APPENDICES

Initial Study/Mitigated Negative Declaration
Golden Meadows Parkway Tanks Project
Menifee, California

Prepared for
Eastern Municipal Water District
2270 Trumble Road
Perris, CA 92572-8300

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APPENDICES

APPENDIX A

Air Quality and Greenhouse Gas CalEEMod Emission Calculation Output, RECON Environmental, Inc.

MODELING PARAMETERS

Construction

Phase	Start Date	End Date	Duration (Days)	Equipment	Notes
Phase 1 Grading	1/2/2023	6/28/2024	390	Tractor/Loader/Backhoe Excavator Dump Truck Delivery Truck	Modeled over entire construction duration
Phase 1 Paving	6/20/2024	6/28/2024	7	Paver Pavign Equipment Roller Concrete Mixer Truck Concrete Boom Pump Truck	Modeled over last 7 days of construction period, simultaneous with other activities
Phase 1 Tank Installation	6/20/2024	6/28/2024	7	Truck Mounted Boom Crane	Modeled over last 7 days of construction period, simultaneous with other activities
Phase 2 Limited Grading	7/1/2024	7/9/2024	7	Tractor/Loader/Backhoe Excavator Dump Truck Delivery Truck	Phase 2 conservatively modeled as beginning right after Phase 1. Grading and paving activities would be very limited to the area around Tank 2, however, as conservative analysis, same equipment assumptions as Phase 1 were modeled.
Phase 2 Limited Paving	7/1/2024	7/9/2024	7	Paver Pavign Equipment Roller Concrete Mixer Truck Concrete Boom Pump Truck	
Phase 2 Tank Installation	7/1/2024	7/9/2024	7	Truck Mounted Boom Crane	

Soil Hauling

291,257	Cubic yards cut
34,402	Cubic yard fill
256,855	Cubic yards export

Modeled over duration of Phase 1 grading

Blasting/Rock Crushing

Phase	Start Date	End Date	Duration (Days)	Equipment	Notes
Phase 1 Blasting/Rock Crushing	1/2/2023	5/5/2023	90	Bore/Drill Rig Crushing/Processing Equipment Dump Truck Excavator	Modeled simlutaneously with first 90 days of Phase 1 Grading.

Vendor Trips

Phase 1 - 25 round trips required to haul all materials to site over first two months of construction.
Modeled as 1 round trip per day over entire construction period, resulting in an overestimation of trips.
Phase 2 - 25 round trips also assumed, over 7 day period tank construction period.

Operation/Maintenance

Maintenance Trips

Per EMWD: maintenance activities tend to be more frequent during the first year of operation due to cycling with the other tanks, seasonal changes, and optimizing the equipment with our Derceto operational calibration, but would be reduced to something more infrequent after that.
Modeled: 1 round trip per weekday (Monday - Friday), 20 mile trip length

Maintenance Vehicles

Defaults adjusted to account for light-heavy-duty and medium-heavy-duty vehicles only.

	CalEEMod Default	Adjusted
LHD1	2.59060%	58.15823%
LHD2	0.71910%	16.14359%
MHD	1.14470%	25.69819%
	4.45440%	100.00000%

PHASE 1		ROG	Nox	CO	Sox	PM10	PM2.5
Phase 1 Grading 2023	On-Site	0.9199	7.1346	9.0448	0.0223	0.3968	0.2903
	Off-Site	0.2009	8.7497	2.6197	0.0463	1.6563	0.5214
	Total	1.1208	15.8843	11.6645	0.0686	2.0531	0.8117
Phase 1 Grading 2024	On-Site	0.8971	6.6601	9.0181	0.0223	0.3714	0.267
	Off-Site	0.1983	8.7721	2.6252	0.0455	1.6556	0.5208
	Total	1.0954	15.4322	11.6433	0.0678	2.027	0.7878
Phase 1 Paving 2024	On-Site	0.8587	7.709	11.341	0.0187	0.3659	0.3471
	Off-Site	0.0416	0.0271	0.3628	0.00112	0.146	0.0391
	Total	0.9003	7.7361	11.7038	0.01982	0.5119	0.3862
Phase 1 Tank Construction 2024	On-Site	0.3318	3.5043	1.7747	0.00577	0.1458	0.1341
	Off-Site	0.3266	0.2128	2.8465	0.0088	1.1452	0.3071
	Total	0.6584	3.7171	4.6212	0.01457	1.291	0.4412
Phase 1 2023 Max Without Blasting/Crushing	On-Site	0.9199	7.1346	9.0448	0.0223	0.3968	0.2903
	Off-Site	0.2009	8.7497	2.6197	0.0463	1.6563	0.5214
	Total	1.1208	15.8843	11.6645	0.0686	2.0531	0.8117
Phase 1 2024 Max	On-Site	2.0876	17.8734	22.1338	0.04677	0.8831	0.7482
	Off-Site	0.5665	9.012	5.8345	0.05542	2.9468	0.867
	Total	2.6541	26.8854	27.9683	0.10219	3.8299	1.6152
PHASE 2							
Phase 2 Limited Grading 2024	On-Site	0.8971	6.6601	9.0181	0.0223	1.1217	0.3444
	Off-Site	0.032	0.0209	0.2791	0.00086	0.1123	0.0301
	Total	0.9291	6.681	9.2972	0.02316	1.234	0.3745
Phase 2 Limited Paving 2024	On-Site	1.0115	9.2513	13.0812	0.0275	0.4145	0.3908
	Off-Site	0.0416	0.0271	0.3628	0.00112	0.146	0.0391
	Total	1.0531	9.2784	13.444	0.02862	0.5605	0.4299
Phase 2 Tank Construction 2024	On-Site	0.2903	3.0663	1.5529	0.00505	0.1276	0.1174
	Off-Site	0.3349	0.4901	2.9565	0.0102	1.1987	0.324
	Total	0.6252	3.5564	4.5094	0.01525	1.3263	0.4414
Phase 2 2024 Max	On-Site	2.1989	18.9777	23.6522	0.05485	1.6638	0.8526
	Off-Site	0.4085	0.5381	3.5984	0.01218	1.457	0.3932
	Total	2.6074	19.5158	27.2506	0.06703	3.1208	1.2458

		ROG	Nox	CO	Sox	PM10	PM2.5
Phase 1 Blasting 2023	On-Site	0.9285	7.0471	9.8781	0.0224	0.3139	0.3025
	Off-Site	0.0342	0.0234	0.2979	0.00089	0.1123	0.0301
	Total	0.9627	7.0705	10.176	0.02329	0.4262	0.3326
Phase 1 2023 Max With Blasting/Crushing	On-Site	1.8484	14.1817	18.9229	0.0447	0.7107	0.5928
	Off-Site	0.2351	8.7731	2.9176	0.04719	1.7686	0.5515
	Total	2.0835	22.9548	21.8405	0.09189	2.4793	1.1443

Operation

Winter	ROG	Nox	CO	Sox	PM10	PM2.5
Area	5.4518	0.00023	0.0249	0	0.00009	0.00009
Energy	0	0	0	0	0	0
Mobile	0.00999	0.02	0.1257	0.00034	0.0378	0.0103
Total	5.46179	0.02023	0.1506	0.00034	0.03789	0.01039

Summer	ROG	Nox	CO	Sox	PM10	PM2.5
Area	5.4518	0.00023	0.0249	0	0.00009	0.00009
Energy	0	0	0	0	0	0
Mobile	0.0112	0.0188	0.1461	0.00036	0.0378	0.0103
Total	5.463	0.01903	0.171	0.00036	0.03789	0.01039

Construction	MT CO2E
Phase 1 2023 - Grading	864
Phase 1 2023 - Blasting	92
Phase 1 2024 - Grading	427
Phase 1 2024 - Paving	6
Phase 1 2024 - Tank Construction	5
Phase 1 2023 Total	956
Phase 1 2024 Total	438
Phase 2 2024 - Limited Grading	7
Phase 2 2024 - Limited Paving	9
Phase 2 2024 - Tank Construction	5
Phase 2 2024 Total	21
Phase 1 + 2 Total	1,416
Amortized over 30 Years	47

Total Project Emissions	MT CO2E
Mobile	4
Energy	127
Area	0
Water and Wastewater	15
Solid Waste	0
Construction	47
Total	194

9295.7 Golden Meadows - Riverside-South Coast County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

9295.7 Golden Meadows

Riverside-South Coast County, Winter

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
General Heavy Industry	243.94	1000sqft	5.60	243,936.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.4	**Precipitation Freq (Days)**	28
Climate Zone	10			**Operational Year**	2024
Utility Company	Southern California Edison				
CO2 Intensity (lb/MWhr)	390.98	**CH4 Intensity (lb/MWhr)**	0.033	**N2O Intensity (lb/MWhr)**	0.004

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - 5.6-acre site

Construction Phase - Phase 1: Grading - 18 months, Paving - 7 days, Tank 2 Construction - 7 days
Phase 2: Limited Grading - 7 days, Limited Paving - 7 days, Tank 2 Construction - 7 days

Off-road Equipment - Tractor/Loader/Backhoe, Excavator, Dump Truck, Delivery Truck

Off-road Equipment - Tractor/Loader/Backhoe, Excavator, Dump Truck, Delivery Truck

Off-road Equipment - Paver, Paving Equipment, Roller, Concrete Mixer Truck, Concrete Boom Pump Truck

Off-road Equipment - Truck Mounted Boom Crane

Off-road Equipment - Tractor/Loader/Backhoe, Excavator, Dump Truck, Delivery Truck

Off-road Equipment - Paver, Paving Equipment, Roller, Concrete Mixer Truck, Concrete Boom Pump Truck

Off-road Equipment - Truck Mounted Boom Crane

9295.7 Golden Meadows - Riverside-South Coast County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Trips and VMT - Phase 1 - 25 round trips total over 1st 2 months of construction
Modeled as 1 round trip per day over entire grading period for worst-case scenario
Phase 2 - 25 round trips over 7 day construction

Grading - 5.6 acres

Vehicle Trips - Minimal maintenance trips only - One weekday round trip per day modeled, 20 mile trip length

Energy Use - Electric loads at the tank site are nominal

Water And Wastewater - 4 million gallons modeled to account for any required tank drainage

Solid Waste - No solid wate generation anticipated

Construction Off-road Equipment Mitigation -

Fleet Mix - LHD1, LHD2, and MHD maintenance vehicles only

Table Name	Column Name	Default Value	New Value
tblConstDustMitigation	WaterUnpavedRoadVehicleSpeed	0	15
tblConstructionPhase	NumDays	20.00	390.00
tblConstructionPhase	NumDays	230.00	7.00
tblConstructionPhase	NumDays	20.00	7.00
tblConstructionPhase	NumDays	20.00	7.00
tblConstructionPhase	NumDays	230.00	7.00
tblConstructionPhase	NumDays	20.00	7.00
tblConstructionPhase	PhaseEndDate	1/27/2023	6/28/2024
tblConstructionPhase	PhaseEndDate	1/12/2024	6/28/2024
tblConstructionPhase	PhaseEndDate	12/27/2024	6/28/2024
tblConstructionPhase	PhaseEndDate	2/24/2023	7/9/2024
tblConstructionPhase	PhaseEndDate	11/29/2024	7/9/2024
tblConstructionPhase	PhaseEndDate	1/24/2025	7/9/2024
tblConstructionPhase	PhaseStartDate	2/25/2023	6/20/2024
tblConstructionPhase	PhaseStartDate	11/30/2024	6/20/2024
tblConstructionPhase	PhaseStartDate	1/28/2023	7/1/2024
tblConstructionPhase	PhaseStartDate	1/13/2024	7/1/2024
tblConstructionPhase	PhaseStartDate	12/28/2024	7/1/2024

9295.7 Golden Meadows - Riverside-South Coast County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

tblEnergyUse	NT24E	5.02	0.00
tblEnergyUse	NT24NG	17.13	0.00
tblEnergyUse	T24E	1.97	0.00
tblEnergyUse	T24NG	15.20	0.00
tblGrading	AcresOfGrading	0.00	5.60
tblGrading	AcresOfGrading	0.00	5.60
tblGrading	MaterialExported	0.00	255,257.00
tblOffRoadEquipment	LoadFactor	0.38	0.38
tblOffRoadEquipment	LoadFactor	0.38	0.38
tblOffRoadEquipment	LoadFactor	0.50	0.50
tblOffRoadEquipment	OffRoadEquipmentType		Dumpers/Tenders
tblOffRoadEquipment	OffRoadEquipmentType		Off-Highway Trucks
tblOffRoadEquipment	OffRoadEquipmentType		Cement and Mortar Mixers
tblOffRoadEquipment	OffRoadEquipmentType		Pumps
tblOffRoadEquipment	OffRoadEquipmentType		Dumpers/Tenders
tblOffRoadEquipment	OffRoadEquipmentType		Off-Highway Trucks
tblOffRoadEquipment	OffRoadEquipmentType		Bore/Drill Rigs
tblOffRoadEquipment	OffRoadEquipmentType		Pumps
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	UsageHours	7.00	8.00
tblSolidWaste	SolidWasteGenerationRate	302.49	0.00
tblTripsAndVMT	VendorTripNumber	0.00	2.00
tblTripsAndVMT	VendorTripNumber	40.00	0.00
tblTripsAndVMT	VendorTripNumber	40.00	8.00
tblVehicleTrips	CC_TL	8.40	20.00
tblVehicleTrips	CNW_TL	6.90	20.00
tblVehicleTrips	CW_TL	16.60	20.00
tblVehicleTrips	DV_TP	5.00	0.00
tblVehicleTrips	PB_TP	3.00	0.00
tblVehicleTrips	PR_TP	92.00	100.00
tblVehicleTrips	ST_TR	6.42	0.00
tblVehicleTrips	SU_TR	5.09	0.00
tblVehicleTrips	WD_TR	3.93	0.01
tblWater	IndoorWaterUseRate	56,411,125.00	4,000,000.00

2.0 Emissions Summary

9295.7 Golden Meadows - Riverside-South Coast County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

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					
2023	1.1208	15.8843	11.6645	0.0686	1.6546	0.3985	2.0531	0.4401	0.3717	0.8117	0.0000	7,085.4765	7,085.4765	0.7519	0.7656	7,332.4091
2024	2.6542	26.8855	27.9683	0.1022	2.9399	0.8899	3.8299	0.7810	0.8343	1.6152	0.0000	10,364.5037	10,364.5037	1.5503	0.7787	10,630.3146
Maximum	**2.6542**	**26.8855**	**27.9683**	**0.1022**	**2.9399**	**0.8899**	**3.8299**	**0.7810**	**0.8343**	**1.6152**	**0.0000**	**10,364.5037**	**10,364.5037**	**1.5503**	**0.7787**	**10,630.3146**

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					
2023	1.1208	15.8843	11.6645	0.0686	1.6006	0.3985	1.9991	0.4323	0.3717	0.8039	0.0000	7,085.4765	7,085.4765	0.7519	0.7656	7,332.4091
2024	2.6542	26.8855	27.9683	0.1022	2.8860	0.8899	3.7759	0.7732	0.8343	1.6074	0.0000	10,364.5037	10,364.5037	1.5503	0.7787	10,630.3146
Maximum	**2.6542**	**26.8855**	**27.9683**	**0.1022**	**2.8860**	**0.8899**	**3.7759**	**0.7732**	**0.8343**	**1.6074**	**0.0000**	**10,364.5037**	**10,364.5037**	**1.5503**	**0.7787**	**10,630.3146**

9295.7 Golden Meadows - Riverside-South Coast County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

	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	2.35	0.00	1.83	1.28	0.00	0.64	0.00	0.00	0.00	0.00	0.00	0.00

9295.7 Golden Meadows - Riverside-South Coast County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

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	5.4518	2.3000e-004	0.0249	0.0000		9.0000e-005	9.0000e-005		9.0000e-005	9.0000e-005		0.0534	0.0534	1.4000e-004		0.0569
Energy	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
Mobile	9.9900e-003	0.0200	0.1257	3.4000e-004	0.0375	2.7000e-004	0.0378	0.0100	2.5000e-004	0.0103		34.8945	34.8945	1.5000e-003	1.5800e-003	35.4016
Total	**5.4618**	**0.0202**	**0.1506**	**3.4000e-004**	**0.0375**	**3.6000e-004**	**0.0379**	**0.0100**	**3.4000e-004**	**0.0104**		**34.9479**	**34.9479**	**1.6400e-003**	**1.5800e-003**	**35.4585**

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	5.4518	2.3000e-004	0.0249	0.0000		9.0000e-005	9.0000e-005		9.0000e-005	9.0000e-005		0.0534	0.0534	1.4000e-004		0.0569
Energy	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
Mobile	9.9900e-003	0.0200	0.1257	3.4000e-004	0.0375	2.7000e-004	0.0378	0.0100	2.5000e-004	0.0103		34.8945	34.8945	1.5000e-003	1.5800e-003	35.4016
Total	**5.4618**	**0.0202**	**0.1506**	**3.4000e-004**	**0.0375**	**3.6000e-004**	**0.0379**	**0.0100**	**3.4000e-004**	**0.0104**		**34.9479**	**34.9479**	**1.6400e-003**	**1.5800e-003**	**35.4585**

9295.7 Golden Meadows - Riverside-South Coast County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

	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	Phase 1 - Grading	Grading	1/2/2023	6/28/2024	5	390	
2	Phase 1 - Tank Construction	Building Construction	6/20/2024	6/28/2024	5	7	
3	Phase 1 - Paving	Paving	6/20/2024	6/28/2024	5	7	
4	Phase 2 - Limited Grading	Grading	7/1/2024	7/9/2024	5	7	
5	Phase 2 - Tank Construction	Building Construction	7/1/2024	7/9/2024	5	7	
6	Phase 2 - Limited Paving	Paving	7/1/2024	7/9/2024	5	7	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 5.6

Acres of Paving: 0

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Phase 1 - Grading	Dumpers/Tenders	1	8.00	16	0.38
Phase 1 - Grading	Excavators	1	8.00	158	0.38
Phase 1 - Grading	Graders	0	8.00	187	0.41
Phase 1 - Grading	Off-Highway Trucks	1	8.00	402	0.38
Phase 1 - Grading	Rubber Tired Dozers	0	8.00	247	0.40

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Phase 1 - Grading	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Phase 1 - Tank Construction	Cranes	1	8.00	231	0.29
Phase 1 - Tank Construction	Forklifts	0	8.00	89	0.20
Phase 1 - Tank Construction	Generator Sets	0	8.00	84	0.74
Phase 1 - Tank Construction	Tractors/Loaders/Backhoes	0	7.00	97	0.37
Phase 1 - Tank Construction	Welders	0	8.00	46	0.45
Phase 1 - Paving	Cement and Mortar Mixers	1	8.00	9	0.56
Phase 1 - Paving	Pavers	1	8.00	130	0.42
Phase 1 - Paving	Paving Equipment	1	8.00	132	0.36
Phase 1 - Paving	Pumps	1	8.00	84	0.74
Phase 1 - Paving	Rollers	1	8.00	80	0.38
Phase 2 - Limited Grading	Dumpers/Tenders	1	8.00	16	0.38
Phase 2 - Limited Grading	Off-Highway Trucks	1	8.00	402	0.38
Phase 2 - Limited Grading	Excavators	1	8.00	158	0.38
Phase 2 - Limited Grading	Graders	0	8.00	187	0.41
Phase 2 - Limited Paving	Bore/Drill Rigs	1	8.00	221	0.50
Phase 2 - Limited Grading	Rubber Tired Dozers	0	8.00	247	0.40
Phase 2 - Limited Grading	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Phase 2 - Tank Construction	Cranes	1	7.00	231	0.29
Phase 2 - Tank Construction	Forklifts	0	8.00	89	0.20
Phase 2 - Tank Construction	Generator Sets	0	8.00	84	0.74
Phase 2 - Tank Construction	Tractors/Loaders/Backhoes	0	7.00	97	0.37
Phase 2 - Tank Construction	Welders	0	8.00	46	0.45
Phase 2 - Limited Paving	Pumps	1	8.00	84	0.74
Phase 2 - Limited Paving	Pavers	1	8.00	130	0.42
Phase 2 - Limited Paving	Paving Equipment	1	8.00	132	0.36
Phase 2 - Limited Paving	Rollers	1	8.00	80	0.38

Trips and VMT

9295.7 Golden Meadows - Riverside-South Coast County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

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
Phase 1 - Grading	4	10.00	2.00	31,907.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Phase 1 - Tank Construction	1	102.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Phase 1 - Paving	5	13.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Phase 2 - Limited Grading	4	10.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Phase 2 - Tank Construction	1	102.00	8.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Phase 2 - Limited Paving	5	13.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Water Exposed Area

Reduce Vehicle Speed on Unpaved Roads

3.2 Phase 1 - Grading - 2023

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					0.0981	0.0000	0.0981	0.0142	0.0000	0.0142			0.0000			0.0000
Off-Road	0.9199	7.1346	9.0448	0.0223		0.2987	0.2987		0.2761	0.2761		2,148.9104	2,148.9104	0.6818		2,165.9562
Total	**0.9199**	**7.1346**	**9.0448**	**0.0223**	**0.0981**	**0.2987**	**0.3968**	**0.0142**	**0.2761**	**0.2903**		**2,148.9104**	**2,148.9104**	**0.6818**		**2,165.9562**

9295.7 Golden Meadows - Riverside-South Coast County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.2 Phase 1 - Grading - 2023

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	0.1646	8.6570	2.2940	0.0450	1.4319	0.0988	1.5306	0.3926	0.0945	0.4870		4,808.2489	4,808.2489	0.0674	0.7577	5,035.7165
Vendor	2.0900e-003	0.0693	0.0278	3.5000e-004	0.0128	5.7000e-004	0.0134	3.6900e-003	5.5000e-004	4.2300e-003		37.1462	37.1462	3.7000e-004	5.4900e-003	38.7926
Worker	0.0342	0.0234	0.2979	8.9000e-004	0.1118	5.2000e-004	0.1123	0.0296	4.8000e-004	0.0301		91.1710	91.1710	2.2900e-003	2.4000e-003	91.9438
Total	**0.2009**	**8.7497**	**2.6197**	**0.0463**	**1.5565**	**0.0998**	**1.6563**	**0.4259**	**0.0955**	**0.5214**		**4,936.5661**	**4,936.5661**	**0.0701**	**0.7656**	**5,166.4529**

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					0.0442	0.0000	0.0442	6.3900e-003	0.0000	6.3900e-003			0.0000			0.0000
Off-Road	0.9199	7.1346	9.0448	0.0223		0.2987	0.2987		0.2761	0.2761	0.0000	2,148.9104	2,148.9104	0.6818		2,165.9562
Total	**0.9199**	**7.1346**	**9.0448**	**0.0223**	**0.0442**	**0.2987**	**0.3428**	**6.3900e-003**	**0.2761**	**0.2825**	**0.0000**	**2,148.9104**	**2,148.9104**	**0.6818**		**2,165.9562**

9295.7 Golden Meadows - Riverside-South Coast County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.2 Phase 1 - Grading - 2023

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	0.1646	8.6570	2.2940	0.0450	1.4319	0.0988	1.5306	0.3926	0.0945	0.4870		4,808.2489	4,808.2489	0.0674	0.7577	5,035.7165
Vendor	2.0900e-003	0.0693	0.0278	3.5000e-004	0.0128	5.7000e-004	0.0134	3.6900e-003	5.5000e-004	4.2300e-003		37.1462	37.1462	3.7000e-004	5.4900e-003	38.7926
Worker	0.0342	0.0234	0.2979	8.9000e-004	0.1118	5.2000e-004	0.1123	0.0296	4.8000e-004	0.0301		91.1710	91.1710	2.2900e-003	2.4000e-003	91.9438
Total	**0.2009**	**8.7497**	**2.6197**	**0.0463**	**1.5565**	**0.0998**	**1.6563**	**0.4259**	**0.0955**	**0.5214**		**4,936.5661**	**4,936.5661**	**0.0701**	**0.7656**	**5,166.4529**

3.2 Phase 1 - Grading - 2024

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					0.0981	0.0000	0.0981	0.0142	0.0000	0.0142			0.0000			0.0000
Off-Road	0.8971	6.6601	9.0181	0.0223		0.2733	0.2733		0.2528	0.2528		2,149.7246	2,149.7246	0.6821		2,166.7770
Total	**0.8971**	**6.6601**	**9.0181**	**0.0223**	**0.0981**	**0.2733**	**0.3714**	**0.0142**	**0.2528**	**0.2670**		**2,149.7246**	**2,149.7246**	**0.6821**		**2,166.7770**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.2 Phase 1 - Grading - 2024

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	0.1642	8.6820	2.3187	0.0443	1.4318	0.0982	1.5300	0.3925	0.0939	0.4865		4,729.7248	4,729.7248	0.0712	0.7455	4,953.6488
Vendor	2.0500e-003	0.0693	0.0275	3.4000e-004	0.0128	5.7000e-004	0.0134	3.6900e-003	5.4000e-004	4.2300e-003		36.5743	36.5743	3.8000e-004	5.4000e-003	38.1933
Worker	0.0320	0.0209	0.2791	8.6000e-004	0.1118	5.0000e-004	0.1123	0.0296	4.6000e-004	0.0301		88.9879	88.9879	2.0800e-003	2.2300e-003	89.7044
Total	**0.1983**	**8.7721**	**2.6252**	**0.0455**	**1.5564**	**0.0992**	**1.6556**	**0.4259**	**0.0949**	**0.5208**		**4,855.2870**	**4,855.2870**	**0.0736**	**0.7531**	**5,081.5464**

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					0.0442	0.0000	0.0442	6.3900e-003	0.0000	6.3900e-003			0.0000			0.0000
Off-Road	0.8971	6.6601	9.0181	0.0223		0.2733	0.2733		0.2528	0.2528	0.0000	2,149.7246	2,149.7246	0.6821		2,166.7770
Total	**0.8971**	**6.6601**	**9.0181**	**0.0223**	**0.0442**	**0.2733**	**0.3174**	**6.3900e-003**	**0.2528**	**0.2592**	**0.0000**	**2,149.7246**	**2,149.7246**	**0.6821**		**2,166.7770**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.2 Phase 1 - Grading - 2024

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	0.1642	8.6820	2.3187	0.0443	1.4318	0.0982	1.5300	0.3925	0.0939	0.4865		4,729.7248	4,729.7248	0.0712	0.7455	4,953.6488
Vendor	2.0500e-003	0.0693	0.0275	3.4000e-004	0.0128	5.7000e-004	0.0134	3.6900e-003	5.4000e-004	4.2300e-003		36.5743	36.5743	3.8000e-004	5.4000e-003	38.1933
Worker	0.0320	0.0209	0.2791	8.6000e-004	0.1118	5.0000e-004	0.1123	0.0296	4.6000e-004	0.0301		88.9879	88.9879	2.0800e-003	2.2300e-003	89.7044
Total	**0.1983**	**8.7721**	**2.6252**	**0.0455**	**1.5564**	**0.0992**	**1.6556**	**0.4259**	**0.0949**	**0.5208**		**4,855.2870**	**4,855.2870**	**0.0736**	**0.7531**	**5,081.5464**

3.3 Phase 1 - Tank Construction - 2024

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	0.3318	3.5043	1.7747	5.7700e-003		0.1458	0.1458		0.1341	0.1341		558.8073	558.8073	0.1807		563.3256
Total	**0.3318**	**3.5043**	**1.7747**	**5.7700e-003**		**0.1458**	**0.1458**		**0.1341**	**0.1341**		**558.8073**	**558.8073**	**0.1807**		**563.3256**

9295.7 Golden Meadows - Riverside-South Coast County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.3 Phase 1 - Tank Construction - 2024

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	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
Worker	0.3266	0.2128	2.8465	8.8000e-003	1.1401	5.1100e-003	1.1452	0.3024	4.7000e-003	0.3071		907.6761	907.6761	0.0212	0.0228	914.9845
Total	**0.3266**	**0.2128**	**2.8465**	**8.8000e-003**	**1.1401**	**5.1100e-003**	**1.1452**	**0.3024**	**4.7000e-003**	**0.3071**		**907.6761**	**907.6761**	**0.0212**	**0.0228**	**914.9845**

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	0.3318	3.5043	1.7747	5.7700e-003		0.1458	0.1458		0.1341	0.1341	0.0000	558.8073	558.8073	0.1807		563.3256
Total	**0.3318**	**3.5043**	**1.7747**	**5.7700e-003**		**0.1458**	**0.1458**		**0.1341**	**0.1341**	**0.0000**	**558.8073**	**558.8073**	**0.1807**		**563.3256**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.3 Phase 1 - Tank Construction - 2024

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	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
Worker	0.3266	0.2128	2.8465	8.8000e-003	1.1401	5.1100e-003	1.1452	0.3024	4.7000e-003	0.3071		907.6761	907.6761	0.0212	0.0228	914.9845
Total	**0.3266**	**0.2128**	**2.8465**	**8.8000e-003**	**1.1401**	**5.1100e-003**	**1.1452**	**0.3024**	**4.7000e-003**	**0.3071**		**907.6761**	**907.6761**	**0.0212**	**0.0228**	**914.9845**

3.4 Phase 1 - Paving - 2024

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	0.8587	7.7090	11.3410	0.0187		0.3659	0.3659		0.3471	0.3471		1,777.3245	1,777.3245	0.3896		1,787.0654
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**0.8587**	**7.7090**	**11.3410**	**0.0187**		**0.3659**	**0.3659**		**0.3471**	**0.3471**		**1,777.3245**	**1,777.3245**	**0.3896**		**1,787.0654**

9295.7 Golden Meadows - Riverside-South Coast County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.4 Phase 1 - Paving - 2024

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	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
Worker	0.0416	0.0271	0.3628	1.1200e-003	0.1453	6.5000e-004	0.1460	0.0385	6.0000e-004	0.0391		115.6842	115.6842	2.7000e-003	2.9000e-003	116.6157
Total	**0.0416**	**0.0271**	**0.3628**	**1.1200e-003**	**0.1453**	**6.5000e-004**	**0.1460**	**0.0385**	**6.0000e-004**	**0.0391**		**115.6842**	**115.6842**	**2.7000e-003**	**2.9000e-003**	**116.6157**

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	0.8587	7.7090	11.3410	0.0187		0.3659	0.3659		0.3471	0.3471	0.0000	1,777.3245	1,777.3245	0.3896		1,787.0654
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**0.8587**	**7.7090**	**11.3410**	**0.0187**		**0.3659**	**0.3659**		**0.3471**	**0.3471**	**0.0000**	**1,777.3245**	**1,777.3245**	**0.3896**		**1,787.0654**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.4 Phase 1 - Paving - 2024

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	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
Worker	0.0416	0.0271	0.3628	1.1200e-003	0.1453	6.5000e-004	0.1460	0.0385	6.0000e-004	0.0391		115.6842	115.6842	2.7000e-003	2.9000e-003	116.6157
Total	**0.0416**	**0.0271**	**0.3628**	**1.1200e-003**	**0.1453**	**6.5000e-004**	**0.1460**	**0.0385**	**6.0000e-004**	**0.0391**		**115.6842**	**115.6842**	**2.7000e-003**	**2.9000e-003**	**116.6157**

3.5 Phase 2 - Limited Grading - 2024

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					0.8484	0.0000	0.8484	0.0916	0.0000	0.0916			0.0000			0.0000
Off-Road	0.8971	6.6601	9.0181	0.0223		0.2733	0.2733		0.2528	0.2528		2,149.7246	2,149.7246	0.6821		2,166.7770
Total	**0.8971**	**6.6601**	**9.0181**	**0.0223**	**0.8484**	**0.2733**	**1.1217**	**0.0916**	**0.2528**	**0.3444**		**2,149.7246**	**2,149.7246**	**0.6821**		**2,166.7770**

9295.7 Golden Meadows - Riverside-South Coast County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.5 Phase 2 - Limited Grading - 2024

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	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
Worker	0.0320	0.0209	0.2791	8.6000e-004	0.1118	5.0000e-004	0.1123	0.0296	4.6000e-004	0.0301		88.9879	88.9879	2.0800e-003	2.2300e-003	89.7044
Total	**0.0320**	**0.0209**	**0.2791**	**8.6000e-004**	**0.1118**	**5.0000e-004**	**0.1123**	**0.0296**	**4.6000e-004**	**0.0301**		**88.9879**	**88.9879**	**2.0800e-003**	**2.2300e-003**	**89.7044**

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					0.3818	0.0000	0.3818	0.0412	0.0000	0.0412			0.0000			0.0000
Off-Road	0.8971	6.6601	9.0181	0.0223		0.2733	0.2733		0.2528	0.2528	0.0000	2,149.7246	2,149.7246	0.6821		2,166.7770
Total	**0.8971**	**6.6601**	**9.0181**	**0.0223**	**0.3818**	**0.2733**	**0.6550**	**0.0412**	**0.2528**	**0.2940**	**0.0000**	**2,149.7246**	**2,149.7246**	**0.6821**		**2,166.7770**

9295.7 Golden Meadows - Riverside-South Coast County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.5 Phase 2 - Limited Grading - 2024

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	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
Worker	0.0320	0.0209	0.2791	8.6000e-004	0.1118	5.0000e-004	0.1123	0.0296	4.6000e-004	0.0301		88.9879	88.9879	2.0800e-003	2.2300e-003	89.7044
Total	**0.0320**	**0.0209**	**0.2791**	**8.6000e-004**	**0.1118**	**5.0000e-004**	**0.1123**	**0.0296**	**4.6000e-004**	**0.0301**		**88.9879**	**88.9879**	**2.0800e-003**	**2.2300e-003**	**89.7044**

3.6 Phase 2 - Tank Construction - 2024

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	0.2903	3.0663	1.5529	5.0500e-003		0.1276	0.1276		0.1174	0.1174		488.9564	488.9564	0.1581		492.9099
Total	**0.2903**	**3.0663**	**1.5529**	**5.0500e-003**		**0.1276**	**0.1276**		**0.1174**	**0.1174**		**488.9564**	**488.9564**	**0.1581**		**492.9099**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.6 Phase 2 - Tank Construction - 2024

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	0.0000
Vendor	8.2100e-003	0.2772	0.1100	1.3800e-003	0.0512	2.2700e-003	0.0535	0.0148	2.1700e-003	0.0169		146.2972	146.2972	1.5300e-003	0.0216	152.7733
Worker	0.3266	0.2128	2.8465	8.8000e-003	1.1401	5.1100e-003	1.1452	0.3024	4.7000e-003	0.3071		907.6761	907.6761	0.0212	0.0228	914.9845
Total	**0.3349**	**0.4901**	**2.9565**	**0.0102**	**1.1914**	**7.3800e-003**	**1.1987**	**0.3171**	**6.8700e-003**	**0.3240**		**1,053.9733**	**1,053.9733**	**0.0227**	**0.0444**	**1,067.7578**

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	0.2903	3.0663	1.5529	5.0500e-003		0.1276	0.1276		0.1174	0.1174	0.0000	488.9564	488.9564	0.1581		492.9099
Total	**0.2903**	**3.0663**	**1.5529**	**5.0500e-003**		**0.1276**	**0.1276**		**0.1174**	**0.1174**	**0.0000**	**488.9564**	**488.9564**	**0.1581**		**492.9099**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.6 Phase 2 - Tank Construction - 2024

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	0.0000
Vendor	8.2100e-003	0.2772	0.1100	1.3800e-003	0.0512	2.2700e-003	0.0535	0.0148	2.1700e-003	0.0169		146.2972	146.2972	1.5300e-003	0.0216	152.7733
Worker	0.3266	0.2128	2.8465	8.8000e-003	1.1401	5.1100e-003	1.1452	0.3024	4.7000e-003	0.3071		907.6761	907.6761	0.0212	0.0228	914.9845
Total	**0.3349**	**0.4901**	**2.9565**	**0.0102**	**1.1914**	**7.3800e-003**	**1.1987**	**0.3171**	**6.8700e-003**	**0.3240**		**1,053.9733**	**1,053.9733**	**0.0227**	**0.0444**	**1,067.7578**

3.7 Phase 2 - Limited Paving - 2024

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	1.0115	9.2513	13.0812	0.0275		0.4145	0.4145		0.3908	0.3908		2,648.7583	2,648.7583	0.6826		2,665.8225
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**1.0115**	**9.2513**	**13.0812**	**0.0275**		**0.4145**	**0.4145**		**0.3908**	**0.3908**		**2,648.7583**	**2,648.7583**	**0.6826**		**2,665.8225**

9295.7 Golden Meadows - Riverside-South Coast County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.7 Phase 2 - Limited Paving - 2024

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	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
Worker	0.0416	0.0271	0.3628	1.1200e-003	0.1453	6.5000e-004	0.1460	0.0385	6.0000e-004	0.0391		115.6842	115.6842	2.7000e-003	2.9000e-003	116.6157
Total	**0.0416**	**0.0271**	**0.3628**	**1.1200e-003**	**0.1453**	**6.5000e-004**	**0.1460**	**0.0385**	**6.0000e-004**	**0.0391**		**115.6842**	**115.6842**	**2.7000e-003**	**2.9000e-003**	**116.6157**

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	1.0115	9.2513	13.0812	0.0275		0.4145	0.4145		0.3908	0.3908	0.0000	2,648.7583	2,648.7583	0.6826		2,665.8225
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**1.0115**	**9.2513**	**13.0812**	**0.0275**		**0.4145**	**0.4145**		**0.3908**	**0.3908**	**0.0000**	**2,648.7583**	**2,648.7583**	**0.6826**		**2,665.8225**

9295.7 Golden Meadows - Riverside-South Coast County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.7 Phase 2 - Limited Paving - 2024

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	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
Worker	0.0416	0.0271	0.3628	1.1200e-003	0.1453	6.5000e-004	0.1460	0.0385	6.0000e-004	0.0391		115.6842	115.6842	2.7000e-003	2.9000e-003	116.6157
Total	**0.0416**	**0.0271**	**0.3628**	**1.1200e-003**	**0.1453**	**6.5000e-004**	**0.1460**	**0.0385**	**6.0000e-004**	**0.0391**		**115.6842**	**115.6842**	**2.7000e-003**	**2.9000e-003**	**116.6157**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

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	9.9900e-003	0.0200	0.1257	3.4000e-004	0.0375	2.7000e-004	0.0378	0.0100	2.5000e-004	0.0103		34.8945	34.8945	1.5000e-003	1.5800e-003	35.4016
Unmitigated	9.9900e-003	0.0200	0.1257	3.4000e-004	0.0375	2.7000e-004	0.0378	0.0100	2.5000e-004	0.0103		34.8945	34.8945	1.5000e-003	1.5800e-003	35.4016

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
General Heavy Industry	2.44	0.00	0.00	12,685	12,685
Total	2.44	0.00	0.00	12,685	12,685

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
General Heavy Industry	20.00	20.00	20.00	59.00	28.00	13.00	100	0	0

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
General Heavy Industry	0.537845	0.056225	0.173186	0.138405	0.025906	0.007191	0.011447	0.018769	0.000611	0.000309	0.023821	0.001097	0.005189

5.0 Energy Detail

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	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
NaturalGas Unmitigated	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

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					
General Heavy Industry	0	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
Total		**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**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

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	lb/day										lb/day					
General Heavy Industry	0	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
Total		**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**

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	5.4518	2.3000e-004	0.0249	0.0000		9.0000e-005	9.0000e-005		9.0000e-005	9.0000e-005		0.0534	0.0534	1.4000e-004		0.0569
Unmitigated	5.4518	2.3000e-004	0.0249	0.0000		9.0000e-005	9.0000e-005		9.0000e-005	9.0000e-005		0.0534	0.0534	1.4000e-004		0.0569

9295.7 Golden Meadows - Riverside-South Coast County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

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	0.6195					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	4.8299					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	2.3000e-003	2.3000e-004	0.0249	0.0000		9.0000e-005	9.0000e-005		9.0000e-005	9.0000e-005		0.0534	0.0534	1.4000e-004		0.0569
Total	**5.4518**	**2.3000e-004**	**0.0249**	**0.0000**		**9.0000e-005**	**9.0000e-005**		**9.0000e-005**	**9.0000e-005**		**0.0534**	**0.0534**	**1.4000e-004**		**0.0569**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

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	0.6195					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	4.8299					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	2.3000e-003	2.3000e-004	0.0249	0.0000		9.0000e-005	9.0000e-005		9.0000e-005	9.0000e-005		0.0534	0.0534	1.4000e-004		0.0569
Total	**5.4518**	**2.3000e-004**	**0.0249**	**0.0000**		**9.0000e-005**	**9.0000e-005**		**9.0000e-005**	**9.0000e-005**		**0.0534**	**0.0534**	**1.4000e-004**		**0.0569**

7.0 Water Detail

7.1 Mitigation Measures Water

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

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 Stationary Equipment

Fire Pumps and Emergency Generators

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

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

9295.7 Golden Meadows

Riverside-South Coast County, Summer

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
General Heavy Industry	243.94	1000sqft	5.60	243,936.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.4	**Precipitation Freq (Days)**	28
Climate Zone	10			**Operational Year**	2024
Utility Company	Southern California Edison				
CO2 Intensity (lb/MWhr)	390.98	**CH4 Intensity (lb/MWhr)**	0.033	**N2O Intensity (lb/MWhr)**	0.004

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - 5.6-acre site

Construction Phase - Phase 1: Grading - 18 months, Paving - 7 days, Tank 2 Construction - 7 days
Phase 2: Limited Grading - 7 days, Limited Paving - 7 days, Tank 2 Construction - 7 days

Off-road Equipment - Tractor/Loader/Backhoe, Excavator, Dump Truck, Delivery Truck

Off-road Equipment - Tractor/Loader/Backhoe, Excavator, Dump Truck, Delivery Truck

Off-road Equipment - Paver, Paving Equipment, Roller, Concrete Mixer Truck, Concrete Boom Pump Truck

Off-road Equipment - Truck Mounted Boom Crane

Off-road Equipment - Tractor/Loader/Backhoe, Excavator, Dump Truck, Delivery Truck

Off-road Equipment - Paver, Paving Equipment, Roller, Concrete Mixer Truck, Concrete Boom Pump Truck

Off-road Equipment - Truck Mounted Boom Crane

9295.7 Golden Meadows - Riverside-South Coast County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Trips and VMT - Phase 1 - 25 round trips total over 1st 2 months of construction
Modeled as 1 round trip per day over entire grading period for worst-case scenario
Phase 2 - 25 round trips over 7 day construction

Grading - 5.6 acres

Vehicle Trips - Minimal maintenance trips only - One weekday round trip per day modeled, 20 mile trip length

Energy Use - Electric loads at the tank site are nominal

Water And Wastewater - 4 million gallons modeled to account for any required tank drainage

Solid Waste - No solid wate generation anticipated

Construction Off-road Equipment Mitigation -

Fleet Mix - LHD1, LHD2, and MHD maintenance vehicles only

Table Name	Column Name	Default Value	New Value
tblConstDustMitigation	WaterUnpavedRoadVehicleSpeed	0	15
tblConstructionPhase	NumDays	20.00	390.00
tblConstructionPhase	NumDays	230.00	7.00
tblConstructionPhase	NumDays	20.00	7.00
tblConstructionPhase	NumDays	20.00	7.00
tblConstructionPhase	NumDays	230.00	7.00
tblConstructionPhase	NumDays	20.00	7.00
tblConstructionPhase	PhaseEndDate	1/27/2023	6/28/2024
tblConstructionPhase	PhaseEndDate	1/12/2024	6/28/2024
tblConstructionPhase	PhaseEndDate	12/27/2024	6/28/2024
tblConstructionPhase	PhaseEndDate	2/24/2023	7/9/2024
tblConstructionPhase	PhaseEndDate	11/29/2024	7/9/2024
tblConstructionPhase	PhaseEndDate	1/24/2025	7/9/2024
tblConstructionPhase	PhaseStartDate	2/25/2023	6/20/2024
tblConstructionPhase	PhaseStartDate	11/30/2024	6/20/2024
tblConstructionPhase	PhaseStartDate	1/28/2023	7/1/2024
tblConstructionPhase	PhaseStartDate	1/13/2024	7/1/2024
tblConstructionPhase	PhaseStartDate	12/28/2024	7/1/2024

9295.7 Golden Meadows - Riverside-South Coast County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

tblEnergyUse	NT24E	5.02	0.00
tblEnergyUse	NT24NG	17.13	0.00
tblEnergyUse	T24E	1.97	0.00
tblEnergyUse	T24NG	15.20	0.00
tblGrading	AcresOfGrading	0.00	5.60
tblGrading	AcresOfGrading	0.00	5.60
tblGrading	MaterialExported	0.00	255,257.00
tblOffRoadEquipment	LoadFactor	0.38	0.38
tblOffRoadEquipment	LoadFactor	0.38	0.38
tblOffRoadEquipment	LoadFactor	0.50	0.50
tblOffRoadEquipment	OffRoadEquipmentType		Dumpers/Tenders
tblOffRoadEquipment	OffRoadEquipmentType		Off-Highway Trucks
tblOffRoadEquipment	OffRoadEquipmentType		Cement and Mortar Mixers
tblOffRoadEquipment	OffRoadEquipmentType		Pumps
tblOffRoadEquipment	OffRoadEquipmentType		Dumpers/Tenders
tblOffRoadEquipment	OffRoadEquipmentType		Off-Highway Trucks
tblOffRoadEquipment	OffRoadEquipmentType		Bore/Drill Rigs
tblOffRoadEquipment	OffRoadEquipmentType		Pumps
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00

9295.7 Golden Meadows - Riverside-South Coast County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	UsageHours	7.00	8.00
tblSolidWaste	SolidWasteGenerationRate	302.49	0.00
tblTripsAndVMT	VendorTripNumber	0.00	2.00
tblTripsAndVMT	VendorTripNumber	40.00	0.00
tblTripsAndVMT	VendorTripNumber	40.00	8.00
tblVehicleTrips	CC_TL	8.40	20.00
tblVehicleTrips	CNW_TL	6.90	20.00
tblVehicleTrips	CW_TL	16.60	20.00
tblVehicleTrips	DV_TP	5.00	0.00
tblVehicleTrips	PB_TP	3.00	0.00
tblVehicleTrips	PR_TP	92.00	100.00
tblVehicleTrips	ST_TR	6.42	0.00
tblVehicleTrips	SU_TR	5.09	0.00
tblVehicleTrips	WD_TR	3.93	0.01
tblWater	IndoorWaterUseRate	56,411,125.00	4,000,000.00

2.0 Emissions Summary

9295.7 Golden Meadows - Riverside-South Coast County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

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					
2023	1.1377	15.3926	11.6853	0.0686	1.6546	0.3984	2.0529	0.4401	0.3715	0.8116	0.0000	7,087.3259	7,087.3259	0.7526	0.7643	7,333.9006
2024	2.6943	26.3834	28.7259	0.1032	2.9399	0.8898	3.8297	0.7810	0.8341	1.6151	0.0000	10,472.0590	10,472.0590	1.5504	0.7769	10,737.3455
Maximum	**2.6943**	**26.3834**	**28.7259**	**0.1032**	**2.9399**	**0.8898**	**3.8297**	**0.7810**	**0.8341**	**1.6151**	**0.0000**	**10,472.0590**	**10,472.0590**	**1.5504**	**0.7769**	**10,737.3455**

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					
2023	1.1377	15.3926	11.6853	0.0686	1.6006	0.3984	1.9990	0.4323	0.3715	0.8038	0.0000	7,087.3259	7,087.3259	0.7526	0.7643	7,333.9006
2024	2.6943	26.3834	28.7259	0.1032	2.8860	0.8898	3.7758	0.7732	0.8341	1.6073	0.0000	10,472.0590	10,472.0590	1.5504	0.7769	10,737.3455
Maximum	**2.6943**	**26.3834**	**28.7259**	**0.1032**	**2.8860**	**0.8898**	**3.7758**	**0.7732**	**0.8341**	**1.6073**	**0.0000**	**10,472.0590**	**10,472.0590**	**1.5504**	**0.7769**	**10,737.3455**

9295.7 Golden Meadows - Riverside-South Coast County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

	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	2.35	0.00	1.83	1.28	0.00	0.64	0.00	0.00	0.00	0.00	0.00	0.00

9295.7 Golden Meadows - Riverside-South Coast County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

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	5.4518	2.3000e-004	0.0249	0.0000		9.0000e-005	9.0000e-005		9.0000e-005	9.0000e-005		0.0534	0.0534	1.4000e-004		0.0569
Energy	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
Mobile	0.0112	0.0188	0.1461	3.6000e-004	0.0375	2.7000e-004	0.0378	0.0100	2.5000e-004	0.0103		37.6293	37.6293	1.5100e-003	1.5400e-003	38.1273
Total	**5.4629**	**0.0190**	**0.1710**	**3.6000e-004**	**0.0375**	**3.6000e-004**	**0.0379**	**0.0100**	**3.4000e-004**	**0.0104**		**37.6827**	**37.6827**	**1.6500e-003**	**1.5400e-003**	**38.1842**

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	5.4518	2.3000e-004	0.0249	0.0000		9.0000e-005	9.0000e-005		9.0000e-005	9.0000e-005		0.0534	0.0534	1.4000e-004		0.0569
Energy	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
Mobile	0.0112	0.0188	0.1461	3.6000e-004	0.0375	2.7000e-004	0.0378	0.0100	2.5000e-004	0.0103		37.6293	37.6293	1.5100e-003	1.5400e-003	38.1273
Total	**5.4629**	**0.0190**	**0.1710**	**3.6000e-004**	**0.0375**	**3.6000e-004**	**0.0379**	**0.0100**	**3.4000e-004**	**0.0104**		**37.6827**	**37.6827**	**1.6500e-003**	**1.5400e-003**	**38.1842**

9295.7 Golden Meadows - Riverside-South Coast County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

	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	Phase 1 - Grading	Grading	1/2/2023	6/28/2024	5	390	
2	Phase 1 - Tank Construction	Building Construction	6/20/2024	6/28/2024	5	7	
3	Phase 1 - Paving	Paving	6/20/2024	6/28/2024	5	7	
4	Phase 2 - Limited Grading	Grading	7/1/2024	7/9/2024	5	7	
5	Phase 2 - Tank Construction	Building Construction	7/1/2024	7/9/2024	5	7	
6	Phase 2 - Limited Paving	Paving	7/1/2024	7/9/2024	5	7	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 5.6

Acres of Paving: 0

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Phase 1 - Grading	Dumpers/Tenders	1	8.00	16	0.38
Phase 1 - Grading	Excavators	1	8.00	158	0.38
Phase 1 - Grading	Graders	0	8.00	187	0.41
Phase 1 - Grading	Off-Highway Trucks	1	8.00	402	0.38
Phase 1 - Grading	Rubber Tired Dozers	0	8.00	247	0.40

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Phase 1 - Grading	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Phase 1 - Tank Construction	Cranes	1	8.00	231	0.29
Phase 1 - Tank Construction	Forklifts	0	8.00	89	0.20
Phase 1 - Tank Construction	Generator Sets	0	8.00	84	0.74
Phase 1 - Tank Construction	Tractors/Loaders/Backhoes	0	7.00	97	0.37
Phase 1 - Tank Construction	Welders	0	8.00	46	0.45
Phase 1 - Paving	Cement and Mortar Mixers	1	8.00	9	0.56
Phase 1 - Paving	Pavers	1	8.00	130	0.42
Phase 1 - Paving	Paving Equipment	1	8.00	132	0.36
Phase 1 - Paving	Pumps	1	8.00	84	0.74
Phase 1 - Paving	Rollers	1	8.00	80	0.38
Phase 2 - Limited Grading	Dumpers/Tenders	1	8.00	16	0.38
Phase 2 - Limited Grading	Off-Highway Trucks	1	8.00	402	0.38
Phase 2 - Limited Grading	Excavators	1	8.00	158	0.38
Phase 2 - Limited Grading	Graders	0	8.00	187	0.41
Phase 2 - Limited Paving	Bore/Drill Rigs	1	8.00	221	0.50
Phase 2 - Limited Grading	Rubber Tired Dozers	0	8.00	247	0.40
Phase 2 - Limited Grading	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Phase 2 - Tank Construction	Cranes	1	7.00	231	0.29
Phase 2 - Tank Construction	Forklifts	0	8.00	89	0.20
Phase 2 - Tank Construction	Generator Sets	0	8.00	84	0.74
Phase 2 - Tank Construction	Tractors/Loaders/Backhoes	0	7.00	97	0.37
Phase 2 - Tank Construction	Welders	0	8.00	46	0.45
Phase 2 - Limited Paving	Pumps	1	8.00	84	0.74
Phase 2 - Limited Paving	Pavers	1	8.00	130	0.42
Phase 2 - Limited Paving	Paving Equipment	1	8.00	132	0.36
Phase 2 - Limited Paving	Rollers	1	8.00	80	0.38

Trips and VMT

9295.7 Golden Meadows - Riverside-South Coast County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

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
Phase 1 - Grading	4	10.00	2.00	31,907.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Phase 1 - Tank Construction	1	102.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Phase 1 - Paving	5	13.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Phase 2 - Limited Grading	4	10.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Phase 2 - Tank Construction	1	102.00	8.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Phase 2 - Limited Paving	5	13.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Water Exposed Area

Reduce Vehicle Speed on Unpaved Roads

3.2 Phase 1 - Grading - 2023

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					0.0981	0.0000	0.0981	0.0142	0.0000	0.0142			0.0000			0.0000
Off-Road	0.9199	7.1346	9.0448	0.0223		0.2987	0.2987		0.2761	0.2761		2,148.9104	2,148.9104	0.6818		2,165.9562
Total	**0.9199**	**7.1346**	**9.0448**	**0.0223**	**0.0981**	**0.2987**	**0.3968**	**0.0142**	**0.2761**	**0.2903**		**2,148.9104**	**2,148.9104**	**0.6818**		**2,165.9562**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.2 Phase 1 - Grading - 2023

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	0.1790	8.1702	2.2467	0.0450	1.4319	0.0986	1.5305	0.3926	0.0943	0.4869		4,800.7410	4,800.7410	0.0681	0.7565	5,027.8722
Vendor	2.2500e-003	0.0653	0.0269	3.5000e-004	0.0128	5.7000e-004	0.0134	3.6900e-003	5.4000e-004	4.2300e-003		37.0542	37.0542	3.8000e-004	5.4800e-003	38.6954
Worker	0.0365	0.0226	0.3669	9.8000e-004	0.1118	5.2000e-004	0.1123	0.0296	4.8000e-004	0.0301		100.6203	100.6203	2.3000e-003	2.3500e-003	101.3768
Total	**0.2178**	**8.2581**	**2.6404**	**0.0463**	**1.5565**	**0.0997**	**1.6562**	**0.4259**	**0.0954**	**0.5213**		**4,938.4155**	**4,938.4155**	**0.0708**	**0.7643**	**5,167.9444**

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					0.0442	0.0000	0.0442	6.3900e-003	0.0000	6.3900e-003			0.0000			0.0000
Off-Road	0.9199	7.1346	9.0448	0.0223		0.2987	0.2987		0.2761	0.2761	0.0000	2,148.9104	2,148.9104	0.6818		2,165.9562
Total	**0.9199**	**7.1346**	**9.0448**	**0.0223**	**0.0442**	**0.2987**	**0.3428**	**6.3900e-003**	**0.2761**	**0.2825**	**0.0000**	**2,148.9104**	**2,148.9104**	**0.6818**		**2,165.9562**

9295.7 Golden Meadows - Riverside-South Coast County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.2 Phase 1 - Grading - 2023

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	0.1790	8.1702	2.2467	0.0450	1.4319	0.0986	1.5305	0.3926	0.0943	0.4869		4,800.7410	4,800.7410	0.0681	0.7565	5,027.8722
Vendor	2.2500e-003	0.0653	0.0269	3.5000e-004	0.0128	5.7000e-004	0.0134	3.6900e-003	5.4000e-004	4.2300e-003		37.0542	37.0542	3.8000e-004	5.4800e-003	38.6954
Worker	0.0365	0.0226	0.3669	9.8000e-004	0.1118	5.2000e-004	0.1123	0.0296	4.8000e-004	0.0301		100.6203	100.6203	2.3000e-003	2.3500e-003	101.3768
Total	**0.2178**	**8.2581**	**2.6404**	**0.0463**	**1.5565**	**0.0997**	**1.6562**	**0.4259**	**0.0954**	**0.5213**		**4,938.4155**	**4,938.4155**	**0.0708**	**0.7643**	**5,167.9444**

3.2 Phase 1 - Grading - 2024

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					0.0981	0.0000	0.0981	0.0142	0.0000	0.0142			0.0000			0.0000
Off-Road	0.8971	6.6601	9.0181	0.0223		0.2733	0.2733		0.2528	0.2528		2,149.7246	2,149.7246	0.6821		2,166.7770
Total	**0.8971**	**6.6601**	**9.0181**	**0.0223**	**0.0981**	**0.2733**	**0.3714**	**0.0142**	**0.2528**	**0.2670**		**2,149.7246**	**2,149.7246**	**0.6821**		**2,166.7770**

9295.7 Golden Meadows - Riverside-South Coast County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.2 Phase 1 - Grading - 2024

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	0.1787	8.1932	2.2716	0.0442	1.4318	0.0980	1.5298	0.3925	0.0938	0.4863		4,722.3126	4,722.3126	0.0719	0.7443	4,945.9045
Vendor	2.2200e-003	0.0654	0.0266	3.4000e-004	0.0128	5.7000e-004	0.0134	3.6900e-003	5.4000e-004	4.2300e-003		36.4831	36.4831	3.9000e-004	5.3800e-003	38.0970
Worker	0.0341	0.0201	0.3435	9.5000e-004	0.1118	5.0000e-004	0.1123	0.0296	4.6000e-004	0.0301		98.1926	98.1926	2.0800e-003	2.1800e-003	98.8941
Total	**0.2149**	**8.2786**	**2.6417**	**0.0455**	**1.5564**	**0.0991**	**1.6555**	**0.4259**	**0.0948**	**0.5207**		**4,856.9883**	**4,856.9883**	**0.0744**	**0.7518**	**5,082.8956**

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					0.0442	0.0000	0.0442	6.3900e-003	0.0000	6.3900e-003			0.0000			0.0000
Off-Road	0.8971	6.6601	9.0181	0.0223		0.2733	0.2733		0.2528	0.2528	0.0000	2,149.7246	2,149.7246	0.6821		2,166.7770
Total	**0.8971**	**6.6601**	**9.0181**	**0.0223**	**0.0442**	**0.2733**	**0.3174**	**6.3900e-003**	**0.2528**	**0.2592**	**0.0000**	**2,149.7246**	**2,149.7246**	**0.6821**		**2,166.7770**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.2 Phase 1 - Grading - 2024

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	0.1787	8.1932	2.2716	0.0442	1.4318	0.0980	1.5298	0.3925	0.0938	0.4863		4,722.3126	4,722.3126	0.0719	0.7443	4,945.9045
Vendor	2.2200e-003	0.0654	0.0266	3.4000e-004	0.0128	5.7000e-004	0.0134	3.6900e-003	5.4000e-004	4.2300e-003		36.4831	36.4831	3.9000e-004	5.3800e-003	38.0970
Worker	0.0341	0.0201	0.3435	9.5000e-004	0.1118	5.0000e-004	0.1123	0.0296	4.6000e-004	0.0301		98.1926	98.1926	2.0800e-003	2.1800e-003	98.8941
Total	**0.2149**	**8.2786**	**2.6417**	**0.0455**	**1.5564**	**0.0991**	**1.6555**	**0.4259**	**0.0948**	**0.5207**		**4,856.9883**	**4,856.9883**	**0.0744**	**0.7518**	**5,082.8956**

3.3 Phase 1 - Tank Construction - 2024

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	0.3318	3.5043	1.7747	5.7700e-003		0.1458	0.1458		0.1341	0.1341		558.8073	558.8073	0.1807		563.3256
Total	**0.3318**	**3.5043**	**1.7747**	**5.7700e-003**		**0.1458**	**0.1458**		**0.1341**	**0.1341**		**558.8073**	**558.8073**	**0.1807**		**563.3256**

9295.7 Golden Meadows - Riverside-South Coast County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.3 Phase 1 - Tank Construction - 2024

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	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
Worker	0.3474	0.2052	3.5038	9.7100e-003	1.1401	5.1100e-003	1.1452	0.3024	4.7000e-003	0.3071		1,001.5640	1,001.5640	0.0212	0.0222	1,008.7196
Total	**0.3474**	**0.2052**	**3.5038**	**9.7100e-003**	**1.1401**	**5.1100e-003**	**1.1452**	**0.3024**	**4.7000e-003**	**0.3071**		**1,001.5640**	**1,001.5640**	**0.0212**	**0.0222**	**1,008.7196**

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	0.3318	3.5043	1.7747	5.7700e-003		0.1458	0.1458		0.1341	0.1341	0.0000	558.8073	558.8073	0.1807		563.3256
Total	**0.3318**	**3.5043**	**1.7747**	**5.7700e-003**		**0.1458**	**0.1458**		**0.1341**	**0.1341**	**0.0000**	**558.8073**	**558.8073**	**0.1807**		**563.3256**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.3 Phase 1 - Tank Construction - 2024

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	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
Worker	0.3474	0.2052	3.5038	9.7100e-003	1.1401	5.1100e-003	1.1452	0.3024	4.7000e-003	0.3071		1,001.5640	1,001.5640	0.0212	0.0222	1,008.7196
Total	**0.3474**	**0.2052**	**3.5038**	**9.7100e-003**	**1.1401**	**5.1100e-003**	**1.1452**	**0.3024**	**4.7000e-003**	**0.3071**		**1,001.5640**	**1,001.5640**	**0.0212**	**0.0222**	**1,008.7196**

3.4 Phase 1 - Paving - 2024

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	0.8587	7.7090	11.3410	0.0187		0.3659	0.3659		0.3471	0.3471		1,777.3245	1,777.3245	0.3896		1,787.0654
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**0.8587**	**7.7090**	**11.3410**	**0.0187**		**0.3659**	**0.3659**		**0.3471**	**0.3471**		**1,777.3245**	**1,777.3245**	**0.3896**		**1,787.0654**

9295.7 Golden Meadows - Riverside-South Coast County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.4 Phase 1 - Paving - 2024

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	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
Worker	0.0443	0.0262	0.4466	1.2400e-003	0.1453	6.5000e-004	0.1460	0.0385	6.0000e-004	0.0391		127.6503	127.6503	2.7000e-003	2.8300e-003	128.5623
Total	**0.0443**	**0.0262**	**0.4466**	**1.2400e-003**	**0.1453**	**6.5000e-004**	**0.1460**	**0.0385**	**6.0000e-004**	**0.0391**		**127.6503**	**127.6503**	**2.7000e-003**	**2.8300e-003**	**128.5623**

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	0.8587	7.7090	11.3410	0.0187		0.3659	0.3659		0.3471	0.3471	0.0000	1,777.3245	1,777.3245	0.3896		1,787.0654
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**0.8587**	**7.7090**	**11.3410**	**0.0187**		**0.3659**	**0.3659**		**0.3471**	**0.3471**	**0.0000**	**1,777.3245**	**1,777.3245**	**0.3896**		**1,787.0654**

9295.7 Golden Meadows - Riverside-South Coast County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.4 Phase 1 - Paving - 2024

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	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
Worker	0.0443	0.0262	0.4466	1.2400e-003	0.1453	6.5000e-004	0.1460	0.0385	6.0000e-004	0.0391		127.6503	127.6503	2.7000e-003	2.8300e-003	128.5623
Total	**0.0443**	**0.0262**	**0.4466**	**1.2400e-003**	**0.1453**	**6.5000e-004**	**0.1460**	**0.0385**	**6.0000e-004**	**0.0391**		**127.6503**	**127.6503**	**2.7000e-003**	**2.8300e-003**	**128.5623**

3.5 Phase 2 - Limited Grading - 2024

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					0.8484	0.0000	0.8484	0.0916	0.0000	0.0916			0.0000			0.0000
Off-Road	0.8971	6.6601	9.0181	0.0223		0.2733	0.2733		0.2528	0.2528		2,149.7246	2,149.7246	0.6821		2,166.7770
Total	**0.8971**	**6.6601**	**9.0181**	**0.0223**	**0.8484**	**0.2733**	**1.1217**	**0.0916**	**0.2528**	**0.3444**		**2,149.7246**	**2,149.7246**	**0.6821**		**2,166.7770**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.5 Phase 2 - Limited Grading - 2024

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	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
Worker	0.0341	0.0201	0.3435	9.5000e-004	0.1118	5.0000e-004	0.1123	0.0296	4.6000e-004	0.0301		98.1926	98.1926	2.0800e-003	2.1800e-003	98.8941
Total	**0.0341**	**0.0201**	**0.3435**	**9.5000e-004**	**0.1118**	**5.0000e-004**	**0.1123**	**0.0296**	**4.6000e-004**	**0.0301**		**98.1926**	**98.1926**	**2.0800e-003**	**2.1800e-003**	**98.8941**

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					0.3818	0.0000	0.3818	0.0412	0.0000	0.0412			0.0000			0.0000
Off-Road	0.8971	6.6601	9.0181	0.0223		0.2733	0.2733		0.2528	0.2528	0.0000	2,149.7246	2,149.7246	0.6821		2,166.7770
Total	**0.8971**	**6.6601**	**9.0181**	**0.0223**	**0.3818**	**0.2733**	**0.6550**	**0.0412**	**0.2528**	**0.2940**	**0.0000**	**2,149.7246**	**2,149.7246**	**0.6821**		**2,166.7770**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.5 Phase 2 - Limited Grading - 2024

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	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
Worker	0.0341	0.0201	0.3435	9.5000e-004	0.1118	5.0000e-004	0.1123	0.0296	4.6000e-004	0.0301		98.1926	98.1926	2.0800e-003	2.1800e-003	98.8941
Total	**0.0341**	**0.0201**	**0.3435**	**9.5000e-004**	**0.1118**	**5.0000e-004**	**0.1123**	**0.0296**	**4.6000e-004**	**0.0301**		**98.1926**	**98.1926**	**2.0800e-003**	**2.1800e-003**	**98.8941**

3.6 Phase 2 - Tank Construction - 2024

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	0.2903	3.0663	1.5529	5.0500e-003		0.1276	0.1276		0.1174	0.1174		488.9564	488.9564	0.1581		492.9099
Total	**0.2903**	**3.0663**	**1.5529**	**5.0500e-003**		**0.1276**	**0.1276**		**0.1174**	**0.1174**		**488.9564**	**488.9564**	**0.1581**		**492.9099**

9295.7 Golden Meadows - Riverside-South Coast County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.6 Phase 2 - Tank Construction - 2024

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	0.0000
Vendor	8.8800e-003	0.2614	0.1064	1.3800e-003	0.0512	2.2600e-003	0.0535	0.0148	2.1600e-003	0.0169		145.9325	145.9325	1.5600e-003	0.0215	152.3881
Worker	0.3474	0.2052	3.5038	9.7100e-003	1.1401	5.1100e-003	1.1452	0.3024	4.7000e-003	0.3071		1,001.5640	1,001.5640	0.0212	0.0222	1,008.7196
Total	**0.3563**	**0.4666**	**3.6102**	**0.0111**	**1.1914**	**7.3700e-003**	**1.1987**	**0.3171**	**6.8600e-003**	**0.3240**		**1,147.4964**	**1,147.4964**	**0.0228**	**0.0438**	**1,161.1077**

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	0.2903	3.0663	1.5529	5.0500e-003		0.1276	0.1276		0.1174	0.1174	0.0000	488.9564	488.9564	0.1581		492.9099
Total	**0.2903**	**3.0663**	**1.5529**	**5.0500e-003**		**0.1276**	**0.1276**		**0.1174**	**0.1174**	**0.0000**	**488.9564**	**488.9564**	**0.1581**		**492.9099**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.6 Phase 2 - Tank Construction - 2024

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	0.0000
Vendor	8.8800e-003	0.2614	0.1064	1.3800e-003	0.0512	2.2600e-003	0.0535	0.0148	2.1600e-003	0.0169		145.9325	145.9325	1.5600e-003	0.0215	152.3881
Worker	0.3474	0.2052	3.5038	9.7100e-003	1.1401	5.1100e-003	1.1452	0.3024	4.7000e-003	0.3071		1,001.5640	1,001.5640	0.0212	0.0222	1,008.7196
Total	**0.3563**	**0.4666**	**3.6102**	**0.0111**	**1.1914**	**7.3700e-003**	**1.1987**	**0.3171**	**6.8600e-003**	**0.3240**		**1,147.4964**	**1,147.4964**	**0.0228**	**0.0438**	**1,161.1077**

3.7 Phase 2 - Limited Paving - 2024

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	1.0115	9.2513	13.0812	0.0275		0.4145	0.4145		0.3908	0.3908		2,648.7583	2,648.7583	0.6826		2,665.8225
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**1.0115**	**9.2513**	**13.0812**	**0.0275**		**0.4145**	**0.4145**		**0.3908**	**0.3908**		**2,648.7583**	**2,648.7583**	**0.6826**		**2,665.8225**

9295.7 Golden Meadows - Riverside-South Coast County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.7 Phase 2 - Limited Paving - 2024

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	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
Worker	0.0443	0.0262	0.4466	1.2400e-003	0.1453	6.5000e-004	0.1460	0.0385	6.0000e-004	0.0391		127.6503	127.6503	2.7000e-003	2.8300e-003	128.5623
Total	**0.0443**	**0.0262**	**0.4466**	**1.2400e-003**	**0.1453**	**6.5000e-004**	**0.1460**	**0.0385**	**6.0000e-004**	**0.0391**		**127.6503**	**127.6503**	**2.7000e-003**	**2.8300e-003**	**128.5623**

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	1.0115	9.2513	13.0812	0.0275		0.4145	0.4145		0.3908	0.3908	0.0000	2,648.7583	2,648.7583	0.6826		2,665.8225
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**1.0115**	**9.2513**	**13.0812**	**0.0275**		**0.4145**	**0.4145**		**0.3908**	**0.3908**	**0.0000**	**2,648.7583**	**2,648.7583**	**0.6826**		**2,665.8225**

9295.7 Golden Meadows - Riverside-South Coast County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.7 Phase 2 - Limited Paving - 2024

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	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
Worker	0.0443	0.0262	0.4466	1.2400e-003	0.1453	6.5000e-004	0.1460	0.0385	6.0000e-004	0.0391		127.6503	127.6503	2.7000e-003	2.8300e-003	128.5623
Total	**0.0443**	**0.0262**	**0.4466**	**1.2400e-003**	**0.1453**	**6.5000e-004**	**0.1460**	**0.0385**	**6.0000e-004**	**0.0391**		**127.6503**	**127.6503**	**2.7000e-003**	**2.8300e-003**	**128.5623**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

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	0.0112	0.0188	0.1461	3.6000e-004	0.0375	2.7000e-004	0.0378	0.0100	2.5000e-004	0.0103		37.6293	37.6293	1.5100e-003	1.5400e-003	38.1273
Unmitigated	0.0112	0.0188	0.1461	3.6000e-004	0.0375	2.7000e-004	0.0378	0.0100	2.5000e-004	0.0103		37.6293	37.6293	1.5100e-003	1.5400e-003	38.1273

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
General Heavy Industry	2.44	0.00	0.00	12,685	12,685
Total	2.44	0.00	0.00	12,685	12,685

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
General Heavy Industry	20.00	20.00	20.00	59.00	28.00	13.00	100	0	0

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
General Heavy Industry	0.537845	0.056225	0.173186	0.138405	0.025906	0.007191	0.011447	0.018769	0.000611	0.000309	0.023821	0.001097	0.005189

5.0 Energy Detail

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	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
NaturalGas Unmitigated	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

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					
General Heavy Industry	0	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
Total		**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**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

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	lb/day										lb/day					
General Heavy Industry	0	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
Total		**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**

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	5.4518	2.3000e-004	0.0249	0.0000		9.0000e-005	9.0000e-005		9.0000e-005	9.0000e-005		0.0534	0.0534	1.4000e-004		0.0569
Unmitigated	5.4518	2.3000e-004	0.0249	0.0000		9.0000e-005	9.0000e-005		9.0000e-005	9.0000e-005		0.0534	0.0534	1.4000e-004		0.0569

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EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

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	0.6195					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	4.8299					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	2.3000e-003	2.3000e-004	0.0249	0.0000		9.0000e-005	9.0000e-005		9.0000e-005	9.0000e-005		0.0534	0.0534	1.4000e-004		0.0569
Total	**5.4518**	**2.3000e-004**	**0.0249**	**0.0000**		**9.0000e-005**	**9.0000e-005**		**9.0000e-005**	**9.0000e-005**		**0.0534**	**0.0534**	**1.4000e-004**		**0.0569**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

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	0.6195					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	4.8299					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	2.3000e-003	2.3000e-004	0.0249	0.0000		9.0000e-005	9.0000e-005		9.0000e-005	9.0000e-005		0.0534	0.0534	1.4000e-004		0.0569
Total	**5.4518**	**2.3000e-004**	**0.0249**	**0.0000**		**9.0000e-005**	**9.0000e-005**		**9.0000e-005**	**9.0000e-005**		**0.0534**	**0.0534**	**1.4000e-004**		**0.0569**

7.0 Water Detail

7.1 Mitigation Measures Water

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

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 Stationary Equipment

Fire Pumps and Emergency Generators

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

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

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EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

9295.7 Golden Meadows

Riverside-South Coast County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
General Heavy Industry	243.94	1000sqft	5.60	243,936.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.4	**Precipitation Freq (Days)**	28
Climate Zone	10			**Operational Year**	2024
Utility Company	Southern California Edison				
CO2 Intensity (lb/MWhr)	390.98	**CH4 Intensity (lb/MWhr)**	0.033	**N2O Intensity (lb/MWhr)**	0.004

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - 5.6-acre site

Construction Phase - Phase 1: Grading - 18 months, Paving - 7 days, Tank 2 Construction - 7 days
Phase 2: Limited Grading - 7 days, Limited Paving - 7 days, Tank 2 Construction - 7 days

Off-road Equipment - Tractor/Loader/Backhoe, Excavator, Dump Truck, Delivery Truck

Off-road Equipment - Tractor/Loader/Backhoe, Excavator, Dump Truck, Delivery Truck

Off-road Equipment - Paver, Paving Equipment, Roller, Concrete Mixer Truck, Concrete Boom Pump Truck

Off-road Equipment - Truck Mounted Boom Crane

Off-road Equipment - Tractor/Loader/Backhoe, Excavator, Dump Truck, Delivery Truck

Off-road Equipment - Paver, Paving Equipment, Roller, Concrete Mixer Truck, Concrete Boom Pump Truck

Off-road Equipment - Truck Mounted Boom Crane

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EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Trips and VMT - Phase 1 - 25 round trips total over 1st 2 months of construction
Modeled as 1 round trip per day over entire grading period for worst-case scenario
Phase 2 - 25 round trips over 7 day construction

Grading - 5.6 acres

Vehicle Trips - Minimal maintenance trips only - One weekday round trip per day modeled, 20 mile trip length

Energy Use - Electric loads at the tank site are nominal

Water And Wastewater - 4 million gallons modeled to account for any required tank drainage

Solid Waste - No solid wate generation anticipated

Construction Off-road Equipment Mitigation -

Fleet Mix - LHD1, LHD2, and MHD maintenance vehicles only

Table Name	Column Name	Default Value	New Value
tblConstDustMitigation	WaterUnpavedRoadVehicleSpeed	0	15
tblConstructionPhase	NumDays	20.00	390.00
tblConstructionPhase	NumDays	230.00	7.00
tblConstructionPhase	NumDays	20.00	7.00
tblConstructionPhase	NumDays	20.00	7.00
tblConstructionPhase	NumDays	230.00	7.00
tblConstructionPhase	NumDays	20.00	7.00
tblConstructionPhase	PhaseEndDate	1/27/2023	6/28/2024
tblConstructionPhase	PhaseEndDate	1/12/2024	6/28/2024
tblConstructionPhase	PhaseEndDate	12/27/2024	6/28/2024
tblConstructionPhase	PhaseEndDate	2/24/2023	7/9/2024
tblConstructionPhase	PhaseEndDate	11/29/2024	7/9/2024
tblConstructionPhase	PhaseEndDate	1/24/2025	7/9/2024
tblConstructionPhase	PhaseStartDate	2/25/2023	6/20/2024
tblConstructionPhase	PhaseStartDate	11/30/2024	6/20/2024
tblConstructionPhase	PhaseStartDate	1/28/2023	7/1/2024
tblConstructionPhase	PhaseStartDate	1/13/2024	7/1/2024
tblConstructionPhase	PhaseStartDate	12/28/2024	7/1/2024

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EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

tblEnergyUse	NT24E	5.02	0.00
tblEnergyUse	NT24NG	17.13	0.00
tblEnergyUse	T24E	1.97	0.00
tblEnergyUse	T24NG	15.20	0.00
tblGrading	AcresOfGrading	0.00	5.60
tblGrading	AcresOfGrading	0.00	5.60
tblGrading	MaterialExported	0.00	255,257.00
tblOffRoadEquipment	LoadFactor	0.38	0.38
tblOffRoadEquipment	LoadFactor	0.38	0.38
tblOffRoadEquipment	LoadFactor	0.50	0.50
tblOffRoadEquipment	OffRoadEquipmentType		Dumpers/Tenders
tblOffRoadEquipment	OffRoadEquipmentType		Off-Highway Trucks
tblOffRoadEquipment	OffRoadEquipmentType		Cement and Mortar Mixers
tblOffRoadEquipment	OffRoadEquipmentType		Pumps
tblOffRoadEquipment	OffRoadEquipmentType		Dumpers/Tenders
tblOffRoadEquipment	OffRoadEquipmentType		Off-Highway Trucks
tblOffRoadEquipment	OffRoadEquipmentType		Bore/Drill Rigs
tblOffRoadEquipment	OffRoadEquipmentType		Pumps
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	UsageHours	7.00	8.00
tblSolidWaste	SolidWasteGenerationRate	302.49	0.00
tblTripsAndVMT	VendorTripNumber	0.00	2.00
tblTripsAndVMT	VendorTripNumber	40.00	0.00
tblTripsAndVMT	VendorTripNumber	40.00	8.00
tblVehicleTrips	CC_TL	8.40	20.00
tblVehicleTrips	CNW_TL	6.90	20.00
tblVehicleTrips	CW_TL	16.60	20.00
tblVehicleTrips	DV_TP	5.00	0.00
tblVehicleTrips	PB_TP	3.00	0.00
tblVehicleTrips	PR_TP	92.00	100.00
tblVehicleTrips	ST_TR	6.42	0.00
tblVehicleTrips	SU_TR	5.09	0.00
tblVehicleTrips	WD_TR	3.93	0.01
tblWater	IndoorWaterUseRate	56,411,125.00	4,000,000.00

2.0 Emissions Summary

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

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					
2023	0.1466	2.0601	1.5148	8.9100e-003	0.2185	0.0518	0.2703	0.0574	0.0483	0.1057	0.0000	835.3490	835.3490	0.0887	0.0902	864.4492
2024	0.0861	1.1091	0.9097	4.7600e-003	0.1312	0.0289	0.1601	0.0329	0.0270	0.0599	0.0000	444.5386	444.5386	0.0514	0.0446	459.1176
Maximum	**0.1466**	**2.0601**	**1.5148**	**8.9100e-003**	**0.2185**	**0.0518**	**0.2703**	**0.0574**	**0.0483**	**0.1057**	**0.0000**	**835.3490**	**835.3490**	**0.0887**	**0.0902**	**864.4492**

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					
2023	0.1466	2.0601	1.5148	8.9100e-003	0.2080	0.0518	0.2598	0.0559	0.0483	0.1042	0.0000	835.3487	835.3487	0.0887	0.0902	864.4489
2024	0.0861	1.1091	0.9097	4.7600e-003	0.1190	0.0289	0.1479	0.0312	0.0270	0.0582	0.0000	444.5384	444.5384	0.0514	0.0446	459.1174
Maximum	**0.1466**	**2.0601**	**1.5148**	**8.9100e-003**	**0.2080**	**0.0518**	**0.2598**	**0.0559**	**0.0483**	**0.1042**	**0.0000**	**835.3487**	**835.3487**	**0.0887**	**0.0902**	**864.4489**

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EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

	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**	**6.49**	**0.00**	**5.27**	**3.58**	**0.00**	**1.94**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Quarter	Start Date	End Date	Maximum Unmitigated ROG + NOX (tons/quarter)	Maximum Mitigated ROG + NOX (tons/quarter)
1	**1-2-2023**	**4-1-2023**	0.5464	0.5464
2	**4-2-2023**	**7-1-2023**	0.5372	0.5372
3	**7-2-2023**	**10-1-2023**	0.5433	0.5433
4	**10-2-2023**	**1-1-2024**	0.5586	0.5586
5	**1-2-2024**	**4-1-2024**	0.5370	0.5370
6	**4-2-2024**	**7-1-2024**	0.5542	0.5542
7	**7-2-2024**	**9-30-2024**	0.0632	0.0632
		Highest	0.5586	0.5586

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EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

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	0.9948	3.0000e-005	3.1100e-003	0.0000		1.0000e-005	1.0000e-005		1.0000e-005	1.0000e-005	0.0000	6.0500e-003	6.0500e-003	2.0000e-005	0.0000	6.4500e-003
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	126.7546	126.7546	0.0107	1.3000e-003	127.4085
Mobile	1.3100e-003	2.6200e-003	0.0170	4.0000e-005	4.8000e-003	4.0000e-005	4.8300e-003	1.2800e-003	3.0000e-005	1.3100e-003	0.0000	4.1821	4.1821	1.8000e-004	1.9000e-004	4.2423
Waste						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Water						0.0000	0.0000		0.0000	0.0000	1.2690	9.2369	10.5059	0.1311	3.1700e-003	14.7292
Total	**0.9961**	**2.6500e-003**	**0.0201**	**4.0000e-005**	**4.8000e-003**	**5.0000e-005**	**4.8400e-003**	**1.2800e-003**	**4.0000e-005**	**1.3200e-003**	**1.2690**	**140.1796**	**141.4486**	**0.1420**	**4.6600e-003**	**146.3864**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

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	0.9948	3.0000e-005	3.1100e-003	0.0000		1.0000e-005	1.0000e-005		1.0000e-005	1.0000e-005	0.0000	6.0500e-003	6.0500e-003	2.0000e-005	0.0000	6.4500e-003
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	126.7546	126.7546	0.0107	1.3000e-003	127.4085
Mobile	1.3100e-003	2.6200e-003	0.0170	4.0000e-005	4.8000e-003	4.0000e-005	4.8300e-003	1.2800e-003	3.0000e-005	1.3100e-003	0.0000	4.1821	4.1821	1.8000e-004	1.9000e-004	4.2423
Waste						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Water						0.0000	0.0000		0.0000	0.0000	1.2690	9.2369	10.5059	0.1311	3.1700e-003	14.7292
Total	**0.9961**	**2.6500e-003**	**0.0201**	**4.0000e-005**	**4.8000e-003**	**5.0000e-005**	**4.8400e-003**	**1.2800e-003**	**4.0000e-005**	**1.3200e-003**	**1.2690**	**140.1796**	**141.4486**	**0.1420**	**4.6600e-003**	**146.3864**

	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	Phase 1 - Grading	Grading	1/2/2023	6/28/2024	5	390	
2	Phase 1 - Tank Construction	Building Construction	6/20/2024	6/28/2024	5	7	
3	Phase 1 - Paving	Paving	6/20/2024	6/28/2024	5	7	

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

4	Phase 2 - Limited Grading	Grading	7/1/2024	7/9/2024	5	7	
5	Phase 2 - Tank Construction	Building Construction	7/1/2024	7/9/2024	5	7	
6	Phase 2 - Limited Paving	Paving	7/1/2024	7/9/2024	5	7	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 5.6

Acres of Paving: 0

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Phase 1 - Grading	Dumpers/Tenders	1	8.00	16	0.38
Phase 1 - Grading	Excavators	1	8.00	158	0.38
Phase 1 - Grading	Graders	0	8.00	187	0.41
Phase 1 - Grading	Off-Highway Trucks	1	8.00	402	0.38
Phase 1 - Grading	Rubber Tired Dozers	0	8.00	247	0.40
Phase 1 - Grading	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Phase 1 - Tank Construction	Cranes	1	8.00	231	0.29
Phase 1 - Tank Construction	Forklifts	0	8.00	89	0.20
Phase 1 - Tank Construction	Generator Sets	0	8.00	84	0.74
Phase 1 - Tank Construction	Tractors/Loaders/Backhoes	0	7.00	97	0.37
Phase 1 - Tank Construction	Welders	0	8.00	46	0.45
Phase 1 - Paving	Cement and Mortar Mixers	1	8.00	9	0.56
Phase 1 - Paving	Pavers	1	8.00	130	0.42
Phase 1 - Paving	Paving Equipment	1	8.00	132	0.36
Phase 1 - Paving	Pumps	1	8.00	84	0.74
Phase 1 - Paving	Rollers	1	8.00	80	0.38
Phase 2 - Limited Grading	Dumpers/Tenders	1	8.00	16	0.38

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Phase 2 - Limited Grading	Off-Highway Trucks	1	8.00	402	0.38
Phase 2 - Limited Grading	Excavators	1	8.00	158	0.38
Phase 2 - Limited Grading	Graders	0	8.00	187	0.41
Phase 2 - Limited Paving	Bore/Drill Rigs	1	8.00	221	0.50
Phase 2 - Limited Grading	Rubber Tired Dozers	0	8.00	247	0.40
Phase 2 - Limited Grading	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Phase 2 - Tank Construction	Cranes	1	7.00	231	0.29
Phase 2 - Tank Construction	Forklifts	0	8.00	89	0.20
Phase 2 - Tank Construction	Generator Sets	0	8.00	84	0.74
Phase 2 - Tank Construction	Tractors/Loaders/Backhoes	0	7.00	97	0.37
Phase 2 - Tank Construction	Welders	0	8.00	46	0.45
Phase 2 - Limited Paving	Pumps	1	8.00	84	0.74
Phase 2 - Limited Paving	Pavers	1	8.00	130	0.42
Phase 2 - Limited Paving	Paving Equipment	1	8.00	132	0.36
Phase 2 - Limited Paving	Rollers	1	8.00	80	0.38

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
Phase 1 - Grading	4	10.00	2.00	31,907.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Phase 1 - Tank Construction	1	102.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Phase 1 - Paving	5	13.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Phase 2 - Limited Grading	4	10.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Phase 2 - Tank Construction	1	102.00	8.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Phase 2 - Limited Paving	5	13.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Water Exposed Area

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

Reduce Vehicle Speed on Unpaved Roads

3.2 Phase 1 - Grading - 2023

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					0.0191	0.0000	0.0191	2.7700e-003	0.0000	2.7700e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.1196	0.9275	1.1758	2.9000e-003		0.0388	0.0388		0.0359	0.0359	0.0000	253.4296	253.4296	0.0804	0.0000	255.4399
Total	**0.1196**	**0.9275**	**1.1758**	**2.9000e-003**	**0.0191**	**0.0388**	**0.0580**	**2.7700e-003**	**0.0359**	**0.0387**	**0.0000**	**253.4296**	**253.4296**	**0.0804**	**0.0000**	**255.4399**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.2 Phase 1 - Grading - 2023

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	0.0225	1.1205	0.2946	5.8500e-003	0.1835	0.0128	0.1963	0.0504	0.0123	0.0626	0.0000	566.5425	566.5425	8.0000e-003	0.0893	593.3458
Vendor	2.8000e-004	8.9100e-003	3.5500e-003	5.0000e-005	1.6400e-003	7.0000e-005	1.7200e-003	4.7000e-004	7.0000e-005	5.4000e-004	0.0000	4.3745	4.3745	4.0000e-005	6.5000e-004	4.5684
Worker	4.2200e-003	3.1300e-003	0.0408	1.2000e-004	0.0143	7.0000e-005	0.0144	3.7900e-003	6.0000e-005	3.8600e-003	0.0000	11.0023	11.0023	2.7000e-004	2.9000e-004	11.0951
Total	**0.0270**	**1.1326**	**0.3390**	**6.0200e-003**	**0.1994**	**0.0130**	**0.2124**	**0.0546**	**0.0124**	**0.0670**	**0.0000**	**581.9193**	**581.9193**	**8.3100e-003**	**0.0902**	**609.0093**

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					8.6100e-003	0.0000	8.6100e-003	1.2500e-003	0.0000	1.2500e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.1196	0.9275	1.1758	2.9000e-003		0.0388	0.0388		0.0359	0.0359	0.0000	253.4293	253.4293	0.0804	0.0000	255.4396
Total	**0.1196**	**0.9275**	**1.1758**	**2.9000e-003**	**8.6100e-003**	**0.0388**	**0.0474**	**1.2500e-003**	**0.0359**	**0.0372**	**0.0000**	**253.4293**	**253.4293**	**0.0804**	**0.0000**	**255.4396**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.2 Phase 1 - Grading - 2023

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	0.0225	1.1205	0.2946	5.8500e-003	0.1835	0.0128	0.1963	0.0504	0.0123	0.0626	0.0000	566.5425	566.5425	8.0000e-003	0.0893	593.3458
Vendor	2.8000e-004	8.9100e-003	3.5500e-003	5.0000e-005	1.6400e-003	7.0000e-005	1.7200e-003	4.7000e-004	7.0000e-005	5.4000e-004	0.0000	4.3745	4.3745	4.0000e-005	6.5000e-004	4.5684
Worker	4.2200e-003	3.1300e-003	0.0408	1.2000e-004	0.0143	7.0000e-005	0.0144	3.7900e-003	6.0000e-005	3.8600e-003	0.0000	11.0023	11.0023	2.7000e-004	2.9000e-004	11.0951
Total	**0.0270**	**1.1326**	**0.3390**	**6.0200e-003**	**0.1994**	**0.0130**	**0.2124**	**0.0546**	**0.0124**	**0.0670**	**0.0000**	**581.9193**	**581.9193**	**8.3100e-003**	**0.0902**	**609.0093**

3.2 Phase 1 - Grading - 2024

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					0.0191	0.0000	0.0191	2.7700e-003	0.0000	2.7700e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0583	0.4329	0.5862	1.4500e-003		0.0178	0.0178		0.0164	0.0164	0.0000	126.7628	126.7628	0.0402	0.0000	127.7684
Total	**0.0583**	**0.4329**	**0.5862**	**1.4500e-003**	**0.0191**	**0.0178**	**0.0369**	**2.7700e-003**	**0.0164**	**0.0192**	**0.0000**	**126.7628**	**126.7628**	**0.0402**	**0.0000**	**127.7684**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.2 Phase 1 - Grading - 2024

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	0.0112	0.5619	0.1489	2.8700e-003	0.0917	6.3800e-003	0.0981	0.0252	6.1000e-003	0.0313	0.0000	278.6442	278.6442	4.2200e-003	0.0439	291.8371
Vendor	1.4000e-004	4.4600e-003	1.7600e-003	2.0000e-005	8.2000e-004	4.0000e-005	8.6000e-004	2.4000e-004	4.0000e-005	2.7000e-004	0.0000	2.1536	2.1536	2.0000e-005	3.2000e-004	2.2489
Worker	1.9700e-003	1.3900e-003	0.0191	6.0000e-005	7.1400e-003	3.0000e-005	7.1800e-003	1.9000e-003	3.0000e-005	1.9300e-003	0.0000	5.3694	5.3694	1.2000e-004	1.3000e-004	5.4124
Total	**0.0133**	**0.5677**	**0.1698**	**2.9500e-003**	**0.0997**	**6.4500e-003**	**0.1061**	**0.0273**	**6.1700e-003**	**0.0335**	**0.0000**	**286.1671**	**286.1671**	**4.3600e-003**	**0.0444**	**299.4983**

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					8.6100e-003	0.0000	8.6100e-003	1.2500e-003	0.0000	1.2500e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0583	0.4329	0.5862	1.4500e-003		0.0178	0.0178		0.0164	0.0164	0.0000	126.7627	126.7627	0.0402	0.0000	127.7682
Total	**0.0583**	**0.4329**	**0.5862**	**1.4500e-003**	**8.6100e-003**	**0.0178**	**0.0264**	**1.2500e-003**	**0.0164**	**0.0177**	**0.0000**	**126.7627**	**126.7627**	**0.0402**	**0.0000**	**127.7682**

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EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.2 Phase 1 - Grading - 2024

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	0.0112	0.5619	0.1489	2.8700e-003	0.0917	6.3800e-003	0.0981	0.0252	6.1000e-003	0.0313	0.0000	278.6442	278.6442	4.2200e-003	0.0439	291.8371
Vendor	1.4000e-004	4.4600e-003	1.7600e-003	2.0000e-005	8.2000e-004	4.0000e-005	8.6000e-004	2.4000e-004	4.0000e-005	2.7000e-004	0.0000	2.1536	2.1536	2.0000e-005	3.2000e-004	2.2489
Worker	1.9700e-003	1.3900e-003	0.0191	6.0000e-005	7.1400e-003	3.0000e-005	7.1800e-003	1.9000e-003	3.0000e-005	1.9300e-003	0.0000	5.3694	5.3694	1.2000e-004	1.3000e-004	5.4124
Total	**0.0133**	**0.5677**	**0.1698**	**2.9500e-003**	**0.0997**	**6.4500e-003**	**0.1061**	**0.0273**	**6.1700e-003**	**0.0335**	**0.0000**	**286.1671**	**286.1671**	**4.3600e-003**	**0.0444**	**299.4983**

3.3 Phase 1 - Tank Construction - 2024

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	1.1600e-003	0.0123	6.2100e-003	2.0000e-005		5.1000e-004	5.1000e-004		4.7000e-004	4.7000e-004	0.0000	1.7743	1.7743	5.7000e-004	0.0000	1.7886
Total	**1.1600e-003**	**0.0123**	**6.2100e-003**	**2.0000e-005**		**5.1000e-004**	**5.1000e-004**		**4.7000e-004**	**4.7000e-004**	**0.0000**	**1.7743**	**1.7743**	**5.7000e-004**	**0.0000**	**1.7886**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.3 Phase 1 - Tank Construction - 2024

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	1.0800e-003	7.6000e-004	0.0105	3.0000e-005	3.9200e-003	2.0000e-005	3.9400e-003	1.0400e-003	2.0000e-005	1.0600e-003	0.0000	2.9490	2.9490	7.0000e-005	7.0000e-005	2.9726
Total	**1.0800e-003**	**7.6000e-004**	**0.0105**	**3.0000e-005**	**3.9200e-003**	**2.0000e-005**	**3.9400e-003**	**1.0400e-003**	**2.0000e-005**	**1.0600e-003**	**0.0000**	**2.9490**	**2.9490**	**7.0000e-005**	**7.0000e-005**	**2.9726**

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	1.1600e-003	0.0123	6.2100e-003	2.0000e-005		5.1000e-004	5.1000e-004		4.7000e-004	4.7000e-004	0.0000	1.7743	1.7743	5.7000e-004	0.0000	1.7886
Total	**1.1600e-003**	**0.0123**	**6.2100e-003**	**2.0000e-005**		**5.1000e-004**	**5.1000e-004**		**4.7000e-004**	**4.7000e-004**	**0.0000**	**1.7743**	**1.7743**	**5.7000e-004**	**0.0000**	**1.7886**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.3 Phase 1 - Tank Construction - 2024

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	1.0800e-003	7.6000e-004	0.0105	3.0000e-005	3.9200e-003	2.0000e-005	3.9400e-003	1.0400e-003	2.0000e-005	1.0600e-003	0.0000	2.9490	2.9490	7.0000e-005	7.0000e-005	2.9726
Total	**1.0800e-003**	**7.6000e-004**	**0.0105**	**3.0000e-005**	**3.9200e-003**	**2.0000e-005**	**3.9400e-003**	**1.0400e-003**	**2.0000e-005**	**1.0600e-003**	**0.0000**	**2.9490**	**2.9490**	**7.0000e-005**	**7.0000e-005**	**2.9726**

3.4 Phase 1 - Paving - 2024

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	3.0100e-003	0.0270	0.0397	7.0000e-005		1.2800e-003	1.2800e-003		1.2100e-003	1.2100e-003	0.0000	5.6433	5.6433	1.2400e-003	0.0000	5.6742
Paving	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**3.0100e-003**	**0.0270**	**0.0397**	**7.0000e-005**		**1.2800e-003**	**1.2800e-003**		**1.2100e-003**	**1.2100e-003**	**0.0000**	**5.6433**	**5.6433**	**1.2400e-003**	**0.0000**	**5.6742**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.4 Phase 1 - Paving - 2024

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	1.4000e-004	1.0000e-004	1.3400e-003	0.0000	5.0000e-004	0.0000	5.0000e-004	1.3000e-004	0.0000	1.3000e-004	0.0000	0.3759	0.3759	1.0000e-005	1.0000e-005	0.3789
Total	**1.4000e-004**	**1.0000e-004**	**1.3400e-003**	**0.0000**	**5.0000e-004**	**0.0000**	**5.0000e-004**	**1.3000e-004**	**0.0000**	**1.3000e-004**	**0.0000**	**0.3759**	**0.3759**	**1.0000e-005**	**1.0000e-005**	**0.3789**

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	3.0100e-003	0.0270	0.0397	7.0000e-005		1.2800e-003	1.2800e-003		1.2100e-003	1.2100e-003	0.0000	5.6433	5.6433	1.2400e-003	0.0000	5.6742
Paving	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**3.0100e-003**	**0.0270**	**0.0397**	**7.0000e-005**		**1.2800e-003**	**1.2800e-003**		**1.2100e-003**	**1.2100e-003**	**0.0000**	**5.6433**	**5.6433**	**1.2400e-003**	**0.0000**	**5.6742**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.4 Phase 1 - Paving - 2024

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	1.4000e-004	1.0000e-004	1.3400e-003	0.0000	5.0000e-004	0.0000	5.0000e-004	1.3000e-004	0.0000	1.3000e-004	0.0000	0.3759	0.3759	1.0000e-005	1.0000e-005	0.3789
Total	**1.4000e-004**	**1.0000e-004**	**1.3400e-003**	**0.0000**	**5.0000e-004**	**0.0000**	**5.0000e-004**	**1.3000e-004**	**0.0000**	**1.3000e-004**	**0.0000**	**0.3759**	**0.3759**	**1.0000e-005**	**1.0000e-005**	**0.3789**

3.5 Phase 2 - Limited Grading - 2024

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					2.9700e-003	0.0000	2.9700e-003	3.2000e-004	0.0000	3.2000e-004	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	3.1400e-003	0.0233	0.0316	8.0000e-005		9.6000e-004	9.6000e-004		8.8000e-004	8.8000e-004	0.0000	6.8257	6.8257	2.1700e-003	0.0000	6.8798
Total	**3.1400e-003**	**0.0233**	**0.0316**	**8.0000e-005**	**2.9700e-003**	**9.6000e-004**	**3.9300e-003**	**3.2000e-004**	**8.8000e-004**	**1.2000e-003**	**0.0000**	**6.8257**	**6.8257**	**2.1700e-003**	**0.0000**	**6.8798**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.5 Phase 2 - Limited Grading - 2024

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	1.1000e-004	7.0000e-005	1.0300e-003	0.0000	3.8000e-004	0.0000	3.9000e-004	1.0000e-004	0.0000	1.0000e-004	0.0000	0.2891	0.2891	1.0000e-005	1.0000e-005	0.2914
Total	**1.1000e-004**	**7.0000e-005**	**1.0300e-003**	**0.0000**	**3.8000e-004**	**0.0000**	**3.9000e-004**	**1.0000e-004**	**0.0000**	**1.0000e-004**	**0.0000**	**0.2891**	**0.2891**	**1.0000e-005**	**1.0000e-005**	**0.2914**

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					1.3400e-003	0.0000	1.3400e-003	1.4000e-004	0.0000	1.4000e-004	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	3.1400e-003	0.0233	0.0316	8.0000e-005		9.6000e-004	9.6000e-004		8.8000e-004	8.8000e-004	0.0000	6.8257	6.8257	2.1700e-003	0.0000	6.8798
Total	**3.1400e-003**	**0.0233**	**0.0316**	**8.0000e-005**	**1.3400e-003**	**9.6000e-004**	**2.3000e-003**	**1.4000e-004**	**8.8000e-004**	**1.0200e-003**	**0.0000**	**6.8257**	**6.8257**	**2.1700e-003**	**0.0000**	**6.8798**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.5 Phase 2 - Limited Grading - 2024

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	1.1000e-004	7.0000e-005	1.0300e-003	0.0000	3.8000e-004	0.0000	3.9000e-004	1.0000e-004	0.0000	1.0000e-004	0.0000	0.2891	0.2891	1.0000e-005	1.0000e-005	0.2914
Total	**1.1000e-004**	**7.0000e-005**	**1.0300e-003**	**0.0000**	**3.8000e-004**	**0.0000**	**3.9000e-004**	**1.0000e-004**	**0.0000**	**1.0000e-004**	**0.0000**	**0.2891**	**0.2891**	**1.0000e-005**	**1.0000e-005**	**0.2914**

3.6 Phase 2 - Tank Construction - 2024

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	1.0200e-003	0.0107	5.4400e-003	2.0000e-005		4.5000e-004	4.5000e-004		4.1000e-004	4.1000e-004	0.0000	1.5525	1.5525	5.0000e-004	0.0000	1.5651
Total	**1.0200e-003**	**0.0107**	**5.4400e-003**	**2.0000e-005**		**4.5000e-004**	**4.5000e-004**		**4.1000e-004**	**4.1000e-004**	**0.0000**	**1.5525**	**1.5525**	**5.0000e-004**	**0.0000**	**1.5651**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.6 Phase 2 - Tank Construction - 2024

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	3.0000e-005	9.6000e-004	3.8000e-004	0.0000	1.8000e-004	1.0000e-005	1.8000e-004	5.0000e-005	1.0000e-005	6.0000e-005	0.0000	0.4638	0.4638	0.0000	7.0000e-005	0.4844
Worker	1.0800e-003	7.6000e-004	0.0105	3.0000e-005	3.9200e-003	2.0000e-005	3.9400e-003	1.0400e-003	2.0000e-005	1.0600e-003	0.0000	2.9490	2.9490	7.0000e-005	7.0000e-005	2.9726
Total	**1.1100e-003**	**1.7200e-003**	**0.0109**	**3.0000e-005**	**4.1000e-003**	**3.0000e-005**	**4.1200e-003**	**1.0900e-003**	**3.0000e-005**	**1.1200e-003**	**0.0000**	**3.4129**	**3.4129**	**7.0000e-005**	**1.4000e-004**	**3.4570**

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	1.0200e-003	0.0107	5.4400e-003	2.0000e-005		4.5000e-004	4.5000e-004		4.1000e-004	4.1000e-004	0.0000	1.5525	1.5525	5.0000e-004	0.0000	1.5651
Total	**1.0200e-003**	**0.0107**	**5.4400e-003**	**2.0000e-005**		**4.5000e-004**	**4.5000e-004**		**4.1000e-004**	**4.1000e-004**	**0.0000**	**1.5525**	**1.5525**	**5.0000e-004**	**0.0000**	**1.5651**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.6 Phase 2 - Tank Construction - 2024

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	3.0000e-005	9.6000e-004	3.8000e-004	0.0000	1.8000e-004	1.0000e-005	1.8000e-004	5.0000e-005	1.0000e-005	6.0000e-005	0.0000	0.4638	0.4638	0.0000	7.0000e-005	0.4844
Worker	1.0800e-003	7.6000e-004	0.0105	3.0000e-005	3.9200e-003	2.0000e-005	3.9400e-003	1.0400e-003	2.0000e-005	1.0600e-003	0.0000	2.9490	2.9490	7.0000e-005	7.0000e-005	2.9726
Total	**1.1100e-003**	**1.7200e-003**	**0.0109**	**3.0000e-005**	**4.1000e-003**	**3.0000e-005**	**4.1200e-003**	**1.0900e-003**	**3.0000e-005**	**1.1200e-003**	**0.0000**	**3.4129**	**3.4129**	**7.0000e-005**	**1.4000e-004**	**3.4570**

3.7 Phase 2 - Limited Paving - 2024

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	3.5400e-003	0.0324	0.0458	1.0000e-004		1.4500e-003	1.4500e-003		1.3700e-003	1.3700e-003	0.0000	8.4102	8.4102	2.1700e-003	0.0000	8.4644
Paving	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**3.5400e-003**	**0.0324**	**0.0458**	**1.0000e-004**		**1.4500e-003**	**1.4500e-003**		**1.3700e-003**	**1.3700e-003**	**0.0000**	**8.4102**	**8.4102**	**2.1700e-003**	**0.0000**	**8.4644**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.7 Phase 2 - Limited Paving - 2024

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	1.4000e-004	1.0000e-004	1.3400e-003	0.0000	5.0000e-004	0.0000	5.0000e-004	1.3000e-004	0.0000	1.3000e-004	0.0000	0.3759	0.3759	1.0000e-005	1.0000e-005	0.3789
Total	**1.4000e-004**	**1.0000e-004**	**1.3400e-003**	**0.0000**	**5.0000e-004**	**0.0000**	**5.0000e-004**	**1.3000e-004**	**0.0000**	**1.3000e-004**	**0.0000**	**0.3759**	**0.3759**	**1.0000e-005**	**1.0000e-005**	**0.3789**

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	3.5400e-003	0.0324	0.0458	1.0000e-004		1.4500e-003	1.4500e-003		1.3700e-003	1.3700e-003	0.0000	8.4102	8.4102	2.1700e-003	0.0000	8.4644
Paving	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**3.5400e-003**	**0.0324**	**0.0458**	**1.0000e-004**		**1.4500e-003**	**1.4500e-003**		**1.3700e-003**	**1.3700e-003**	**0.0000**	**8.4102**	**8.4102**	**2.1700e-003**	**0.0000**	**8.4644**

9295.7 Golden Meadows - Riverside-South Coast County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.7 Phase 2 - Limited Paving - 2024

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	1.4000e-004	1.0000e-004	1.3400e-003	0.0000	5.0000e-004	0.0000	5.0000e-004	1.3000e-004	0.0000	1.3000e-004	0.0000	0.3759	0.3759	1.0000e-005	1.0000e-005	0.3789
Total	**1.4000e-004**	**1.0000e-004**	**1.3400e-003**	**0.0000**	**5.0000e-004**	**0.0000**	**5.0000e-004**	**1.3000e-004**	**0.0000**	**1.3000e-004**	**0.0000**	**0.3759**	**0.3759**	**1.0000e-005**	**1.0000e-005**	**0.3789**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

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	1.3100e-003	2.6200e-003	0.0170	4.0000e-005	4.8000e-003	4.0000e-005	4.8300e-003	1.2800e-003	3.0000e-005	1.3100e-003	0.0000	4.1821	4.1821	1.8000e-004	1.9000e-004	4.2423
Unmitigated	1.3100e-003	2.6200e-003	0.0170	4.0000e-005	4.8000e-003	4.0000e-005	4.8300e-003	1.2800e-003	3.0000e-005	1.3100e-003	0.0000	4.1821	4.1821	1.8000e-004	1.9000e-004	4.2423

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
General Heavy Industry	2.44	0.00	0.00	12,685	12,685
Total	2.44	0.00	0.00	12,685	12,685

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
General Heavy Industry	20.00	20.00	20.00	59.00	28.00	13.00	100	0	0

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
General Heavy Industry	0.537845	0.056225	0.173186	0.138405	0.025906	0.007191	0.011447	0.018769	0.000611	0.000309	0.023821	0.001097	0.005189

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

5.0 Energy Detail

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	126.7546	126.7546	0.0107	1.3000e-003	127.4085
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000	0.0000	126.7546	126.7546	0.0107	1.3000e-003	127.4085
NaturalGas Mitigated	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
NaturalGas Unmitigated	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

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

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					
General Heavy Industry	0	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
Total		**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**

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					
General Heavy Industry	0	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
Total		**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**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
General Heavy Industry	714732	126.7546	0.0107	1.3000e-003	127.4085
Total		**126.7546**	**0.0107**	**1.3000e-003**	**127.4085**

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
General Heavy Industry	714732	126.7546	0.0107	1.3000e-003	127.4085
Total		**126.7546**	**0.0107**	**1.3000e-003**	**127.4085**

6.0 Area Detail

6.1 Mitigation Measures Area

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

	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	0.9948	3.0000e-005	3.1100e-003	0.0000		1.0000e-005	1.0000e-005		1.0000e-005	1.0000e-005	0.0000	6.0500e-003	6.0500e-003	2.0000e-005	0.0000	6.4500e-003
Unmitigated	0.9948	3.0000e-005	3.1100e-003	0.0000		1.0000e-005	1.0000e-005		1.0000e-005	1.0000e-005	0.0000	6.0500e-003	6.0500e-003	2.0000e-005	0.0000	6.4500e-003

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	0.1131					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.8815					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	2.9000e-004	3.0000e-005	3.1100e-003	0.0000		1.0000e-005	1.0000e-005		1.0000e-005	1.0000e-005	0.0000	6.0500e-003	6.0500e-003	2.0000e-005	0.0000	6.4500e-003
Total	**0.9948**	**3.0000e-005**	**3.1100e-003**	**0.0000**		**1.0000e-005**	**1.0000e-005**		**1.0000e-005**	**1.0000e-005**	**0.0000**	**6.0500e-003**	**6.0500e-003**	**2.0000e-005**	**0.0000**	**6.4500e-003**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

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	0.1131					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.8815					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	2.9000e-004	3.0000e-005	3.1100e-003	0.0000		1.0000e-005	1.0000e-005		1.0000e-005	1.0000e-005	0.0000	6.0500e-003	6.0500e-003	2.0000e-005	0.0000	6.4500e-003
Total	**0.9948**	**3.0000e-005**	**3.1100e-003**	**0.0000**		**1.0000e-005**	**1.0000e-005**		**1.0000e-005**	**1.0000e-005**	**0.0000**	**6.0500e-003**	**6.0500e-003**	**2.0000e-005**	**0.0000**	**6.4500e-003**

7.0 Water Detail

7.1 Mitigation Measures Water

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated	10.5059	0.1311	3.1700e-003	14.7292
Unmitigated	10.5059	0.1311	3.1700e-003	14.7292

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
General Heavy Industry	4 / 0	10.5059	0.1311	3.1700e-003	14.7292
Total		**10.5059**	**0.1311**	**3.1700e-003**	**14.7292**

7.2 Water by Land Use

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
General Heavy Industry	4 / 0	10.5059	0.1311	3.1700e-003	14.7292
Total		**10.5059**	**0.1311**	**3.1700e-003**	**14.7292**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	0.0000	0.0000	0.0000	0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
General Heavy Industry	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
General Heavy Industry	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

9.0 Operational Offroad

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

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

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

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

9295.7 - Golden Meadows - Blasting and Rock Crushing - Riverside-South Coast County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

9295.7 - Golden Meadows - Blasting and Rock Crushing

Riverside-South Coast County, Winter

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
General Heavy Industry	170.32	1000sqft	3.91	170,319.60	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.4	**Precipitation Freq (Days)**	28
Climate Zone	10			**Operational Year**	2024
Utility Company	Southern California Edison				
CO2 Intensity (lb/MWhr)	390.98	**CH4 Intensity (lb/MWhr)**	0.033	**N2O Intensity (lb/MWhr)**	0.004

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - 3.91 acre site

Construction Phase - 90 days of potential blasting/crushing

Off-road Equipment - Drill, rock crusher, excavator, dump truck

Grading -

Construction Off-road Equipment Mitigation -

Table Name	Column Name	Default Value	New Value
tblConstDustMitigation	WaterUnpavedRoadVehicleSpeed	0	15
tblConstructionPhase	NumDays	8.00	90.00
tblConstructionPhase	PhaseEndDate	2/15/2023	5/5/2023
tblConstructionPhase	PhaseStartDate	2/4/2023	1/2/2023
tblLandUse	LandUseSquareFeet	170,320.00	170,319.60
tblOffRoadEquipment	LoadFactor	0.50	0.50
tblOffRoadEquipment	OffRoadEquipmentType		Bore/Drill Rigs
tblOffRoadEquipment	OffRoadEquipmentType		Crushing/Proc. Equipment
tblOffRoadEquipment	OffRoadEquipmentType		Dumpers/Tenders
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	0.00

9295.7 - Golden Meadows - Blasting and Rock Crushing - Riverside-South Coast County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

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					
2023	0.9628	7.0705	10.1760	0.0233	0.1118	0.3144	0.4262	0.0296	0.3030	0.3327	0.0000	2,236.7274	2,236.7274	0.5079	2.4000e-003	2,250.1397
Maximum	**0.9628**	**7.0705**	**10.1760**	**0.0233**	**0.1118**	**0.3144**	**0.4262**	**0.0296**	**0.3030**	**0.3327**	**0.0000**	**2,236.7274**	**2,236.7274**	**0.5079**	**2.4000e-003**	**2,250.1397**

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					
2023	0.9628	7.0705	10.1760	0.0233	0.1118	0.3144	0.4262	0.0296	0.3030	0.3327	0.0000	2,236.7274	2,236.7274	0.5079	2.4000e-003	2,250.1397
Maximum	**0.9628**	**7.0705**	**10.1760**	**0.0233**	**0.1118**	**0.3144**	**0.4262**	**0.0296**	**0.3030**	**0.3327**	**0.0000**	**2,236.7274**	**2,236.7274**	**0.5079**	**2.4000e-003**	**2,250.1397**

	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**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Grading	Grading	1/2/2023	5/5/2023	5	90	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 0

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Grading	Bore/Drill Rigs	1	8.00	221	0.50
Grading	Crushing/Proc. Equipment	1	8.00	85	0.78
Grading	Dumpers/Tenders	1	8.00	16	0.38
Grading	Excavators	1	8.00	158	0.38
Grading	Graders	0	8.00	187	0.41
Grading	Rubber Tired Dozers	0	8.00	247	0.40
Grading	Tractors/Loaders/Backhoes	0	8.00	97	0.37

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
Grading	4	10.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Water Exposed Area

Reduce Vehicle Speed on Unpaved Roads

9295.7 - Golden Meadows - Blasting and Rock Crushing - Riverside-South Coast County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.2 Grading - 2023

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					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000			0.0000
Off-Road	0.9285	7.0471	9.8781	0.0224		0.3139	0.3139		0.3025	0.3025		2,145.5563	2,145.5563	0.5056		2,158.1959
Total	**0.9285**	**7.0471**	**9.8781**	**0.0224**	**0.0000**	**0.3139**	**0.3139**	**0.0000**	**0.3025**	**0.3025**		**2,145.5563**	**2,145.5563**	**0.5056**		**2,158.1959**

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	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
Worker	0.0342	0.0234	0.2979	8.9000e-004	0.1118	5.2000e-004	0.1123	0.0296	4.8000e-004	0.0301		91.1710	91.1710	2.2900e-003	2.4000e-003	91.9438
Total	**0.0342**	**0.0234**	**0.2979**	**8.9000e-004**	**0.1118**	**5.2000e-004**	**0.1123**	**0.0296**	**4.8000e-004**	**0.0301**		**91.1710**	**91.1710**	**2.2900e-003**	**2.4000e-003**	**91.9438**

9295.7 - Golden Meadows - Blasting and Rock Crushing - Riverside-South Coast County, Winter

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

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					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000			0.0000
Off-Road	0.9285	7.0471	9.8781	0.0224		0.3139	0.3139		0.3025	0.3025	0.0000	2,145.5563	2,145.5563	0.5056		2,158.1959
Total	**0.9285**	**7.0471**	**9.8781**	**0.0224**	**0.0000**	**0.3139**	**0.3139**	**0.0000**	**0.3025**	**0.3025**	**0.0000**	**2,145.5563**	**2,145.5563**	**0.5056**		**2,158.1959**

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	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
Worker	0.0342	0.0234	0.2979	8.9000e-004	0.1118	5.2000e-004	0.1123	0.0296	4.8000e-004	0.0301		91.1710	91.1710	2.2900e-003	2.4000e-003	91.9438
Total	**0.0342**	**0.0234**	**0.2979**	**8.9000e-004**	**0.1118**	**5.2000e-004**	**0.1123**	**0.0296**	**4.8000e-004**	**0.0301**		**91.1710**	**91.1710**	**2.2900e-003**	**2.4000e-003**	**91.9438**

9295.7 - Golden Meadows - Blasting and Rock Crushing - Riverside-South Coast County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

9295.7 - Golden Meadows - Blasting and Rock Crushing

Riverside-South Coast County, Summer

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
General Heavy Industry	170.32	1000sqft	3.91	170,319.60	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.4	**Precipitation Freq (Days)**	28
Climate Zone	10			**Operational Year**	2024
Utility Company	Southern California Edison				
CO2 Intensity (lb/MWhr)	390.98	**CH4 Intensity (lb/MWhr)**	0.033	**N2O Intensity (lb/MWhr)**	0.004

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - 3.91 acre site

Construction Phase - 90 days of potential blasting/crushing

Off-road Equipment - Drill, rock crusher, excavator, dump truck

Grading -

Construction Off-road Equipment Mitigation -

Table Name	Column Name	Default Value	New Value
tblConstDustMitigation	WaterUnpavedRoadVehicleSpeed	0	15
tblConstructionPhase	NumDays	8.00	90.00
tblConstructionPhase	PhaseEndDate	2/15/2023	5/5/2023
tblConstructionPhase	PhaseStartDate	2/4/2023	1/2/2023
tblLandUse	LandUseSquareFeet	170,320.00	170,319.60
tblOffRoadEquipment	LoadFactor	0.50	0.50
tblOffRoadEquipment	OffRoadEquipmentType		Bore/Drill Rigs
tblOffRoadEquipment	OffRoadEquipmentType		Crushing/Proc. Equipment
tblOffRoadEquipment	OffRoadEquipmentType		Dumpers/Tenders
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	0.00

9295.7 - Golden Meadows - Blasting and Rock Crushing - Riverside-South Coast County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

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					
2023	0.9651	7.0696	10.2450	0.0234	0.1118	0.3144	0.4262	0.0296	0.3030	0.3327	0.0000	2,246.1766	2,246.1766	0.5079	2.3500e-003	2,259.5728
Maximum	**0.9651**	**7.0696**	**10.2450**	**0.0234**	**0.1118**	**0.3144**	**0.4262**	**0.0296**	**0.3030**	**0.3327**	**0.0000**	**2,246.1766**	**2,246.1766**	**0.5079**	**2.3500e-003**	**2,259.5728**

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					
2023	0.9651	7.0696	10.2450	0.0234	0.1118	0.3144	0.4262	0.0296	0.3030	0.3327	0.0000	2,246.1766	2,246.1766	0.5079	2.3500e-003	2,259.5728
Maximum	**0.9651**	**7.0696**	**10.2450**	**0.0234**	**0.1118**	**0.3144**	**0.4262**	**0.0296**	**0.3030**	**0.3327**	**0.0000**	**2,246.1766**	**2,246.1766**	**0.5079**	**2.3500e-003**	**2,259.5728**

	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**

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Grading	Grading	1/2/2023	5/5/2023	5	90	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 0

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0 (Architectural Coating –

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Grading	Bore/Drill Rigs	1	8.00	221	0.50
Grading	Crushing/Proc. Equipment	1	8.00	85	0.78
Grading	Dumpers/Tenders	1	8.00	16	0.38
Grading	Excavators	1	8.00	158	0.38
Grading	Graders	0	8.00	187	0.41
Grading	Rubber Tired Dozers	0	8.00	247	0.40
Grading	Tractors/Loaders/Backhoes	0	8.00	97	0.37

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
Grading	4	10.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Water Exposed Area

Reduce Vehicle Speed on Unpaved Roads

9295.7 - Golden Meadows - Blasting and Rock Crushing - Riverside-South Coast County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.2 Grading - 2023

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					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000			0.0000
Off-Road	0.9285	7.0471	9.8781	0.0224		0.3139	0.3139		0.3025	0.3025		2,145.5563	2,145.5563	0.5056		2,158.1959
Total	**0.9285**	**7.0471**	**9.8781**	**0.0224**	**0.0000**	**0.3139**	**0.3139**	**0.0000**	**0.3025**	**0.3025**		**2,145.5563**	**2,145.5563**	**0.5056**		**2,158.1959**

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	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
Worker	0.0365	0.0226	0.3669	9.8000e-004	0.1118	5.2000e-004	0.1123	0.0296	4.8000e-004	0.0301		100.6203	100.6203	2.3000e-003	2.3500e-003	101.3768
Total	**0.0365**	**0.0226**	**0.3669**	**9.8000e-004**	**0.1118**	**5.2000e-004**	**0.1123**	**0.0296**	**4.8000e-004**	**0.0301**		**100.6203**	**100.6203**	**2.3000e-003**	**2.3500e-003**	**101.3768**

9295.7 - Golden Meadows - Blasting and Rock Crushing - Riverside-South Coast County, Summer

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

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					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000			0.0000
Off-Road	0.9285	7.0471	9.8781	0.0224		0.3139	0.3139		0.3025	0.3025	0.0000	2,145.5563	2,145.5563	0.5056		2,158.1959
Total	**0.9285**	**7.0471**	**9.8781**	**0.0224**	**0.0000**	**0.3139**	**0.3139**	**0.0000**	**0.3025**	**0.3025**	**0.0000**	**2,145.5563**	**2,145.5563**	**0.5056**		**2,158.1959**

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	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
Worker	0.0365	0.0226	0.3669	9.8000e-004	0.1118	5.2000e-004	0.1123	0.0296	4.8000e-004	0.0301		100.6203	100.6203	2.3000e-003	2.3500e-003	101.3768
Total	**0.0365**	**0.0226**	**0.3669**	**9.8000e-004**	**0.1118**	**5.2000e-004**	**0.1123**	**0.0296**	**4.8000e-004**	**0.0301**		**100.6203**	**100.6203**	**2.3000e-003**	**2.3500e-003**	**101.3768**

9295.7 - Golden Meadows - Blasting and Rock Crushing - Riverside-South Coast County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

9295.7 - Golden Meadows - Blasting and Rock Crushing

Riverside-South Coast County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
General Heavy Industry	170.32	1000sqft	3.91	170,319.60	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.4	**Precipitation Freq (Days)**	28
Climate Zone	10			**Operational Year**	2024
Utility Company	Southern California Edison				
CO2 Intensity (lb/MWhr)	390.98	**CH4 Intensity (lb/MWhr)**	0.033	**N2O Intensity (lb/MWhr)**	0.004

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - 3.91 acre site

Construction Phase - 90 days of potential blasting/crushing

Off-road Equipment - Drill, rock crusher, excavator, dump truck

Grading -

Construction Off-road Equipment Mitigation -

Table Name	Column Name	Default Value	New Value
tblConstDustMitigation	WaterUnpavedRoadVehicleSpeed	0	15
tblConstructionPhase	NumDays	8.00	90.00
tblConstructionPhase	PhaseEndDate	2/15/2023	5/5/2023
tblConstructionPhase	PhaseStartDate	2/4/2023	1/2/2023
tblLandUse	LandUseSquareFeet	170,320.00	170,319.60
tblOffRoadEquipment	LoadFactor	0.50	0.50
tblOffRoadEquipment	OffRoadEquipmentType		Bore/Drill Rigs
tblOffRoadEquipment	OffRoadEquipmentType		Crushing/Proc. Equipment
tblOffRoadEquipment	OffRoadEquipmentType		Dumpers/Tenders
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	0.00

9295.7 - Golden Meadows - Blasting and Rock Crushing - Riverside-South Coast County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

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					
2023	0.0432	0.3182	0.4586	1.0500e-003	4.9500e-003	0.0142	0.0191	1.3100e-003	0.0136	0.0150	0.0000	91.3972	91.3972	0.0207	1.0000e-004	91.9453
Maximum	**0.0432**	**0.3182**	**0.4586**	**1.0500e-003**	**4.9500e-003**	**0.0142**	**0.0191**	**1.3100e-003**	**0.0136**	**0.0150**	**0.0000**	**91.3972**	**91.3972**	**0.0207**	**1.0000e-004**	**91.9453**

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					
2023	0.0432	0.3182	0.4586	1.0500e-003	4.9500e-003	0.0142	0.0191	1.3100e-003	0.0136	0.0150	0.0000	91.3971	91.3971	0.0207	1.0000e-004	91.9452
Maximum	**0.0432**	**0.3182**	**0.4586**	**1.0500e-003**	**4.9500e-003**	**0.0142**	**0.0191**	**1.3100e-003**	**0.0136**	**0.0150**	**0.0000**	**91.3971**	**91.3971**	**0.0207**	**1.0000e-004**	**91.9452**

	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**

Quarter	Start Date	End Date	Maximum Unmitigated ROG + NOX (tons/quarter)	Maximum Mitigated ROG + NOX (tons/quarter)
1	1-2-2023	4-1-2023	0.2582	0.2582
2	4-2-2023	7-1-2023	0.0976	0.0976
		Highest	0.2582	0.2582

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Grading	Grading	1/2/2023	5/5/2023	5	90	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 0

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0 (Architectural Coating –

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Grading	Bore/Drill Rigs	1	8.00	221	0.50
Grading	Crushing/Proc. Equipment	1	8.00	85	0.78
Grading	Dumpers/Tenders	1	8.00	16	0.38
Grading	Excavators	1	8.00	158	0.38
Grading	Graders	0	8.00	187	0.41
Grading	Rubber Tired Dozers	0	8.00	247	0.40
Grading	Tractors/Loaders/Backhoes	0	8.00	97	0.37

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
Grading	4	10.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Water Exposed Area

Reduce Vehicle Speed on Unpaved Roads

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

3.2 Grading - 2023

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					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0418	0.3171	0.4445	1.0100e-003		0.0141	0.0141		0.0136	0.0136	0.0000	87.5887	87.5887	0.0206	0.0000	88.1047
Total	**0.0418**	**0.3171**	**0.4445**	**1.0100e-003**	**0.0000**	**0.0141**	**0.0141**	**0.0000**	**0.0136**	**0.0136**	**0.0000**	**87.5887**	**87.5887**	**0.0206**	**0.0000**	**88.1047**

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	1.4600e-003	1.0800e-003	0.0141	4.0000e-005	4.9500e-003	2.0000e-005	4.9700e-003	1.3100e-003	2.0000e-005	1.3400e-003	0.0000	3.8085	3.8085	9.0000e-005	1.0000e-004	3.8406
Total	**1.4600e-003**	**1.0800e-003**	**0.0141**	**4.0000e-005**	**4.9500e-003**	**2.0000e-005**	**4.9700e-003**	**1.3100e-003**	**2.0000e-005**	**1.3400e-003**	**0.0000**	**3.8085**	**3.8085**	**9.0000e-005**	**1.0000e-004**	**3.8406**

9295.7 - Golden Meadows - Blasting and Rock Crushing - Riverside-South Coast County, Annual

EMFAC Off-Model Adjustment Factors for Gasoline Light Duty Vehicle to Account for the SAFE Vehicle Rule Applied

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					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0418	0.3171	0.4445	1.0100e-003		0.0141	0.0141		0.0136	0.0136	0.0000	87.5886	87.5886	0.0206	0.0000	88.1046
Total	**0.0418**	**0.3171**	**0.4445**	**1.0100e-003**	**0.0000**	**0.0141**	**0.0141**	**0.0000**	**0.0136**	**0.0136**	**0.0000**	**87.5886**	**87.5886**	**0.0206**	**0.0000**	**88.1046**

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	1.4600e-003	1.0800e-003	0.0141	4.0000e-005	4.9500e-003	2.0000e-005	4.9700e-003	1.3100e-003	2.0000e-005	1.3400e-003	0.0000	3.8085	3.8085	9.0000e-005	1.0000e-004	3.8406
Total	**1.4600e-003**	**1.0800e-003**	**0.0141**	**4.0000e-005**	**4.9500e-003**	**2.0000e-005**	**4.9700e-003**	**1.3100e-003**	**2.0000e-005**	**1.3400e-003**	**0.0000**	**3.8085**	**3.8085**	**9.0000e-005**	**1.0000e-004**	**3.8406**

9295.7 Golden Meadows
Construction DPM HRA

Construction Health Risk Calculations

Annual PM Exhaust Generation

Annual Tons/Year	Pounds/year	lbs/day	lbs/hr	g/day	sec/day	g/sec
0.066	132	3.62E-01	1.51E-02	164	86,400	1.90E-03

Max 1-hour concentration	1.66E-02	µg/m^3
Annualized average concentration (0.08)	1.33E-03	µg/m^3

Onsite Maximum Exposure	3rd Trimester	0<2	2<9	2<16	16<30	16-70
Cair	1.33E-03	1.33E-03	1.33E-03	1.33E-03	1.33E-03	1.33E-03
DBR	361	1090	861	745	335	290
A	1	1	1	1	1	1
EF	0.96	0.96	0.96	0.96	0.96	0.96
Dose-air	4.61E-07	1.39E-06	1.10E-06	9.50E-07	4.27E-07	3.70E-07
CPF	1.10	1.10	1.10	1.10	1.10	1.10
ASF	10	10	3	3	1	1
ED (years of construction = 1.5)	0.25	1.500	1.167	1.167	1.167	1.167
AT	70	70	70	70	70	70
FAH	0.85	0.85	0.72	0.72	0.73	0.73
Risk in 1 mill	**0.02**	**0.28**	**0.04**	**0.04**	**0.01**	**0.00**
	5.00	5.00	5.00	5.00	5.00	5.00
Chronic Exposure	**0.0003**	**0.0003**	**0.0003**	**0.0003**	**0.0003**	**0.0003**

0-9	0.34	2.92
0-30	0.34	4.08
0-70	0.34	4.08

AERSCREEN 11126 / AERMOD 1206 06/01/22
14:25:51

TITLE: Golden Meadows

********** VOLUME PARAMETERS **********

SOURCE EMISSION RATE: 0.190E-02 g/s 0.151E-01 lb/hr
VOLUME HEIGHT: 5.00 meters 16.40 feet
INITIAL LATERAL DIMENSION: 375.00 meters 1230.31 feet
INITIAL VERTICAL DIMENSION: 145.00 meters 475.72 feet
RURAL OR URBAN: URBAN
POPULATION: 20000

FLAGPOLE RECEPTOR HEIGHT: 1.50 meters 4.92 feet

INITIAL PROBE DISTANCE = 5000. meters 16404. feet

********** BUILDING DOWNWASH PARAMETERS **********

BUILDING DOWNWASH NOT USED FOR NON-POINT SOURCES

********** PROBE ANALYSIS **********
25 meter receptor spacing: 807. meters - 5000. meters

SECTOR	Zo ROUGHNESS LENGTH	1-HR CONC (ug/m3)	DIST (m)	TEMPORAL PERIOD
1*	1.000	0.1661E-01	807.2	WIN

* = worst case flow sector

********** MAKEMET METEOROLOGY PARAMETERS **********

MIN/MAX TEMPERATURE: 250.0 / 310.0 (K)

MINIMUM WIND SPEED: 0.5 m/s

ANEMOMETER HEIGHT: 10.000 meters

SURFACE CHARACTERISTICS INPUT: AERMET SEASONAL TABLES

DOMINANT SURFACE PROFILE: Urban
DOMINANT CLIMATE TYPE: Dry Conditions
DOMINANT SEASON: Winter

ALBEDO: 0.35
BOWEN RATIO: 2.00
ROUGHNESS LENGTH: 1.000 (meters)

METEOROLOGY CONDITIONS USED TO PREDICT OVERALL MAXIMUM IMPACT

YR	MO	DY	JDY	HR
10	01	16	16	01

H0	U*	W*	DT/DZ	ZICNV	ZIMCH	M-O LEN	Z0	BOWEN	ALBEDO	REF WS

- -
-0.41 0.043 -9.000 0.020 -999. 21. 19.3 1.000 2.00 0.35 0.50

HT REF TA HT
- - - - - - - - - - -
10.0 310.0 2.0

METEOROLOGY CONDITIONS USED TO PREDICT AMBIENT BOUNDARY IMPACT

YR MO DY JDY HR
-- -- -- --- --
10 01 16 16 01

H0 U* W* DT/DZ ZICNV ZIMCH M-O LEN Z0 BOWEN ALBEDO REF WS
- -
-0.41 0.043 -9.000 0.020 -999. 21. 19.3 1.000 2.00 0.35 0.50

HT REF TA HT
- - - - - - - - - - -
10.0 310.0 2.0

********** AERSCREEN AUTOMATED DISTANCES **********
OVERALL MAXIMUM CONCENTRATIONS BY DISTANCE

MAXIMUM DIST (m)	MAXIMUM 1-HR CONC (ug/m3)	MAXIMUM DIST (m)	MAXIMUM 1-HR CONC (ug/m3)
807.25	0.1661E-01	2925.00	0.9440E-02
825.00	0.1644E-01	2950.00	0.9402E-02
850.00	0.1621E-01	2975.00	0.9364E-02
875.00	0.1599E-01	3000.00	0.9327E-02
900.00	0.1578E-01	3025.00	0.9290E-02
925.00	0.1558E-01	3050.00	0.9253E-02
950.00	0.1540E-01	3075.00	0.9217E-02
975.00	0.1522E-01	3100.00	0.9181E-02
1000.00	0.1504E-01	3125.00	0.9145E-02
1025.00	0.1488E-01	3150.00	0.9110E-02
1050.00	0.1472E-01	3175.00	0.9075E-02
1075.00	0.1457E-01	3200.00	0.9040E-02
1100.00	0.1442E-01	3225.00	0.9005E-02
1125.00	0.1428E-01	3250.00	0.8971E-02
1150.00	0.1414E-01	3275.00	0.8937E-02
1175.00	0.1401E-01	3300.00	0.8903E-02
1200.00	0.1389E-01	3325.00	0.8870E-02
1225.00	0.1376E-01	3350.00	0.8837E-02
1250.00	0.1365E-01	3375.00	0.8804E-02
1275.00	0.1353E-01	3400.00	0.8771E-02
1300.00	0.1342E-01	3425.00	0.8739E-02
1325.00	0.1331E-01	3450.00	0.8707E-02
1350.00	0.1321E-01	3475.00	0.8675E-02
1375.00	0.1310E-01	3500.00	0.8643E-02
1400.00	0.1300E-01	3525.00	0.8612E-02
1425.00	0.1291E-01	3550.00	0.8581E-02
1450.00	0.1281E-01	3575.00	0.8550E-02
1475.00	0.1272E-01	3600.00	0.8519E-02
1500.00	0.1263E-01	3625.00	0.8488E-02
1525.00	0.1254E-01	3650.00	0.8458E-02
1550.00	0.1246E-01	3675.00	0.8428E-02
1575.00	0.1238E-01	3700.00	0.8398E-02
1600.00	0.1229E-01	3725.00	0.8369E-02
1625.00	0.1221E-01	3750.00	0.8339E-02
1650.00	0.1214E-01	3775.00	0.8310E-02
1675.00	0.1206E-01	3800.00	0.8281E-02
1700.00	0.1198E-01	3825.00	0.8252E-02

1725.00	0.1191E-01	3850.00	0.8224E-02
1750.00	0.1184E-01	3875.00	0.8195E-02
1775.00	0.1177E-01	3900.00	0.8167E-02
1800.00	0.1170E-01	3925.00	0.8139E-02
1825.00	0.1163E-01	3950.00	0.8111E-02
1850.00	0.1156E-01	3975.00	0.8083E-02
1875.00	0.1150E-01	4000.00	0.8056E-02
1900.00	0.1144E-01	4025.00	0.8029E-02
1925.00	0.1137E-01	4050.00	0.8001E-02
1950.00	0.1131E-01	4075.00	0.7975E-02
1975.00	0.1125E-01	4100.00	0.7948E-02
2000.00	0.1119E-01	4125.00	0.7921E-02
2025.00	0.1113E-01	4150.00	0.7895E-02
2050.00	0.1107E-01	4175.00	0.7868E-02
2075.00	0.1101E-01	4200.00	0.7842E-02
2100.00	0.1096E-01	4225.00	0.7816E-02
2125.00	0.1090E-01	4250.00	0.7791E-02
2150.00	0.1085E-01	4275.00	0.7765E-02
2175.00	0.1079E-01	4300.00	0.7740E-02
2200.00	0.1074E-01	4325.00	0.7714E-02
2225.00	0.1069E-01	4350.00	0.7689E-02
2250.00	0.1063E-01	4375.00	0.7664E-02
2275.00	0.1058E-01	4400.00	0.7639E-02
2300.00	0.1053E-01	4425.00	0.7615E-02
2325.00	0.1048E-01	4450.00	0.7590E-02
2350.00	0.1043E-01	4475.00	0.7566E-02
2375.00	0.1038E-01	4500.00	0.7542E-02
2400.00	0.1034E-01	4525.00	0.7517E-02
2425.00	0.1029E-01	4550.00	0.7494E-02
2450.00	0.1024E-01	4575.00	0.7470E-02
2475.00	0.1019E-01	4600.00	0.7446E-02
2500.00	0.1015E-01	4625.00	0.7422E-02
2525.00	0.1010E-01	4650.00	0.7399E-02
2550.00	0.1006E-01	4675.00	0.7376E-02
2575.00	0.1001E-01	4700.00	0.7353E-02
2600.00	0.9970E-02	4725.00	0.7330E-02
2625.00	0.9927E-02	4750.00	0.7307E-02
2650.00	0.9884E-02	4775.00	0.7284E-02
2675.00	0.9842E-02	4800.00	0.7261E-02
2700.00	0.9800E-02	4825.00	0.7239E-02
2725.00	0.9758E-02	4850.00	0.7217E-02
2750.00	0.9717E-02	4875.00	0.7194E-02
2775.00	0.9676E-02	4900.00	0.7172E-02
2800.00	0.9636E-02	4925.00	0.7150E-02
2825.00	0.9596E-02	4950.00	0.7128E-02
2850.00	0.9557E-02	4975.00	0.7107E-02
2875.00	0.9517E-02	5000.00	0.7085E-02
2900.00	0.9479E-02		

********** AERSCREEN MAXIMUM IMPACT SUMMARY **********

CALCULATION PROCEDURE	MAXIMUM 1-HOUR CONC (ug/m3)	SCALED 3-HOUR CONC (ug/m3)	SCALED 8-HOUR CONC (ug/m3)	SCALED 24-HOUR CONC (ug/m3)	SCALED ANNUAL CONC (ug/m3)
FLAT TERRAIN	1.66E-02	1.66E-02	1.50E-02	9.97E-03	1.66E-03

DISTANCE FROM SOURCE 807.25 meters

IMPACT AT THE AMBIENT BOUNDARY	0.1661E-01	0.1661E-01	0.1495E-01	0.9965E-02	0.1661E-02

DISTANCE FROM SOURCE 807.25 meters

APPENDIX B

Biological Resources Assessment, L&L Environmental, Inc.

L&L ENVIRONMENTAL, INC.
REGULATORY SERVICES
BIOLOGICAL & CULTURAL INVESTIGATIONS & MONITORING

FINAL

UPDATED BIOLOGICAL RESOURCES ASSESSMENT, BOTANICAL, BURROWING OWL, AND NESTING RAPTOR SURVEYS, AND RIPARIAN BIRD HABITAT ASSESSMENT GOLDEN MEADOWS PROJECT, TRACT 31194, CITY OF MENIFEE, CALIFORNIA

±204.65-Acre Property, ±4.68 Acres Offsite, ±209.33 Acres Surveyed

APNs 360-300-002, -003, -004, -005, -006, -009, 360-350-001, and portions of offsite 360-180-009, 360-300-001, -008, 360-350-019, -022, -023, -024, 360-360-009, -010, -011, and 360-380-004, Tract 31194, Township 6 South, Range 3 West, Sections 15 and 16, USGS Romoland, 7.5' Topographic Quadrangle

Prepared For:

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Report Summary:

The Project site is in the area covered by the MSHCP but is not in the Criteria Area. The site is mainly agricultural land and disturbed/ruderal areas with some coastal scrub, chaparral, and scattered riparian vegetation. One sensitive vegetation community is present, arroyo willow thickets. No listed plant species observed. Two special status plants, long-spined spineflower and southern California black walnut observed. One immature coast live oak and other trees present. Coastal California gnatcatcher present and nesting on the site. White-tailed kite observed foraging but no nesting. No vernal pools or fairy shrimp habitat. Riparian birds considered absent. Several special status wildlife species observed. One burrowing owl and occupied burrow observed in 2018 but not present in 2021. A preconstruction survey is required. Habitat suitable for nesting birds is present and preconstruction clearance survey and avoidance buffers recommended during the nesting season. Site is not within a wildlife corridor. Jurisdictional and MSHCP riparian/riverine areas present. Regulatory permits and a DBESP required.

Surveys Conducted By: Guy Bruyea and John Konecny

Surveys Conducted: May – November 2021

Report Date: October 2017, updated October 2018, July 2019, November 2021, revised December 2021

Celebrating 20+ Years of Service to Southern CA and the Great Basin, WBE Certified (Caltrans, CPUC, WBENC)
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MANAGEMENT SUMMARY

L&L Environmental, Inc. (L&L) conducted biological surveys on Richland Communities' ±204.65-acre Golden Meadows Project site (and associated offsite improvement areas of ±4.68 acres) in the City of Menifee, California. The Project consists of construction of 572 single-family residential lots and associated roads and infrastructure. A blue-line stream runs through the site and the Project includes an Avoidance Area along the stream that will retain native habitat and natural flows. Open space will also be retained in the northeast corner of the site. An Environmental Impact Report (EIR) for the Project was published in 2006.

L&L has performed biological surveys on this property since 2003. The purpose of this study was to examine the site to determine presence/absence of biological resources on the property and potential for special status species to occur, as well as update previous survey results. Surveys in 2021 included a biological resources assessment/habitat assessment, focused botanical survey, protocol breeding season burrowing owl survey, nesting raptor survey, and riparian bird habitat assessment. This study reflects the most current field conditions and, where appropriate, makes comparative statements regarding past observed conditions.

The site is within the area covered by the Western Riverside County Multiple Species Habitat Conservation Plan (MSHCP). The MSHCP requires habitat assessments, and focused surveys if suitable habitat is present, for riparian/riverine resources and associated species and burrowing owl (*Athene cunicularia*). There is one area of Public/Quasi-Public (PQP) Conserved Lands approximately 0.68 miles north-northeast of the site, identified as the Ringing Rock Archaeological Site. Other than the Ringing Rock Site, there are no PQP or MSHCP Conserved Lands within a mile of the site. The site is not within or near any MSHCP Core Areas or Linkages.

The site consists mainly of cultivated agricultural fields (dry-farmed wheat) and disturbed/ruderal areas with some areas of disturbed to relatively undisturbed California buckwheat scrub and chamise chaparral. The ephemeral blue-line stream runs through the agricultural fields and includes scattered and degraded riparian vegetation (arroyo willow thickets and mulefat thickets). Arroyo willow thicket is a sensitive vegetation community. No vernal pools or ponding areas were observed.

Land use adjacent to the site includes anthropogenic disturbances such as rural residential development, agricultural areas, unimproved roads, powerline easements, off-highway vehicle (OHV) activity, and trash dumping.

No state or federally listed threatened or endangered plant species were observed on the site. Two (2) special status plant species were observed, southern California black walnut (*Juglans californica*) and long-spined spineflower (*Chorizanthe polygonoides* var. *longispina*). Five (5) black walnut trees are present within the riparian area on the site. Two long-spined spineflower plants were present in 2017 but the species has not been observed during subsequent surveys. Both of these species are covered under the MSHCP and considered adequately conserved. No other special status plants were observed onsite during previous or current surveys, but three (3) species have a low to moderate or moderate potential to occur: smooth tarplant (*Centromadia pungens ssp. laevis*), Parry's spineflower (*Chorizanthe parryi var. parryi*), and small-flowered morning-glory (*Convolvulus simulans*). All of these species are covered under the MSHCP and considered adequately conserved.

There is a single immature coast live oak tree and a number of other native and non-native trees on the site, mainly in the riparian area. The City may regulate removal or replacement of trees and a tree survey may be required.

Previous and current surveys have documented coastal California gnatcatchers (*Polioptila californica californica*) present on the Project site and nesting has been observed. This species is federally listed as threatened. All observations were in the California buckwheat scrub habitat in the northeastern portion of the site. Coastal California gnatcatcher is a covered species under the MSHCP and considered adequately conserved. Under the MSHCP, focused surveys for this species are not required.

Two white-tailed kites (*Elanus leucurus*) were observed on the Project site in 2005 and one in 2011, but this species has not been observed on the site during more recent surveys. This species is fully protected in California. The EIR includes a mitigation measure (4.3-5) requiring a nesting raptor survey prior to issuance of grading permits and a CDFW Incidental Take Permit (2080 permit) if white-tailed kite are documented as nesting on the Project site. The California Natural Diversity Database (CNDDB) has documented occurrences of five (5) white-tailed kite nests within 10 miles of the Project site but no white-tailed kite nesting has been observed onsite. White-tailed kite is a covered species under the MSHCP and considered adequately conserved.

No vernal pools, ponding areas, or potential habitat for fairy shrimp were observed. The riparian vegetation on the site is scattered and degraded and there is no suitable habitat for least Bell's vireo (*Vireo bellii pusillus*), southwestern willow flycatcher (*Empidonax traillii extimus*), or western yellow-billed cuckoo (*Coccyzus americanus occidentalis*).

Two other listed species have a moderate or high potential to occur on the Project site, although they have not been observed: Stephens' kangaroo rat (*Dipodomys stephensii*) and tricolored blackbird (foraging) (*Agelaius tricolor*). Both of these species are covered under the MSHCP and considered adequately conserved. Under the MSHCP, focused trapping surveys for Stephens' kangaroo rat are not required.

Habitat suitable for use by burrowing owl is present on much of the property but is regularly disturbed by agricultural activities. There were no observations of burrowing owls during biological surveys of the site in 2003, 2004, 2005, 2006, 2011, 2013, and 2017. Surveys in 2018 observed one burrowing owl and an active burrow. The owl was observed during the survey on May 30, 2018 but was not observed during subsequent surveys. Focused surveys in 2019 and 2021 did not detect any burrowing owl, occupied burrows, or owl sign. A preconstruction clearance survey for burrowing owl (valid for 30 days) will be required.

Other special status wildlife species have observed on the site during previous and current surveys: coast horned lizard (*Phrynosoma blainvillii*), orange-throated whiptail (*Aspidoscelis hyperythra*), coastal (western) whiptail (*Aspidoscelis tigris stejnegeri*), Cooper's hawk (*Accipiter cooperii*), northern harrier (*Circus hudsonius*), California horned lark (*Eremophila alpestris actia*), great egret (*Ardea alba*), great blue heron (fly over) (*Ardea herodias*), Lawrence's goldfinch (*Spinus lawrencei*), loggerhead shrike (*Lanius ludovicianus*), California thrasher (*Toxostoma redivivum*), southern California rufous-crowned sparrow (*Aimophila ruficeps canescens*), Bell's sage sparrow (*Artemisiospiza belli belli*), Nuttall's woodpecker (*Dryobates nuttallii*), wrentit (*Chamaea fasciata*), Costa's hummingbird (*Calypte costae*), rufous hummingbird (*Selasphorus rufus*), and San Diego black-tailed jackrabbit (*Lepus californicus bennettii*).

All of these species are covered under the MSHCP and considered adequately conserved except great egret, Lawrence's goldfinch, California thrasher, Nuttall's woodpecker, wrentit, Costa's hummingbird, and rufous hummingbird, which are not covered under the MSHCP.

Five (5) additional special status wildlife species have not been observed on the Project site during surveys but have a low to moderate potential to occur: Crotch bumble bee (*Bombus crotchii*), southern California legless lizard (*Anniella stebbinsi*), Dulzura pocket mouse (*Chaetodipus californicus femoralis*), northwestern San Diego pocket mouse (*Chaetodipus fallax fallax*), and western mastiff bat (foraging) (*Eumops perotis californicus*). Northwestern San Diego pocket mouse is covered under the MSHCP and considered adequately conserved. The remaining four species are not covered under the MSHCP. Crotch bumble bee was previously

a candidate for state listing, but its status is currently in litigation. If this species becomes listed, focused surveys and incidental take permitting may be required.

Nesting birds are protected under State and federal laws and habitat suitable for nesting birds (including raptors) is present within and around the site. Scheduling Project activities outside the nesting season (generally February 1 through August 31) or conducting preconstruction nesting bird clearance surveys and establishing avoidance buffers around any active nests is recommended. If nesting birds are present, an avoidance buffer of 300 to 500 feet (or as recommended by a biologist) should be established around active nests until juvenile birds have fledged and/or a biologist has verified that the nest has become inactive.

The Project site is largely surrounded by scattered existing development and there is no connectivity between the site and conserved lands to the east (Diamond Valley Lake) and southwest (Santa Rosa Plateau, Cleveland National Forest). Although there may be limited local movement of wildlife across the site, it is not within or adjacent to a wildlife corridor.

An ephemeral blue-line stream is present on the site and includes state waters and wetlands, federal waters, and MSHCP riparian/riverine habitat. All jurisdictional areas onsite will either be impacted by development or incorporated into the Avoidance Area. The Avoidance Area will retain native riparian habitat and natural flows. Regulatory permits from the U.S. Army Corps of Engineers (USACE), Regional Water Quality Control Board (RWQCB), and California Department of Fish and Wildlife (CDFW) will be required for impacts to jurisdictional areas. A Determination of Biologically Equivalent or Superior Preservation (DBESP) will be required for impacts to MSHCP riparian/riverine habitat.

Pools or depressions characteristic of vernal habitat were not observed on the site and no wetland or vernal pool plant species were present. No evidence of ponding areas (i.e., cracked soils, tire ruts, etc.) were observed on the site during surveys.

1.0) INTRODUCTION

This report was prepared by L&L Environmental, Inc. (L&L) for Richland Communities. It describes the results of biological surveys conducted on a proposed residential development site located within the City of Menifee, Riverside County, California. The Project site consists of Assessor's Parcel Numbers (APNs) 360-300-002, -003, -004, -005, -006, -009, and 360-350-001 (totaling ±204.65 acres) and portions of APNs 360-180-009, 360-300-001, -008, 360-350-019, -022, -023, -024, 360-360-009, -010, -011, and 360-380-004 where offsite improvements are planned (totaling ±4.68 acres).

The 2021 updated assessment consisted of (1) a records search and literature review, conducted to determine the species of concern in the Project area and proximity to closest documented special status species observations, (2) field surveys to identify plants and wildlife on the site and assess presence/absence of habitat for species of concern, (3) a focused botanical survey, (4) a protocol breeding season survey for burrowing owl, and (4) a habitat assessment for riparian birds.

1.1) Project Description

The Project is identified as Golden Meadows (formerly known as Menifee Assemblage), Tract No. 31194, and consists of construction of 572 single-family residential lots and associated roads and infrastructure (Figure 3b). The Project will be constructed in four (4) phases. Offsite impacts include improvements to existing roads and installation of flood control structures. The site plan is provided in Appendix E. An Environmental Impact Report for the Project was published in 2006 (T&B 2006).

The property also includes an Eastern Municipal Water District (EMWD) tank site. The proposed tank site includes two large water tanks and an access road. The tanks will serve multiple developments, including Golden Meadows. The tank site is located within the tract boundary, but it is not within the proposed Project boundary and is not a part of the Project.

The Project includes an Avoidance Area along the blue-line stream that retains native habitat and natural flows. Open space will also be retained in the northeast corner of the site.

1.2) Location

The site is located in Paloma Valley, west of the Interstate 215 freeway (I-215), south of Newport Road, and east of Murrieta Road (Figure 1). It is located between Wickerd Road to the south and Garbani Road to the north. The site is situated in Sections 15 and 16, Township 6 South, Range 3 West, within the USGS *Romoland* 7.5' series quadrangle map (Figure 2).

The site is generally bounded as follows: to the west by agricultural lands, Evans Road (unimproved), rural residential areas, and a school; to the east by a mixture of disturbed and relatively undisturbed vacant land, Sherman Road (unimproved), and a Frontier Communications building complex and Haun Road beyond; to the north by a mixture of disturbed and relatively undisturbed vacant lands, rural residential areas, Garbani Road (unimproved), and residential developments; and to the south by Wickerd Road (unimproved), and a mix of disturbed and relatively undisturbed vacant lands and rural residential areas (Figure 3a).



L&L Environmental, Inc.

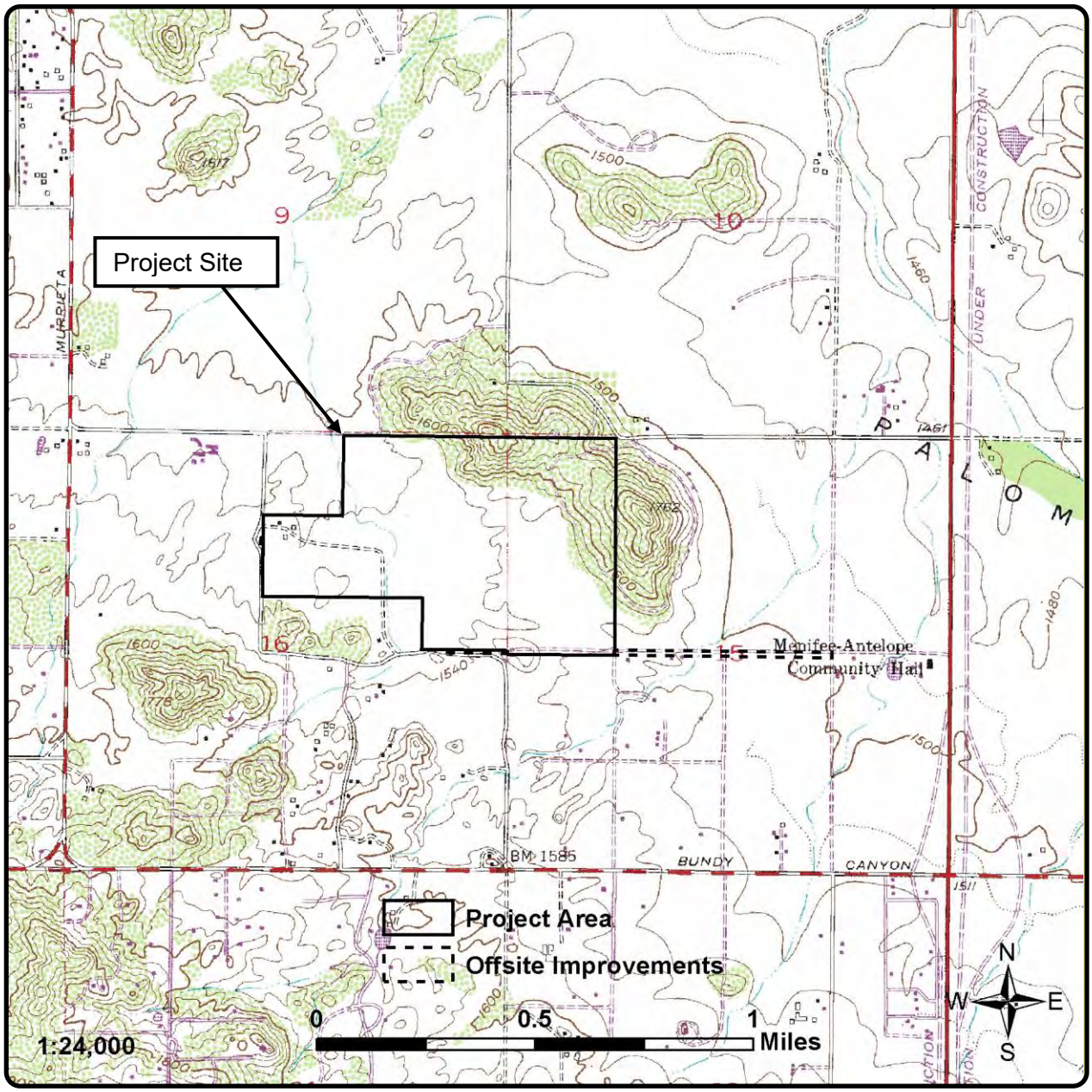
BIOLOGICAL AND CULTURAL INVESTIGATIONS AND MONITORING

RLCC-03-187
December 2021

Figure 1

Project Vicinity Map

Golden Meadows, TT 31194
City of Menifee, California



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BIOLOGICAL AND CULTURAL INVESTIGATIONS AND MONITORING

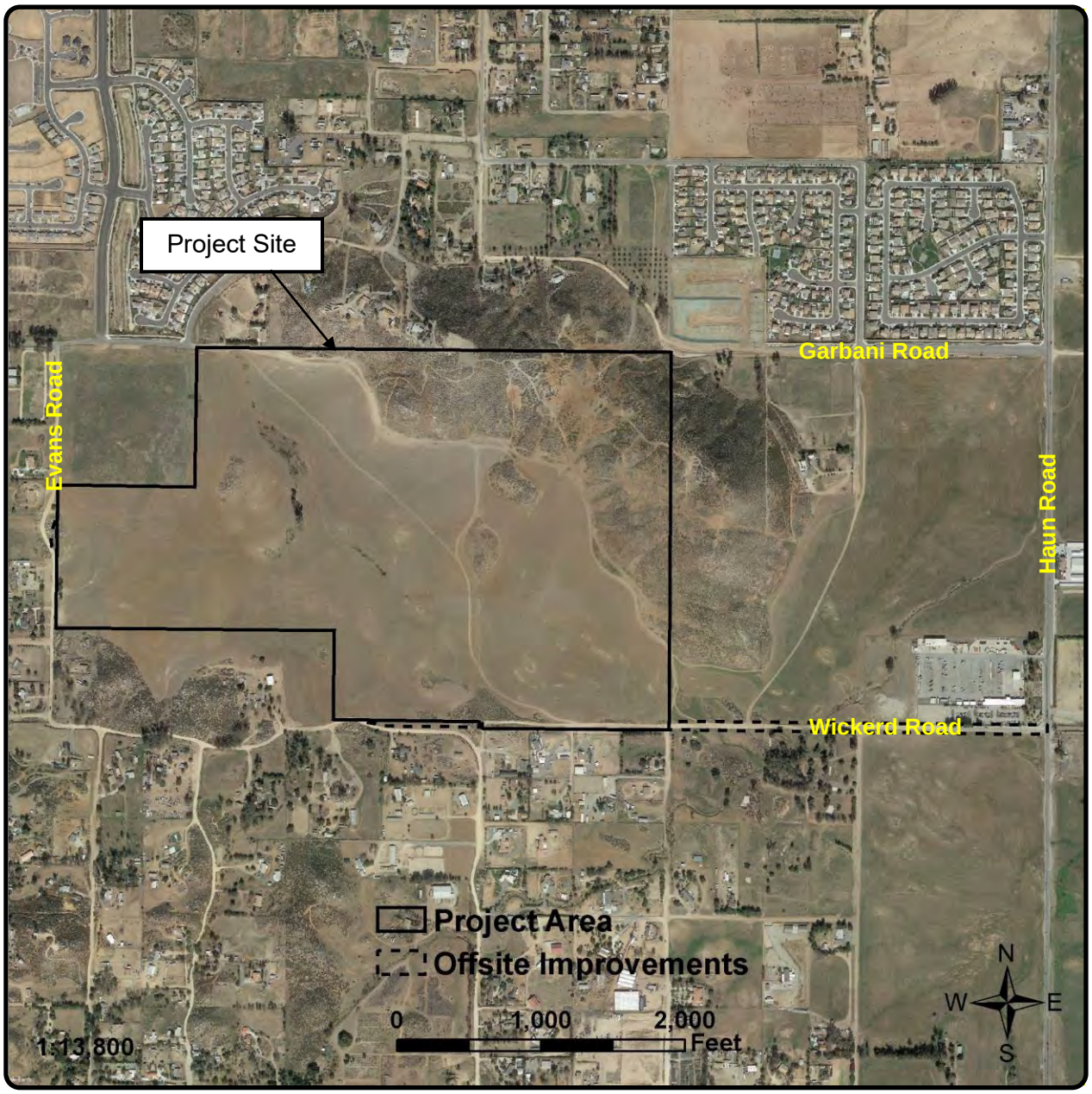
RLCC-03-187
December 2021

Figure 2

Project Location Map

(USGS Romoland 1979 quadrangle,
Sections 15 & 16, Township 6 South, Range 3 West)

Golden Meadows, TT 31194
City of Menifee, California



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December 2021

Figure 3a

Aerial Photograph
(Photo obtained from Google Earth, February 2018)

Golden Meadows, TT 31194
City of Menifee, California



L&L Environmental, Inc.

BIOLOGICAL AND CULTURAL INVESTIGATIONS AND MONITORING

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December 2021

Figure 3b

Development Plan
(Plan obtained from Hunsaker & Assoc. Irvine, Inc., 2021)

Golden Meadows, TT 31194
City of Menifee, California

1.3) Vegetation and Setting

A review of historical aerial images (NETRonline 2021, Google Earth 2021) finds that most areas of the site have been disturbed in association with agricultural uses since at least 1938. These areas are still under cultivation and do not support native habitat communities. Areas of California buckwheat scrub are present in the less disturbed areas on the property, mainly the slopes in the northeastern corner. Remnants of chamise chaparral are present along the southern site boundary.

An ephemeral drainage feature and mapped blue-line stream is present trending from the southwest/central to the northwest portion of the site, as well as various other jurisdictional features. Much of this area has been impacted by agricultural activities and invasive plants, but limited areas of disturbed and degraded riparian vegetation are present in association with this drainage. No vernal pools or ponding areas were observed onsite.

Land use adjacent to the site includes anthropogenic disturbances such as rural residential development, agricultural areas, unimproved roads, powerline easements, OHV activity, and trash dumping.

Two (2) unimproved roads are present on the property. The first is an unnamed dirt road that begins at the eastern terminus of Daniel Road (in the northwestern corner of the site) and exits at the southeastern corner of the site near the intersection of Wickerd Road and Ascot Way. The second is identified as Krubsack Road, which runs north-south through agricultural fields within the roughly west-central portion of the property and connects with Wickerd Road to the south and Daniel Road to the north. Many OHV trails are also present on the property, mainly in the northeastern corner. The 2021 survey found that earthen berms and rock piles had recently been placed on roads and trails to block entrance to the site.

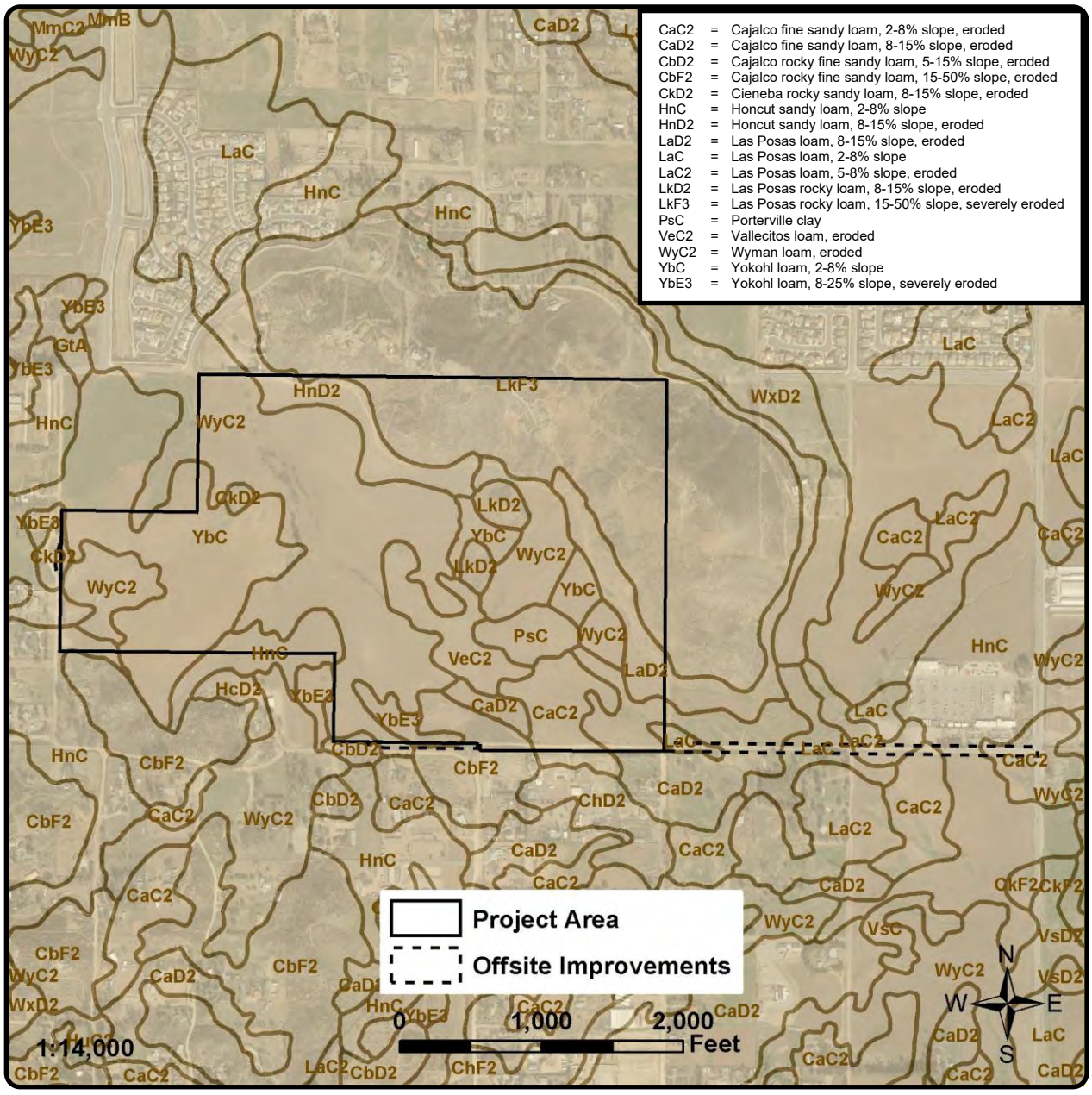
1.4) Soils and Topography

Soils on the Project site were mapped as Wyman loam (WyC2), Vallecitos loam (VeC2), Porterville clay (PsC), Yokohl loam (YbC and YbE3), Cajalco fine sandy loam (CaC2 and CaD2), Cajalco rocky fine sandy loam (CbF2), Honcut sandy loam (HnC and HnD2), Las Posas loam (LaD2), and Las Posas rocky loam (LkD2 and LkF3) (NRCS 2021) (Figure 4).

The most common soils mapped for the subject property are Wyman loam on the central and western portion of the site (in agricultural areas) and Las Posas rocky loams on vegetated

hillsides within the northern and eastern portions of the site. Clay soils are relatively uncommon on the site, but Porterville clay is mapped as present near the southeastern portion of the property. Soils observed onsite range from mostly sandy-loamy within the agricultural areas to rocky loamy on the vegetated hillsides. Cryptobiotic crusts are present, but only within less disturbed portions of the site.

Topographically, much of the site is relatively flat and contains open land with low-relief rocky outcrops. Gently to steeply sloping hills and ridgelines are present within the northeastern portion of the property. The site has a combined maximum vertical relief of roughly 220 feet (67 meters) between the highest and lowest points on the property, with elevation ranging from approximately 1,500 to 1,720 feet (457 to 524 meters) above mean sea level (AMSL).



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BIOLOGICAL AND CULTURAL INVESTIGATIONS AND MONITORING

RLCC-03-187
December 2021

Figure 4

Soils Map

(Photo obtained from Google Earth, February 2016, USDA Nat. Res. Cons. Serv. SSURGO Data)

Golden Meadows, TT 31194
City of Menifee, California

2.0) METHODS AND PERSONNEL

2.1) Literature Review

Certain plants and animals have been listed as threatened or endangered under state or federal Endangered Species Acts. Other species have not been formally listed, but declining populations or habitat availability are reasons for concern regarding their long-term viability. These species are included in lists compiled by resource management agencies or conservation organizations. In this report, the term "listed" refers to all species that are listed, or candidates for listing, as threatened or endangered by the U.S. Fish and Wildlife Service (USFWS) or California Department of Fish and Wildlife (CDFW). "Special status species" refers to all species included in one or more compendia of rare species, but not listed as threatened or endangered by USFWS or CDFW.

Pertinent literature was reviewed to identify local occurrences and habitat requirements of special status species and communities occurring in the region. Literature reviewed included compendia provided by resource agencies (CDFW 2021a, 2021b), a search of the California Natural Diversity Database (CNDDB; CDFW 2021c) and California Native Plant Society Inventory of Rare and Endangered Plants (CNPS 2021) for the Project topographic quadrangle (Romoland) and adjacent quadrangles (Steele Peak, Perris, Lakeview, Lake Elsinore, Winchester, Wildomar, Murrieta, and Bachelor Mountain), and a search of USFWS Information for Planning and Consultation (IPaC; USFWS 2021a) for the Project site. Reports of previous surveys completed for the site (L&L 2003-2019) were also reviewed. Information from past surveys is summarized and included in this report as appropriate.

Potentials for occurrence of plant and wildlife species were evaluated and classified as either absent, not expected, low, moderate, high, or occurs. These classifications are based on the presence and quality of habitat, geographic and elevation range of species, proximity to a known occurrence of a species obtained from CNDDB or other reliable data, and field observations. Classifications for individual species may be modified based on biologists' experience and expert opinion.

Scientific names of plants follow Baldwin et al. (2012) with updates from the online Jepson eFlora (Jepson 2021). Scientific names of animals follow Stebbins (1985), Jameson and Peeters (1988), Cornell (2021), and Arnett (2000), with updates from academic sources. Current conservation status of plant and wildlife species determined from CDFW (2021a,

2021b). Vegetation community classifications follow Sawyer et al. (2009) with updates from CDFW (2020). State ranks (S ranks) for vegetation communities are from CDFW (2020). Other sources consulted for information regarding biological resources include Brown (1994), Recon (1985), Schoenherr (1990), and Small (1994).

In this report, the "Project site" or "site" includes all of the Project parcels (±204.65 acres) plus offsite impact areas (±4.68 acres) for a total of ±209.33 acres surveyed. Acreages are based on GIS calculations.

2.2) General Biological and Botanical Survey Methods

L&L biologist Guy Bruyea visited the Project site from May through November of 2021 to conduct general biological and botanical surveys (Table 1).

Table 1. General Biological and Botanical Survey Dates and Weather Conditions

Date	Time	Weather	Wind (mph)
05.21.2021	0545-0845	Clear, 50-56º F	1-6
05.21.2021	1700-1930	Clear, 62-67º F	2-5
05.25.2021	0530-0830	Clear, 57-65º F	0-1
05.31.2021	0530-0830	Marine layer/Clear, 61-73º F	0-4
05.31.2021	1700-1930	Clear, 74-82º F	2-4
06.05.2021	0600-1100	Clear, 74-83º F	0-2
06.07.2021	0600-1000	Clear, 58-67º F	0-3
07.06.2021	0600-0900	Clear, 66-75º F	0-2
07.11.2021	0600-0830	Partly Cloudy, 73-81º F	1-2
08.01.2021	0630-1030	Clear, 76-87º F	1-4
11.08.2021	0800-1200	Clear, 66-75º F	0-3
11.09.2021	0900-1300	Clear, 70-79º F	1-5

A total of about 40.5 person-hours were spent onsite during surveys in 2021. All habitat types onsite were visited on foot. The site was surveyed by conducting a series of transects across the subject property where possible, stopping periodically for observations and notations. A general habitat map and field notes were completed at the time of the survey. All field surveys were conducted during daylight hours. Digital photographs were taken to record the condition of the site during the present survey.

The methodology used is consistent with recommendations by the California Native Plant Society (CNPS 2001), CDFW (2018, 2000), and USFWS (2000). All plant species observed were identified in the field or collected for later identification or confirmation. All species were recorded in field notes and the locations of special status species were documented using GPS. Plants of uncertain identity were collected and subsequently identified from keys, descriptions,

and illustrations in Baldwin (2012), Abrams (1923, 1944, and 1951), Abrams and Ferris (1960), Munz (1974), and Parker (1999).

Vegetation community mapping of the site was also verified in 2021. The vegetation mapping from the 2018 biological survey report (L&L 2018a) was used as a basis and verified through field observations. Vegetation community classification is consistent with the California Natural Community List (CDFW 2020) and Sawyer et al. (2009).

2.3) Burrowing Owl Survey Methods

Protocol breeding season burrowing owl surveys were conducted by Mr. Bruyea concurrently with a portion of the general biological and botanical surveys (Table 2).

Table 2. Burrowing Owl Survey Dates and Weather Conditions

Date	Time	Sunrise*	Sunset*	Weather	Wind (mph)
05.21.2021	0545-0845	0547	--	Clear, 50-56º F	1-6
05.21.2021	1700-1930	--	1952	Clear, 62-67º F	2-5
05.31.2021	0530-0830	0542	--	Marine layer/Clear, 61-73º F	0-4
05.31.2021	1700-1930	--	1958	Clear, 74-82º F	2-4
06.05.2021	0600-1100	0541	--	Clear, 74-83º F	0-2
06.07.2021	0600-1000	0541	--	Clear, 58-67º F	0-3
07.06.2021	0600-0900	0547	--	Clear, 66-75º F	0-2
07.11.2021	0600-0830	0550	--	Partly Cloudy, 73-81º F	1-2

*sunrise/sunset times from timeanddate.com

A total of about 25.5 person-hours were spent during burrowing owl surveys in 2021. The site was examined for suitable burrow sites and for signs of occupation by burrowing owl, including pellets, feathers, whitewash, prey remains, and eggshell fragments, as well as individual owls. A search for potentially suitable burrows within dirt, wood, and rock debris piles, artificially created berms, and other locations was conducted during the surveys. The surveys were concentrated in areas typically associated with burrowing owl habitat, including open areas onsite and areas where California ground squirrel activity (i.e., suitable burrows) was expected. An additional 150-meter (500-foot) buffer area surrounding the site was visually inspected, where possible, in areas identified as potential burrowing owl habitat (Figure 5). Any developed areas were visually surveyed with binoculars due to trespassing concerns on private property.

Transects were walked throughout the property where suitable habitat is present. Coupled with binocular surveys of any restricted areas, this allowed for complete visual ground coverage of the survey area. Distance between transects was approximately 15 to 20 meters.

Per MSHCP protocol for burrowing owl surveys (RCA 2006), surveys should be conducted during weather that is conducive to observing owls outside their burrows and detecting burrowing owl sign. Surveys will not be accepted if they are conducted during rain, high winds (>20 mph), dense fog, or temperatures over 90°F. Surveys should be conducted in the morning one hour before sunrise to two hours after sunrise or in the early evening two (2) hours before sunset to one (1) hour after sunset. Surveys were conducted during appropriate hours and weather conditions (Table 2).

2.4) Nesting Raptor Survey Methods

Concurrently with the burrowing owl survey, the site was examined to determine the presence/absence of nesting raptors on the property, in particular white-tailed kite. This survey primarily focused on examining trees onsite and within 500 feet of the Project site for evidence of raptor nesting.

2.5) Riparian Bird Habitat Assessment Methods

A habitat assessment for riparian bird species least Bell's vireo, southwestern willow flycatcher, and western yellow-billed cuckoo was conducted by John Konecny of Konecny Biological Services. Mr. Konecny holds USFWS Section 10(a) permit TE837308-7 for southwestern willow flycatcher.

The habitat assessment was conducted on September 29, 2021 and focused on the riparian vegetation on the site. Weather conditions during the survey were mild with little wind and scattered overcast. No call prompting of any species was conducted.

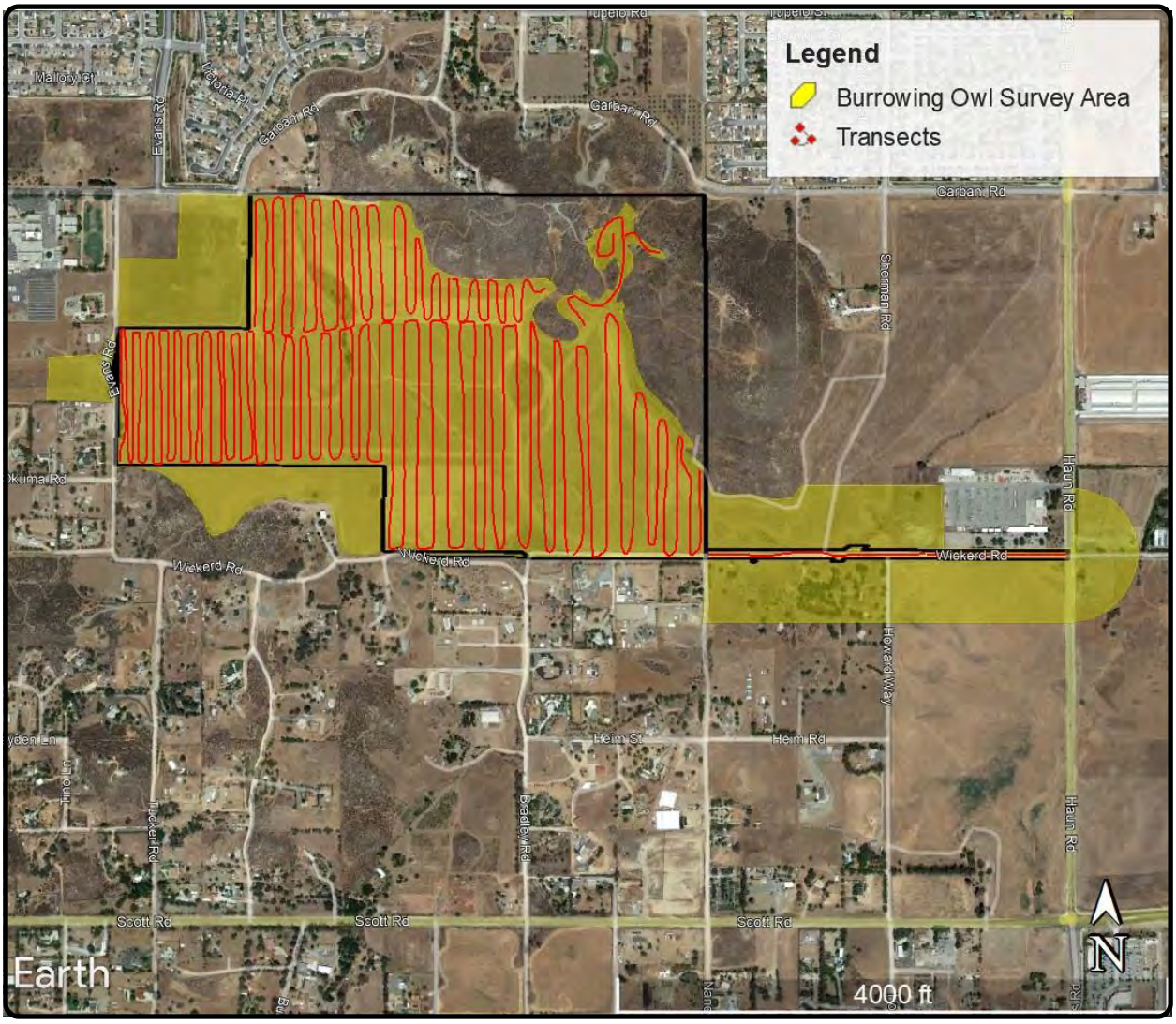

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Figure 5

Burrowing Owl Survey Area
(Photo obtained from Google Earth, August 2021)

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3.0) RESULTS

3.1) Literature Review Results

3.1.1) MSHCP Requirements

The site is located within the area covered by the MSHCP but is not within the Criteria Area. There is one area of Public/Quasi-Public (PQP) Conserved Lands approximately 0.68 miles north-northeast of the site. This PQP area is identified as Ringing Rock Archaeological Site under the management of the Riverside County Parks and Open Space District. Other than the Ringing Rock Site, there are no other PQP or MSHCP Conserved Lands within a mile of the site. The site is not within or near any MSHCP Core Areas or Linkages (Figure 6).

Surveys required by the MSHCP are a habitat assessment to address riparian/riverine and vernal pool habitats and associated species and burrowing owl (RCA 2021). If suitable habitat is present, focused surveys are required.

The MSHCP mapped vegetation layer (1994 baseline) depicts the site as largely agricultural land with areas of coastal sage scrub, grassland, and chaparral. No riparian habitat or Riversidean alluvial fan sage scrub is mapped on the parcel in the 1994 baseline (RCA 2021).

3.1.2) Precipitation

Precipitation data was obtained from the Clark, Sage, and Cranston Remote Automated Weather Stations (RAWS) (WRCC 2021). The Clark RAWS is located about 16.8 miles north-northwest of the Project site at an elevation of 1,720 feet; Sage RAWS is about 14.7 miles east-southeast of the site at an elevation of 1,516 feet; Cranston RAWS is about 21.0 miles east-northeast of the site at an elevation of 1,950 feet (WRCC 2021).

Total precipitation recorded by the Clark, Sage, and Cranston RAWS for the 2021 water year[1] was 4.96, 6.19, and 6.75 inches, respectively. Average annual precipitation for the Project area is 10 to 15 inches (WRCC 2018). Precipitation data is provided in Appendix C.

[1] A water year is October through September. For example, the 2021 water year is October 2020 through September 2021.

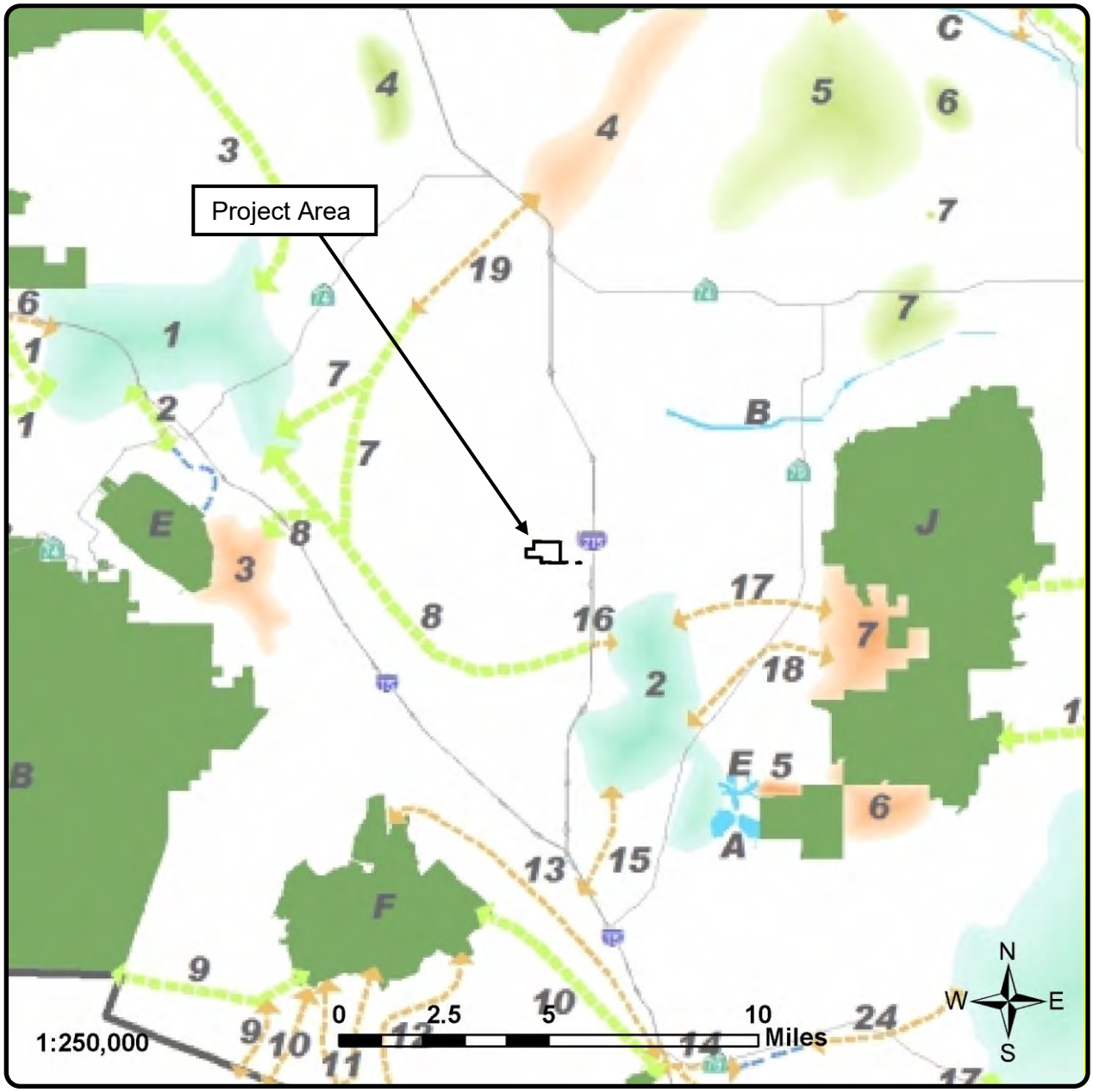

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Figure 6

MSHCP Cores and Linkages
(Riverside County MSHCP)

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3.1.3) Previous Surveys

L&L reviewed the results of previous biological surveys of the site, which included a general biological survey and a jurisdictional delineation in 2003 (L&L 2003a, 2003b), spring botanical survey and focused surveys for Quino checkerspot butterfly and coastal California gnatcatcher in 2004 (L&L 2004a, 2004b, 2004c), burrowing owl survey, habitat assessment for riparian birds, and updated jurisdictional delineation in 2005 (L&L 2005a, 2005b, 2005c), burrowing owl survey, focused surveys for least Bell's vireo and southwestern willow flycatcher, and a habitat assessment for yellow-billed cuckoo in 2006 (L&L 2006a, 2006b), burrowing owl survey in 2007 (L&L 2007), surveys for special status plants, burrowing owl, and updated jurisdictional delineation in 2011 (L&L 2011), habitat assessment and burrowing owl survey in 2013 (L&L 2013), general biological and botanical survey in 2017 (L&L 2017), burrowing owl and nesting raptor surveys and updated jurisdictional delineation in 2018 (L&L 2018a, 2018b), and burrowing owl surveys and an updated jurisdictional delineation in 2019 (L&L 2019a, 2019b). Previous survey results are summarized and incorporated into this report as appropriate.

3.1.4) 2006 Environmental Impact Report

The 2006 Final Environmental Impact Report (EIR) for the Project (T&B 2006) includes the following mitigation measures for impacts to biological resources:

> 4.3-1 TTM No. 31194, Lot #503 (approximately 39.0 acres in the northeastern portion of the property) shall be preserved as open space and shall be covered by a conservation easement or other mechanism to ensure permanent preservation, with allowance for required maintenance of fuel modification zones. The conservation easement area shall be shown on the Final Map.
>
> 4.3-2 Thirty days prior to grading, a qualified biologist shall make a determination regarding the presence or absence of the burrowing owl. The determination shall be documented in a report to be reviewed and accepted by the County of Riverside. If the species is determined to be present, and the MSHCP's stated objectives 1 – 4 for burrowing owl have not yet been met, mitigation shall be required in compliance with the MSHCP, Appendix E which states:
>
> > a. If the site contains or is part of an area supporting less than 35 acres of suitable habitat or the survey reveals that the site and surrounding area supports

less than 3 pairs of burrowing owls, then the on-site burrowing owls shall be passively or actively relocated following accepted protocols.

b. If the site (including adjacent areas) supports 3 or more pairs of burrowing owls, supports greater than 35 acres of suitable habitat and is non-contiguous with MSHCP Conservation Area lands, at least 90 percent of the area with long-term conservation value and burrowing owl pairs shall be conserved on-site.

4.3-3 Prior to issuance of grading permits, the applicant shall be required to pay Local Development Mitigation Fees (per County Ordinance No. 4.62.070) for implementation of the MSHCP.

4.3-4 Prior to issuance of grading permits, the applicant shall pay fees in accordance with the USFWS-approved HCP, to mitigate the project's potentially significant impacts to the Stephens' kangaroo rat.

4.3-5 If construction activities occur between February 1 and August 31 and within 150 feet of suitable nesting locations, a focused raptor survey will be required prior to issuance of grading permits. If active nests are located within the portion of the site to be disturbed or within 150 feet of the area to be disturbed, measures shall be initiated to avoid any impacts to nesting raptors. Measures to avoid impacts will include identifying the location and creating a buffer zone around the tree within which impacts will be avoided until the juveniles have fledged.

a. The white-tailed kite is "fully-protected" by the California Department of Fish and Game. If this species is documented as nesting on the project site during the raptor survey, or it is determined this species will be significantly impacted by development a 2080 permit for "take" shall be required from the CDFG.

4.3-6 Prior to the issuance of grading permits, the applicant shall submit documentation to the County of Riverside verifying that the necessary permits required by the U.S. Army Corps of Engineers (ACOE), California Department of Fish and Game (CDFG) and Regional Water Quality Control Board (RWQCB) have been obtained. The ACOE has a no net loss policy which requires that any unavoidable impacts to wetland values and functions be replaced. In addition, the RWQCB will add restrictions to control runoff from the site, require on the site treatment of runoff to improve water quality, and impose Best Management Practices on the construction. It is anticipated that the following measures

or similar measures as approved by the ACOE, CDFG, and RWQCB would reduce impacts to ACOE and CDFG jurisdictional areas to a level less than significant:

a. On or off-site replacement of ACOE jurisdictional waters and wetlands at a ratio no less than 1:1;

b. On or off-site replacement of CDFG jurisdictional streambed and associated riparian habitat at a ratio no less than 1:1; and/or

c. Incorporation of design features into the proposed project that will avoid biological impacts to off-site blue-line streams that ultimately end up in the Railroad Canyon Reservoir (Canyon Lake).

4.3-7 Individual lot fencing shall be used to restrict access to the on-site wetland areas. Back yard gates from individual residential lots that open onto the wetland area shall be prohibited. Fencing locations and materials shall be shown on the Final Map and approved by the County's Environmental Programs Department (EPD) prior to issuance of building permits. Required fencing shall be installed prior to issuance of occupancy permits.

4.3-8 Night lighting during and after project construction shall be directed away from onsite wetland areas and, except for safety and other requirements, lighting shall be limited from the boundaries of onsite wetland areas. In the event that lighting in an area adjacent to the wetland area is necessary, a shield shall be incorporated in project designs to ensure ambient lighting in the wetland area is not increased. Lighting plans shall be approved by the County prior to issuance of building permits. Lighting restrictions and the reasons for such restrictions shall be included in the project's CC&Rs.

4.3-9 The landscape plans for the project in areas adjacent or tributary to wetland areas shall not include those species listed in the MSHCP as "Plants That Should Be Avoided Adjacent to The MSHCP Conservation Area." The County of Riverside Planning Department shall review and approve all plant material for the project, prior to issuance of building permits. Information regarding the importance of avoiding the listed plants, even in front and backyard landscaping, shall be included in sales literature distributed to homeowners. The list of restricted plant materials and the reasons for such restrictions shall be listed in the project's CC&Rs.

3.2) Vegetation Communities

Much of the property has been disturbed by current and historical cultivation and past sheep grazing and does not support native habitat. Less disturbed areas are present, primarily in the northeastern portions of the site, with a mixture of disturbed and relatively undisturbed California buckwheat scrub and chamise chaparral. Sparse riparian vegetation and trees are found along the blue-line stream in the northwestern/central portion of the site (Figure 7).

The agricultural fields are dry farmed for wheat. Evidence of widespread sheep grazing was observed throughout all areas of the site in 2013. Hillsides containing California buckwheat scrub along the farmland edges, especially to the north and east, had been severely damaged by sheep grazing. Very few annuals remained (none in some areas) and many of the perennials had been stripped of vegetation and/or trampled. No evidence of current sheep grazing was observed during surveys in 2017, 2018, 2019, and 2021 and regrowth of native annuals and perennials was observed in the buckwheat scrub areas.

Table 3. Vegetation Communities Present

Vegetation Community	**Area Present (acres)**		
	Onsite	**Offsite**	**Total**
California Buckwheat Scrub	41.69	0	41.69
California Buckwheat Scrub/Ruderal	2.52	0	2.52
Chamise Chaparral	2.05	0.18	2.23
Arroyo Willow Thickets and Mulefat Thickets	1.31	0.05	1.36
Agriculture and Disturbed/Ruderal	157.08	4.45	161.53
Total	**204.65**	**4.68**	**209.33**

Table 4. Vegetation Community Impacts

Vegetation Community	**Area Impacted (acres)***		
	Onsite	**Offsite**	**Total**
California Buckwheat Scrub	18.49**	0	18.49**
California Buckwheat Scrub/Ruderal	2.52	0	2.52
Chamise Chaparral	2.05	0.18	2.23
Arroyo Willow Thickets and Mulefat Thickets	1.31	0.05	1.36
Agriculture and Disturbed/Ruderal	154.30	4.45	158.75
Total	**178.67**	**4.68**	**183.35**

*Any discrepancy in totals due to rounding error. **Includes the water tank site. The water tank site is a separate project covered under a separate CEQA process by EMWD and not a part of the Golden Meadows Project.

3.2.1) California Buckwheat Scrub

In previous reports, this vegetation community was referred to by the older name of Riversidean sage scrub (Holland Element Code 32700). Under the more recent Sawyer et al. (2009) classification, this type of coastal scrub is best classified as California buckwheat scrub (*Eriogonum fasciculatum* Shrubland Alliance). CDFW ranks this community as S5 (secure – common, widespread, and abundant) and it is not considered sensitive.

California buckwheat scrub is present on the northeastern portion of the site on south, west, and east-facing slopes containing numerous rocky outcrops. Native shrubs and other conspicuous plants commonly observed in these areas include California buckwheat (*Eriogonum fasciculatum*), California sagebrush (*Artemisia californica*), and white sage (*Salvia apiana*). Other conspicuous plants include brittlebush (*Encelia farinosa*), yellow bush-penstemon (*Keckiella antirrhinoides*), wishbone bush (*Mirabilis laevis* var. *crassifolia*), sweetbush (*Bebbia juncea*), and black sage (*Salvia mellifera*). Annuals are also abundant in this community and include natives such as wreath plant (*Stephanomeria virgata*) and western sunflower (*Helianthus annuus*) and non-natives such as shortpod mustard (*Hirschfeldia incana*), red brome (*Bromus rubens*), slender wild oat (*Avena barbata*), and Mediterranean grass (*Schismus barbatus*).

Open patches can be found throughout portions of the buckwheat scrub onsite and contain a mixture of native and non-native annuals. Natives include popcorn flower (*Plagiobothrys* species), large flower rancher's fiddleneck (*Amsinckia intermedia*), common cryptantha (*Cryptantha intermedia*), evening primrose (*Camissonia* species), wild carrot (*Daucus pusillus*), slender tarweed (*Deinandra fasciculata*), and phacelia (*Phacelia* species). Other plants observed include chia (*Salvia columbariae*), perezia (*Acourtia microcephala*), hooked navarretia (*Navarretia hamata*), sapphire woollystar (*Eriastrum sapphirinum*), and fringed spineflower (*Chorizanthe fimbriata*).

3.2.2) Chamise Chaparral

In previous reports, this vegetation community was referred to by the older name of northern mixed chaparral (Holland Element Code 37130). Under the more recent Sawyer et al. (2009) classification, this vegetation community is best classified as chamise chaparral (*Adenostoma fasciculatum* Shrubland Alliance) or chamise–black sage chaparral (*Adenostoma fasciculatum*–*Salvia mellifera* Shrubland Alliance). CDFW ranks chamise chaparral as S5 (secure – common,

widespread, and abundant) and chamise-black sage chaparral at S4 (apparently secure – uncommon but not rare). The chaparral on the site is not considered sensitive.

Common species found in the chaparral areas onsite are chamise (*Adenostoma fasciculatum*), black sage, and other perennials. A poorly developed understory is usually present in association with chaparral and is characteristic of this vegetation community on the site.

Only small patches of remnant chaparral were observed on the site along the southern boundary. The survey in November 2021 found that a portion of the chamise chaparral on the site had been mowed to the ground.

3.2.3) Arroyo Willow Thickets and Mulefat Thickets

In previous reports, the riparian vegetation onsite was referred to by the older names of southern arroyo willow riparian (Holland Element Code 61320), mulefat scrub (Holland Element Code 63310), and disturbed wetland (Holland Element Code 11200). Under the more recent Sawyer et al. (2009) classification, this vegetation community is best classified as arroyo willow thickets (*Salix lasiolepis* Shrubland Alliance) and mulefat thickets (*Baccharis salicifolia* Shrubland Alliance). CDFW ranks arroyo willow thickets as S4 (apparently secure – uncommon but not rare); however, it is considered sensitive. Mulefat thickets are ranked as S5 (secure – common, widespread, and abundant) and not considered sensitive.

Arroyo willow thickets and mulefat thickets are dependent on the presence of at least periodic surface or subsurface water. The northwestern portion of the site contains a degraded blue-line stream sparsely inhabited by arroyo willow (*Salix lasiolepis*), mulefat (*Baccharis salicifolia*), or a mix of the two. A single Fremont cottonwood tree (*Populus fremontii* ssp. *fremontii*), five southern California black walnut trees (*Juglans californica*), black willow (*Salix gooddingii*), and scattered blue elderberry (*Sambucus nigra* ssp. *cerulea*) and non-native tamarisks (*Tamarix* species) are also present. The understory is dominated by native and non-native annuals, including (but not limited to) shortpod mustard, western sunflower, large-flowered rancher's fiddleneck, Spanish clover (*Acmispon americanus*), wild radish (*Raphanus sativus*), mayweed (*Anthemis cotula*), prickly lettuce (*Lactuca serriola*), and non-native grasses, including wheat (*Triticum aestivum*) and oat (*Avena* species).

Surface water was not observed within any of the onsite drainage features during the surveys. Over the course of surveys since 2003, it has been noted that the density and health of riparian

shrubs and trees appears to be declining. Over time, some areas of the streambed and gaps in riparian vegetation have been incorporated into the surrounding agricultural fields.

3.2.4) Agriculture and Disturbed/Ruderal

In previous reports, agricultural fields and disturbed/ruderal areas onsite were referred to by the older designations of Holland Element Codes 18300 and 11300. Agriculture is not included under the more recent Sawyer et al. (2009) classification. Disturbed/ruderal areas that are strongly dominated by annual non-natives may be classified as semi-natural stands, such as *Brassica* (*nigra*) and Other Mustards Semi-natural Herbaceous Stands or *Bromus rubens*—*Schismus barbatus* Semi-natural Herbaceous Stands. These are not considered sensitive vegetation communities.

The majority of the site is under cultivation and consists of dry-farmed wheat crops. Invasive plants are found within farmed portions of the site, and include lamb's quarters (*Chenopodium murale*), calabazilla (*Cucurbita foetidissima*), and knotweed (*Polygonum aviculare*).

Disturbed habitat includes unvegetated areas (such as roads) and areas that contain mostly non-native plant species, including ornamentals and ruderal invasives. Some non-native and weedy species have invaded these areas, including short-pod mustard, red brome, redstem filaree (*Erodium cicutarium*), and various non-native grasses. Other non-native plant species observed in these areas include horehound (*Marrubium vulgare*), Russian thistle (*Salsola tragus*), and tumbling pigweed (*Amaranthus albus*).

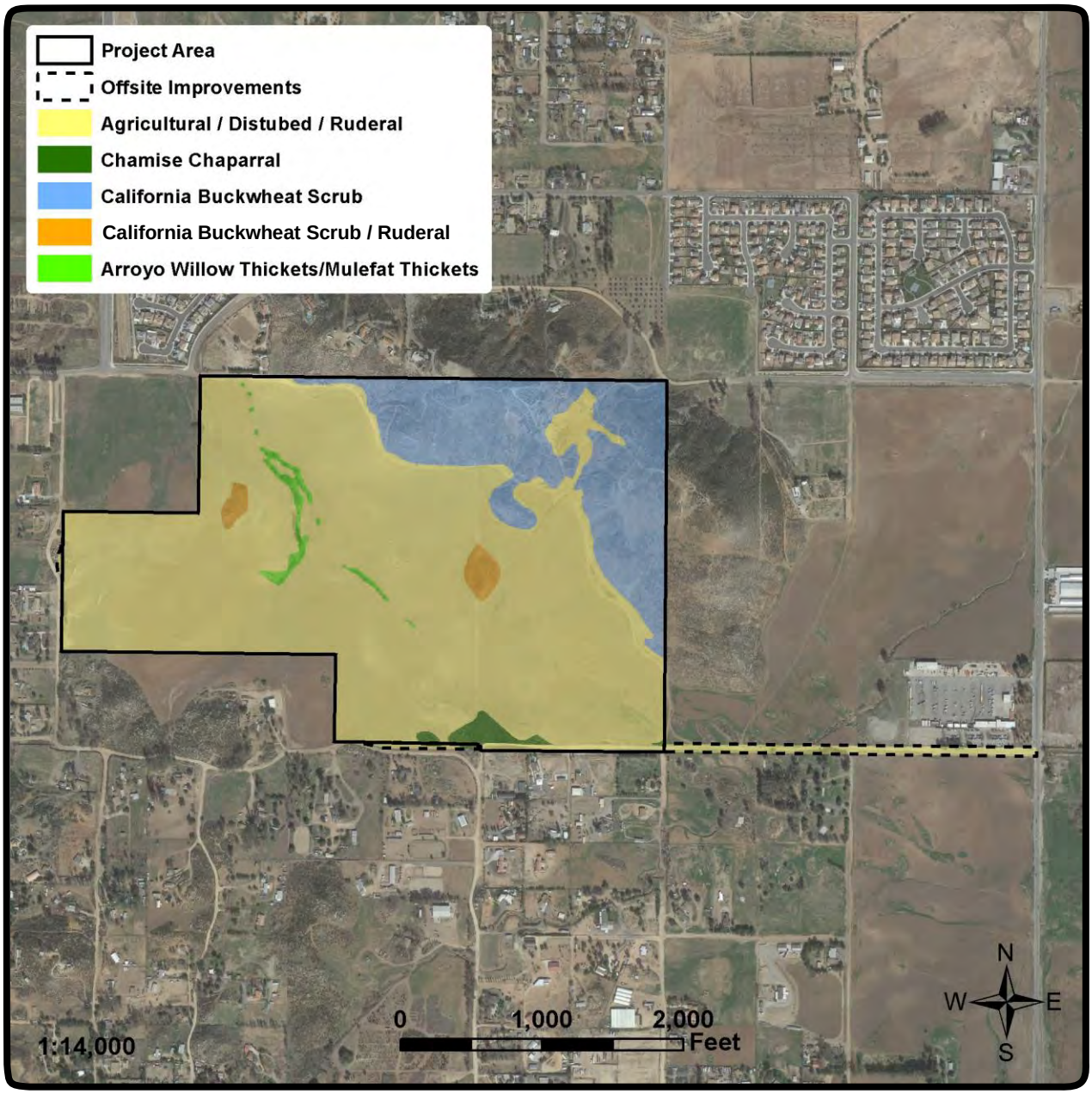

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Figure 7

Vegetation Community Map
(Photo obtained from Google Earth, February 2016)

Golden Meadows, TT 31194
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3.3) Plant Species

A total of 127 plant species were observed onsite during biological surveys conducted by L&L from 2003 through 2021. Of the 127 plant species present, 46 (36 percent) are non-natives. A list of all plant species identified onsite during previous and current surveys is included in Appendix A.

No state or federally listed plants were observed during surveys and the Project site is not within USFWS designated critical habitat for any listed plant species. Two special status plant species were observed on the site during surveys, long-spined spineflower (*Chorizanthe polygonoides* var. *longispina*) and southern California black walnut (*Juglans californica*). Details of special status plant observations are provided in Table 5 and locations are mapped on Figure 8.

Table 5. Special Status Plant Species Observations

Species	Date	GPS Coordinates (Decimal Degrees)	Number Detected	Elevation (feet)
Long-spined spineflower *Chorizanthe polygonoides var. longispina*	05.12.2017	33.655304, -117.187238	2	~1600
Southern California black walnut *Juglans californica*	09.22.2005 11.08.2021	33.653919, -117.192902	1	1517
	09.22.2005 11.08.2021	33.653955, -117.192924	1	1518
	11.08.2021	33.654018, -117.193226	1	1519
	11.08.2021	33.653468, -117.192879	1	1517
	11.08.2021	33.652603, -117.192823	1	1522

Long-spined spineflower is an annual herb in the Polygonaceae (Buckwheat) family. It is found in chaparral, coastal scrub, meadows and seeps, valley and foothill grasslands, and vernal pools at 100 to 5,020 feet elevation. It flowers from April through July. This species is found in Riverside, Orange, and San Diego Counties and Baja California, Mexico (CNPS 2021).

This species is not state or federally listed as threatened or endangered. It has a California Rare Plant Rank (CRPR) of 1B.2 (rare or endangered in California and elsewhere, moderately threatened in California). It is a covered species under the MSHCP and considered adequately conserved.

Long-spined spineflower was observed on the site in 2017. Two (2) plants were observed on clay soils within California buckwheat scrub in the northeast portion of the site along an east-west ridgeline. This area has been impacted by OHV use and the species has not been observed during subsequent surveys. Long-spined spineflower has also been documented by the CNDDB (Element Occurrence #57) on the east-central portion of the site. This record is from 2004 and estimates at least 100,000 plants on five acres of the site. It was not observed in this location during L&L surveys.

Southern California black walnut is a deciduous tree in the Juglandaceae (Walnut) family. It is found in chaparral, cismontane woodland, coastal scrub, and riparian woodland at 165 to 2,955 feet elevation. It is endemic to California and found in portions of southern, central, and northern California (CNPS 2021).

This species is not state or federally listed as threatened or endangered. It has a CRPR of 4.2 (limited distribution, moderately threatened in California). It is a covered species under the MSHCP and considered adequately conserved.

Five (5) southern California black walnut trees were observed in the riparian area in the central portion of the site. Representative photos are provided in Appendix D.

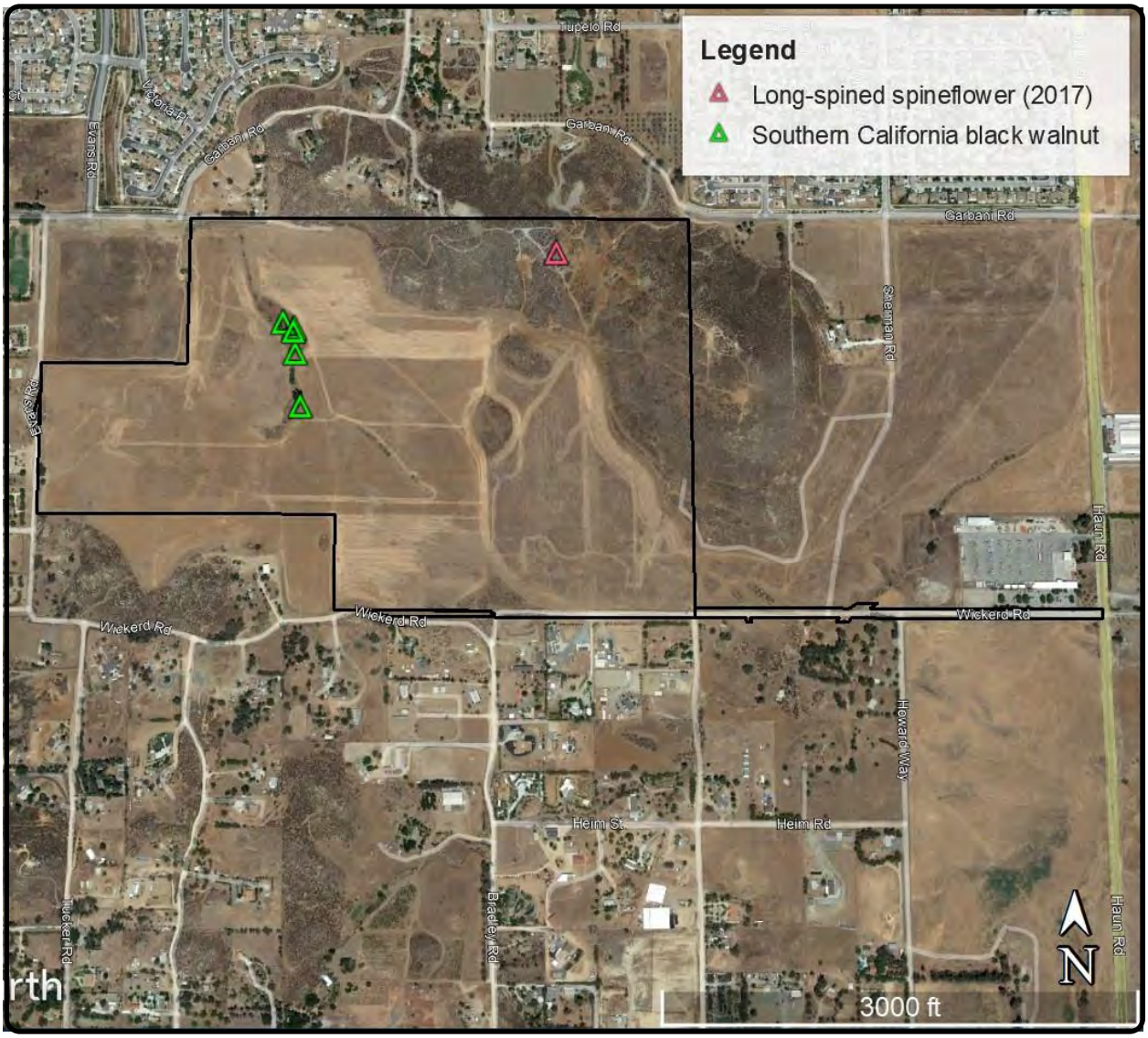
Three (3) additional special status plant species have a low to moderate or moderate potential to occur on the Project site but not been observed during surveys (see Appendix B). These species are:

- smooth tarplant (*Centromadia pungens ssp. laevis*; CRPR 1B.1 [rare or endangered in California and elsewhere, seriously threatened in California]),
- Parry's spineflower (*Chorizanthe parryi var. parryi*; CRPR 1B.1), and
- small-flowered morning-glory (*Convolvulus simulans*; CRPR 4.2).

These three (3) species are all covered under the MSHCP and considered adequately conserved.

3.3.1) Trees

There is a single immature coast live oak tree (*Quercus agrifolia*) present on the site within the riparian area. Other native trees on the site are blue elderberry, southern California black walnut, Fremont cottonwood, arroyo willow, and black willow. Non-native and escaped ornamental trees on the site include Peruvian pepper tree (*Schinus molle*), eucalyptus, tree tobacco (*Nicotiana glauca*), and tamarisk. The City may regulate removal or replacement of trees and a tree survey may be required.



L&L Environmental, Inc.

BIOLOGICAL AND CULTURAL INVESTIGATIONS AND MONITORING

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Figure 8

Special Status Plant Observations

(Photo obtained from Google Earth, August 2021)

Golden Meadows, TT 31194
City of Menifee, California

3.4) Wildlife Species

A total of 85 vertebrate wildlife species, plus domestic dog, have been detected during L&L's biological surveys of the site from 2003 through 2021. An additional 15 common butterfly species were observed (during Quino checkerspot butterfly surveys in 2004) but this does not represent a comprehensive list of insects present. A list of all wildlife species identified onsite is provided in Appendix A. Details of listed and special status species observations are provided in Table 6 and observations are mapped on Figure 9. CNDDB forms for 2021 observations are included in Appendix E.

Table 6. Listed and Special Status Wildlife Species Observations

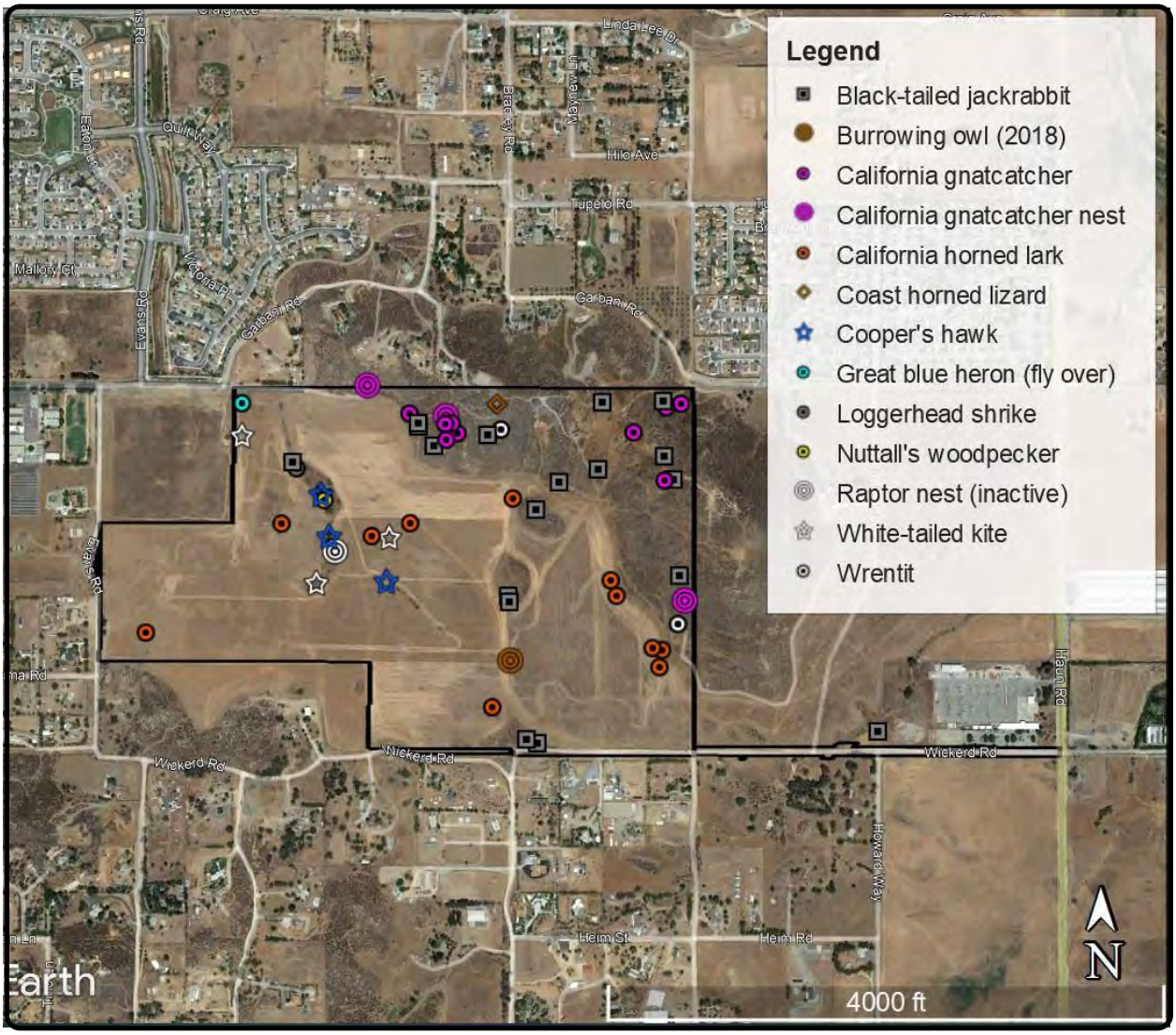
Species	Date	GPS Coordinates (Decimal Degrees)	Number Detected	Elevation (feet)
Coast horned lizard *Phrynosoma blainvillii*	04.26.2011	33.655640, -117.188980	1	1723
	2004*	--	--	--
Orange-throated whiptail *Aspidoscelis hyperythra*	2004*	--	--	--
Coastal (western) whiptail *Aspidoscelis tigris stejnegeri*	2005*	--	--	--
	2004*			
Raptor nest site	2013, 2017, 2018, 2019	33.652749, -117.192797	1 nest (inactive)	1520
Cooper's hawk *Accipiter cooperii*	06.07.2021	33.653876, -117.193126	1	1518
	05.21.2021	33.653050, -117.192942	1	1522
	2007*	--	--	--
	2005	33.652173, -117.191589	2	1524
	2004*	--	--	--
Northern harrier *Circus hudsonius*	2013*	--	--	--
	2011*	--	--	--
	2004*	--	--	--
White-tailed kite *Elanus leucurus*	04.26.2011	33.653036, -117.191520	1	Fly over
	2005	33.652143, -117.193236	1	1523
	2005	33.655034, -117.194991	1	1508

Species	Date	GPS Coordinates (Decimal Degrees)	Number Detected	Elevation (feet)
California horned lark *Eremophila alpestris actia*	07.06.2021	33.649724, -117.189071	Several	1542
	06.05.2021 05.21.2021	33.650884, -117.185290	Several	1558
	05.25.2021	33.651187, -117.197238	Several	1537
	05.28.2019	33.653331, -117.191005	Several	1524
	04.16.2019	33.650844, -117.185067	Several	1557
	06.14.2018	33.653079, -117.191911	Several	1520
	05.24.2018	33.650510, -117.185130	Several	1548
	04.25.2017	33.653816, -117.188586	Several	1556
	04.08.2017	33.653324, -117.194038	Several	1519
	04.01.2017	33.652212, -117.186278	Several	1560
	09.17.2013	33.651900, -117.186140	20+	1561
	2004*	--	--	--
	07.2003*	--	--	--
Great egret *Ardea alba*	2004*	--	--	--
Great blue heron *Ardea herodias*	04.01.2017	33.655683, -117.194971	1	Fly over
	2005*	--	--	--
Lawrence's goldfinch *Spinus lawrencei*	2004*	--	-	--
Loggerhead shrike *Lanius ludovicianus*	2005	33.654408, -117.193684	1	1517
California thrasher *Toxostoma redivivum*	2005*	--	--	--
	2004*	--	--	--
Southern California rufous-crowned sparrow *Aimophila ruficeps canescens*	2004*	--	--	--
Bell's sage sparrow *Artemisiospiza belli belli*	2004*	--	--	--
Nuttall's woodpecker *Dryobates nuttallii*	07.06.2021	33.653838, -117.193080	1 male	1517

Species	Date	GPS Coordinates (Decimal Degrees)	Number Detected	Elevation (feet)
Coastal California gnatcatcher *Polioptila californica californica*	06.07.2021 05.31.2021	33.654966, -117.184909	2 males 1 female	1643
	04.16.2019	33.655093, -117.189888	1	1629
	03.11.2019[1]	33.655673, -117.184620	1	1557
	05.24.2018	33.655112, -117.185740	2 (a pair)	1576
	04.01.2017	33.655336, -117.190141	1 male	1621
	03.28.2017	33.654170, -117.185007	1 male	1656
	03.28.2017[2]	33.655604, -117.184969	2 (a pair)	1576
	04.29.2011	33.65529, -117.19003	2 (a pair)	1637
	04.26.2011	33.65548, -117.19102	1 male	1557
	04.19.2004	33.656002, -117.192037 (just offsite)	Active nest	1547
	04.04.2004	33.655400, -117.190183	Active nest	1624
	04.04.2004	33.651783, -117.184550	Active nest	1627
Burrowing owl *Athene cunicularia*	05.30.2018	33.650610, -117.188668	1 adult 1 burrow	1536
Wrentit *Chamaea fasciata*	07.11.2021	33.651355, -117.184692	1	1610
	05.31.2021	33.655169, -117.188866	1	1672
	07.2003*	--	--	--
Costa's hummingbird *Calypte costae*	2011*	--	--	--
	2004*	--	--	--
Rufous hummingbird *Selasphorus rufus*	2004*	--	--	--
San Diego black-tailed jackrabbit *Lepus californium bennettii*	05.25.2021	33.653599, -117.188042	1	1563
	06.14.2018	33.654478, -117.193719	1	1512
	03.28.2017[3]	33.654645, -117.185019	2	1650
	04.01.2017	33.654137, -117.187498	2	1583
	2013	33.655294, -117.190818	1	1563
	2013	33.651907, -117.188694	1	1545
	2013	33.649095, -117.188265	1	1570

Species	Date	GPS Coordinates (Decimal Degrees)	Number Detected	Elevation (feet)
San Diego black-tailed jackrabbit *Lepus californium bennettii* (continued)	2013	33.649251, -117.179982 (offsite)	1	1513
	04.26.2011	33.649020, -117.188010	1	1579
	04.26.2011	33.651790, -117.188670	1	1546
	04.26.2011	33.655230, -117.190810	1	1557
	04.26.2011	33.655703, -117.186478	1	1661
	04.26.2011	33.654188, -117.184800	1	1667
	04.26.2011	33.652306, -117.184658	1	1632
	04.26.2011	33.654389, -117.186578	1	1607
	04.26.2011	33.654851, -117.190446	1	1592
	04.26.2011	33.655064, -117.189181	1	1657
	04.26.2011	33.655727, -117.185042	1	1570
	2004*	--	--	--

*Details of observations are not available. 1. Coastal California gnatcatcher detected during unrelated survey of adjacent property. 2. Coastal California gnatcatcher was also detected in the same approximate areas on 04.08.2017, 04.25.2017, and 05.06.2017. These are likely the same individuals previously detected in the area. 3. Black-tailed jackrabbit was also detected in the same approximate areas on 04.08.2017 and 05.06.2017; number of individuals was not determined.



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BIOLOGICAL AND CULTURAL INVESTIGATIONS AND MONITORING

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Figure 9

Special Status Wildlife Observations (2003-2021)

(Photo obtained from Google Earth, August 2021)

Golden Meadows, TT 31194
City of Menifee, California

3.4.1) Listed and Fully Protected Wildlife

Biological surveys conducted on the Project site by L&L from 2003 to 2021 detected two listed or fully protected wildlife species on the site, coastal California gnatcatcher (*Polioptila californica californica*) and white-tailed kite (*Elanus leucurus*), discussed below.

Two other listed species have not been observed on the Project site during surveys but have a moderate or high potential to occur, Stephens' kangaroo rat (*Dipodomys stephensii*) and tricolored blackbird (*Agelaius tricolor*) (see Appendix B).

Stephens' kangaroo rat is federally listed as endangered and state listed as threatened. Based on potentially suitable habitat and multiple documented occurrences in the Project vicinity (CDFDW 2021c), this species has a high potential to occur on the site. Stephens' kangaroo rat is a covered species under the MSHCP and considered adequately conserved. Focused trapping surveys for this species are not required by the MSHCP.

Tricolored blackbird is state listed as threatened. Based on potentially suitable foraging habitat and several eBird records (eBird 2021) in the Project vicinity, this species has a low to moderate potential to forage on the site, but there is no suitable nesting habitat. Tricolored blackbird is a covered species under the MSHCP and considered adequately conserved.

Coastal California Gnatcatcher

Coastal California gnatcatcher is federally listed as threatened and a CDFW Species of Special Concern. Coastal California gnatcatcher is a covered species under the MSHCP and considered adequately conserved. Focused surveys for this species are not required by the MSHCP; however the MSHCP limits disturbance to outside the nesting season.

Surveys from 2004 to 2021 have documented coastal California gnatcatchers on the Project site (Table 6). Nesting was observed in 2004 and breeding pairs were present in 2011, 2017, and 2018. Coastal California gnatcatchers were observed in 2021 and, although nesting was not observed, it is likely. All observations were in the California buckwheat scrub habitat in the northeastern portion of the site (Figure 9).

White-tailed Kite

White-tailed kite (*Elanus leucurus*) is a CDFW Fully Protected species. The classification of Fully Protected was California's initial effort to identify and protect rare wildlife species. With a few exceptions, Fully Protected species have subsequently been listed under the California

and/or Federal Endangered Species Acts. One of the exceptions is white-tailed kite, which is not state or federally listed, but retains its Fully Protected status. White-tailed kite is a covered species under the MSHCP and considered adequately conserved.

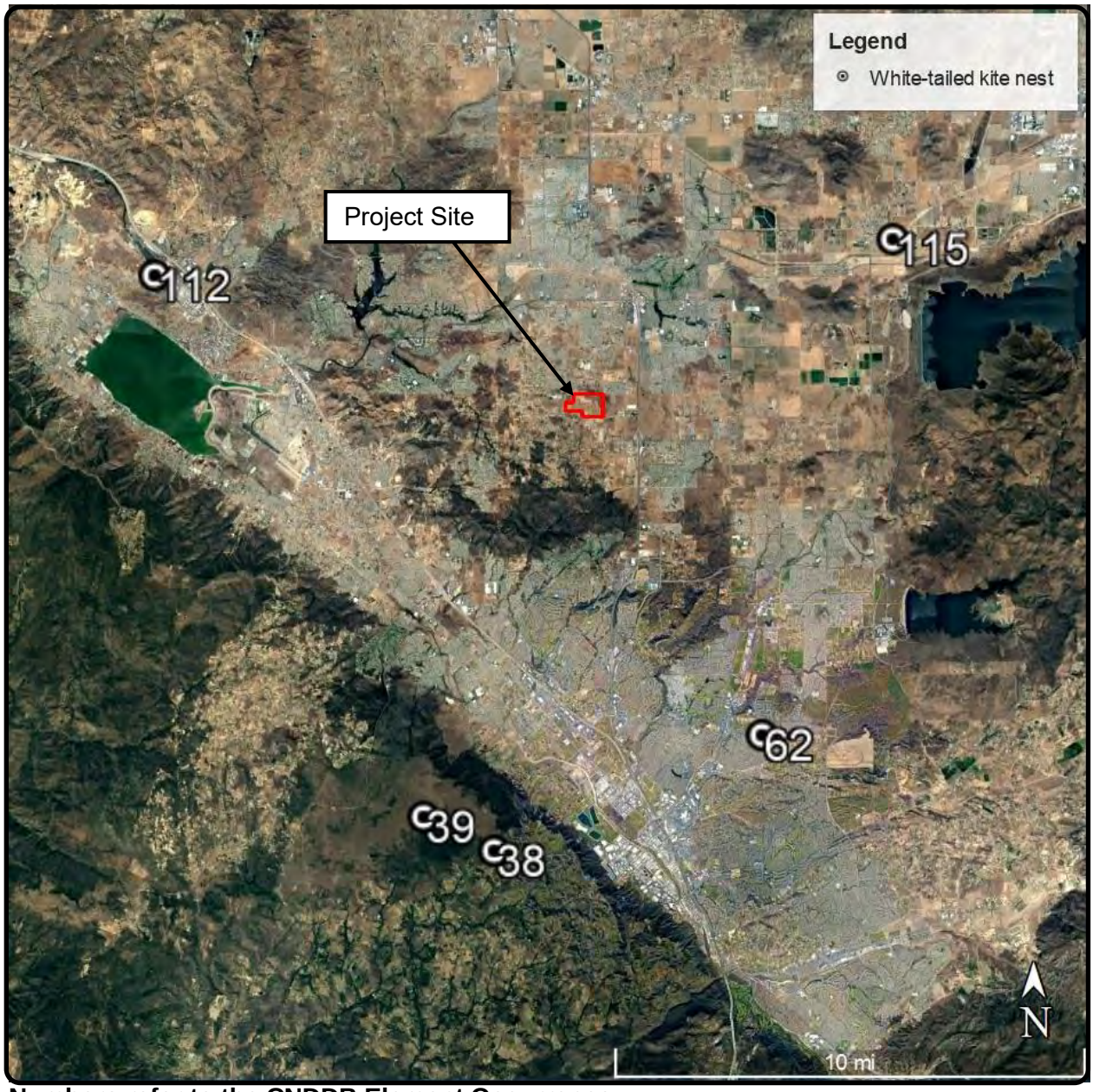
White-tailed kite forages in open grasslands, farmlands, meadows, and wetlands. Nests are located near foraging areas in substantial groves of dense, broad-leafed trees. Nests are built near the top of oaks, willows, or other trees, usually between 20 to 100 feet above the ground. The nest is composed of loosely piled sticks, lined with grass, straw, or rootlets. White-tailed kite breeds from February to October, with a peak from May to August (Zeiner et al. 1990).

The CNDDB (CDFW 2021c) has documented occurrences of five (5) white-tailed kite nests within 10 miles of the Project site (Figure 10):

> Occurrence 38 is approximately 9.3 miles south-southwest of the Project site. The occurrence is located at the Santa Rosa Plateau Preserve within oak savannah and native grassland at an elevation of 1,950 feet. Successful nesting was last documented in 1988 and 1989. Google Earth images show undisturbed habitat present in that area and the occurrence is presumed extant.
>
> Occurrence 39 is approximately 9.2 miles southwest of the Project site. The occurrence is described as located on private land between two parcels of Santa Rosa Plateau Preserve property. The habitat is oak savannah and native grassland at an elevation of 1,820 feet. The nest was last observed in 1989 (active nest, outcome unknown) and noted as threatened by proposed development. Examination of Google Earth images shows undisturbed habitat present in that area. The occurrence is presumed extant.
>
> Occurrence 62 is approximately 7.5 miles southeast of the Project site in Murrieta. The occurrence is located in southern riparian scrub habitat at an elevation of 1,240 feet. The record notes that the area was proposed for development, and Google Earth images now show the occurrence within a narrow area of habitat surrounded by residential developments. A pair of white-tailed kites was last observed in 1999. The occurrence is presumed extant but may have been extirpated by development.
>
> Occurrence 112 is approximately 9.4 miles west-northwest of the Project site and just north of Lake Elsinore. The occurrence is located in willow riparian woodland at an elevation of 1,258 feet. Successful nesting was documented in 2006. Google Earth images show undisturbed habitat at that location and the occurrence is presumed extant.

Occurrence 115 is approximately 7.1 miles northeast of the Project site. The occurrence is located in a small grove of trees associated with a rural residence in Winchester, north of Diamond Valley Lake. Agricultural fields are also present in the area. Successful nesting was documented in 2005 and 2006. Google Earth images show trees and agricultural fields remain in the area, as described in the CNDDB record. The occurrence is presumed extant.

Two white-tailed kites were observed on the Project site in 2005 and one in 2011 (Table 6, Figure 9). No kites have been observed during more recent surveys. Although this species may forage on the Project site and potentially suitable nesting habitat is present, no nesting has been observed there. A raptor nest was present in a eucalyptus tree in the riparian area on the site but has been observed during surveys to be either inactive or potentially associated with red-tailed hawk (*Buteo jamaicensis*) nesting. The 2021 survey found that this nest is no longer present.



Numbers refer to the CNDDB Element Occurrence.

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Figure 10

White-tailed Kite Nests within 10 Miles of the Project Site
(Photo obtained from Google Earth, August 2021)

Golden Meadows, TT 31194
City of Menifee, California

Fairy Shrimp

The two listed fairy shrimp species known from the area are vernal pool fairy shrimp (*Branchinecta lynchi*), a federally listed threatened species, and Riverside fairy shrimp (*Streptocephalus woottoni*), a federally listed endangered species. Both species are covered by the MSHCP and surveys are required where suitable habitat is present.

Vernal pool fairy shrimp is restricted to seasonal pools and prefers cool-water pools that are often short lived. Riverside fairy shrimp is restricted to deep seasonal vernal pools, ephemeral ponds, stock ponds, and other human-modified depressions. Riverside fairy shrimp prefers warm-water pools that remain filled for extended periods of time (Dudek 2003).

Pools or depressions characteristic of vernal habitat were not observed on the site and no wetland or vernal pool plant species were present. No evidence of ponding areas (i.e., cracked soils, tire ruts, etc.) were observed on the site during surveys. No fairy shrimp or potential fairy shrimp habitat was observed during current or previous surveys.

Riparian Birds

Least Bell's vireo (*Vireo bellii pusillus*) is state and federally listed as endangered. It is a covered species under the MSHCP and considered adequately conserved, but surveys are required in suitable habitat as described in MSHCP Section 6.1.2 and mitigation is required if the species is present. This species is migratory and breeds in California, arriving in March and departing by September or October. Males establish and defend territories in riparian woodlands and riparian scrub. Territory size ranges from 0.5 to 7.5 acres (USFWS 1998). Dense shrub cover is required for nesting.

There are two (2) CNDDB documented occurrences of nesting least Bell's vireo within five (5) miles of the site. The closest is Element Occurrence (EO) #412, located along the San Jacinto River just south of Canyon Lake, 4.2 miles to the west-northwest of the site. This occurrence is from 2002 and documents one (1) least Bell's vireo territory.

EO #407 is 4.5 miles west-northwest of the site along the San Jacinto River east of Lake Elsinore. This occurrence had one least Bell's vireo territory in 2003, two territories in 2004 and 2005, one singing male in 2006, six territories and two pairs with fledglings in 2009, and nine territories in 2010.

Southwestern willow flycatcher (*Empidonax traillii extimus*) is state and federally listed as endangered. It is a covered species under the MSHCP and considered adequately conserved, but surveys are required in suitable habitat as described in MSHCP Section 6.1.2 and mitigation is required if the species is present. This species inhabits dense riparian forests with ample numbers of willows and other associated trees and shrubs.

Western yellow-billed cuckoo (*Coccyzus americanus occidentalis*) is federally listed as threatened and state listed as endangered. It is a covered species under the MSHCP and considered adequately conserved, but surveys are required in suitable habitat as described in MSHCP Section 6.1.2 and mitigation is required if the species is present. This species inhabits extensive riparian thickets or forests with dense, low-level or understory foliage and abutting on slow-moving watercourses, backwaters, or seeps.

There are no CNDDB documented occurrences of nesting southwestern willow flycatcher or western yellow-billed cuckoo within five (5) miles of the site.

The habitat assessment found that riparian vegetation on the site is distributed intermittently along a linear area that is approximately 1,500-feet long (Figure 7). The riparian area is no more than two or three shrubs across at its widest points and surrounded by agricultural fields. The understory is poorly developed and has several introduced species. Representative photos are included in Appendix D.

No least Bell's vireo, southwestern willow flycatcher, or western yellow-billed cuckoo have been incidentally detected during surveys. Riparian vegetation onsite is scattered and degraded, the understory is poorly developed, and the streambed does not have persistent water flow. Typical habitat to support least Bell's vireo, southwestern willow flycatcher, and yellow-billed cuckoo is not present and these species are considered absent from the site.

Quino Checkerspot Butterfly

Quino checkerspot butterfly (*Euphydryas editha quino*) is federally listed as endangered. No adults, larvae, or pupae were observed onsite during focused surveys in 2004, although potentially suitable habitat and larval host and nectaring plant species are present. This species has not been incidentally observed during any subsequent surveys. Quino checkerspot butterfly is a covered species under the MSHCP and considered adequately conserved. Focused surveys are not required by the MSHCP.

3.4.2) Special Status Wildlife

In addition to coastal California gnatcatcher and white-tailed kite, discussed above, biological surveys conducted on the Project site by L&L from 2003 to 2021 detected 19 special status wildlife species on the site:

- orange-throated whiptail (*Aspidoscelis hyperythra*; CDFW Watch List),
- coastal (western) whiptail (*Aspidoscelis tigris stejnegeri*; CDFW Species of Special Concern),
- coast horned lizard (*Phrynosoma blainvillii*; CDFW Species of Special Concern),
- Cooper's hawk (*Accipiter cooperi*; CDFW Watch List),
- southern California rufous-crowned sparrow (*Aimophila ruficeps canescens*; CDFW Watch List species),
- great egret (*Ardea alba*; CDFW Special Animal),
- great blue heron (fly over) (*Ardea herodias*; CDFW Special Animal),
- Bell's sage sparrow (*Artemisiospiza belli belli*; USFWS Bird of Conservation Concern, CDFW Watch List species),
- burrowing owl (*Athene cunicularia*, USFWS Bird of Conservation Concern, CDFW Species of Special Concern),
- Costa's hummingbird (*Calypte costae*; USFWS Bird of Conservation Concern, CDFW Special Animal),
- wrentit (*Chamaea fasciata*; USFWS Bird of Conservation Concern),
- northern harrier (*Circus cyaneus*; CDFW Species of Special Concern),
- Nuttall's woodpecker (*Dryobates nuttallii*; USFWS Bird of Conservation Concern),
- California horned lark (*Eremophila alpestris actia*; CDFW Watch List),
- loggerhead shrike (*Lanius ludovicianus*; USFWS Bird of Conservation Concern, CDFW Species of Special Concern),
- rufous hummingbird (*Selasphorus rufus*; USFWS Bird of Conservation Concern, CDFW Special Animal),
- Lawrence's goldfinch (*Spinus lawrencei*; USFWS Bird of Conservation Concern, CDFW Special Animal),
- California thrasher (*Toxostoma redivivum*; USFWS Bird of Conservation Concern), and
- San Diego black-tailed jackrabbit (*Lepus californicus bennettii*; CDFW Species of Special Concern).

All of these species are covered under the MSHCP and considered adequately conserved, with the exception of great egret, Costa's hummingbird, wrentit, Nuttall's woodpecker, rufous hummingbird, Lawrence's goldfinch, and California thrasher, which are not covered under the MSHCP. Burrowing owl is discussed below. Special status species observations are listed in Table 6 and mapped on Figure 9.

Five (5) additional special status wildlife species have a low to moderate potential to occur on the Project site but have not been observed during L&L surveys (see Appendix B). These species are:

- Crotch bumble bee (*Bombus crotchii*; CDFW Special Animal[2]),
- southern California legless lizard (*Anniella stebbinsi*; CDFW Species of Special Concern),
- Dulzura pocket mouse (*Chaetodipus californicus femoralis*; CDFW Species of Special Concern),
- northwestern San Diego pocket mouse (*Chaetodipus fallax fallax*; CDFW Species of Special Concern), and
- western mastiff bat (foraging) (*Eumops perotis californicus*; CDFW Species of Special Concern).

Northwestern San Diego pocket mouse is covered under the MSHCP and considered adequately conserved. The remaining four species are not covered under the MSHCP.

Burrowing Owl

Burrowing owl (*Athene cunicularia*) is protected under the federal Migratory Bird Treaty Act and California Fish and Game Code and is a CDFW Species of Special Concern. It is a small, ground-dwelling owl found in open dry grassland, desert, or shrubland areas and in uncultivated agricultural areas, rangelands, and other open areas with low-growing vegetation.

Burrows are an essential element of burrowing owl habitat. Although the burrowing owl is capable of excavating its own burrows in soft soils, it typically modifies and inhabits abandoned

[2] Crotch bumble bee was previously a candidate for state listing, but the Sacramento Superior Court ruled that insects are not eligible for listing under the California Endangered Species Act: *Almond Alliance of California v. California Department of Fish and Wildlife*, Sacramento Superior Court No. 34-2019-80003216 (Nov. 13, 2020). The California Fish and Game Commission filed an intent to appeal this decision in February 2021. The status of this species may be affected by subsequent litigation or changes to regulations.

burrows of small mammals, such as ground squirrels and pocket gophers. The burrowing owl has also been known to use man-made structures such as cement culverts, debris piles, and other artificial burrows.

Occupancy of burrowing owl habitat can be verified at a site by observation of at least one (1) owl or sign of owl (molted feathers, cast pellets, prey remains, eggshell fragments, or excrement) at or near a burrow entrance. A site is considered occupied if at least one (1) owl has been identified onsite in the past three (3) years, because (if undisturbed) burrowing owls exhibit high site fidelity (CDFG 2012, CBOC 1993).

The site has suitable burrowing owl habitat. Focused surveys for burrowing owl in 2005, 2006, 2007, 2011, and 2013 did not detect burrowing owls utilizing the site. No burrowing owl or sign was observed during 2017 general biological surveys.

Focused surveys in 2018 observed a single adult burrowing owl onsite and one (1) burrow with signs of occupation (Table 6, Figure 9). The owl was observed on May 30, 2018. The occupied burrow was found very close to where the owl was observed. Pellets, scat, feathers, owl tracks, and pieces of shredded cloth were observed at the burrow entrance. The burrow was monitored during subsequent site visits, but there were no additional observations of burrowing owl adults or juveniles. It was not determined if the owl was using the burrow for nesting. Coyote and/or dog tracks were observed around the burrow, but the burrow itself was not disturbed and there were no signs that owls had been predated. No other active burrows or burrowing owls were observed during surveys in 2018.

Focused surveys in 2019 did not detect any burrowing owl, occupied burrows, or owl sign. The agricultural fields on the site, including the site of the 2018 burrow observation, had tall, dense non-native vegetation at that time, which created unsuitable conditions for burrowing owl. Thick vegetation was also present at the burrow site in 2021, until the agricultural fields were mowed (sometime between August and November surveys).

No burrowing owls, owl sign (pellets, scat, feathers, tracks, etc.), or occupied burrows were observed onsite during the 2021 protocol breeding season survey. No owls or owl sign were observed at the 2018 burrow site in November 2021 after the agricultural fields were mowed. Potentially suitable burrowing owl habitat is present on the site, including small mammal burrows. Potentially suitable habitat is also present within the 150-meter buffer area (Figure 5), but no owls, owl sign, or occupied burrows were observed in the buffer.

There are 47 CNDDB documented occurrences of burrowing owl within five (5) miles of the Project site (CDFW 2021c). These occurrences date between 1998 and 2016.

Because suitable habitat is present, the MSHCP requires a preconstruction clearance survey for burrowing owl within 30 days prior to the start of site disturbance. If burrowing owls are found on the site at that time, additional mitigation is required under the MSHCP (see Section 6.10).

Nesting Birds

There is habitat suitable for nesting birds (including raptors) within and adjacent to the site. Nesting birds may utilize trees, shrubs, and other vegetation, and open ground on and adjacent to the site for nesting. Some relatively large eucalyptus trees are present on the western portion of the site and along the western boundary along Evans Road. Red-tailed hawks (*Buteo jamaicensis*) have been observed onsite and may be utilizing the trees for nesting.

A potential (inactive) raptor nest site was found in a large eucalyptus tree on the site in 2013. It was located in a eucalyptus tree in the west-central portion of the site (Table 6, Figure 9). No raptors were observed utilizing the nest site during surveys in 2013, 2017, 2018, and 2019. The 2021 survey found that the nest was no longer present and likely fell from the tree.

3.4.3) Wildlife Corridor

Wildlife corridors link together areas of suitable wildlife habitat that are otherwise separated by rugged terrain, changes in vegetation, or human disturbance. The fragmentation of open space areas by urbanization creates isolated “islands” of wildlife habitat. In the absence of habitat linkages that allow movement to adjoining open space areas, various studies have concluded that some wildlife species, especially larger and more mobile mammals, will not likely persist over time in fragmented or isolated habitat areas because movement barriers prohibit the infusion of new individuals and genetic variation.

Wildlife movement activities usually fall into one of three movement categories: dispersal (e.g., juvenile animals dispersing from natal areas or individuals extending their range), seasonal migration, and movements related to home range activities (e.g., foraging for food or water, defending territories, or searching for mates, breeding areas, or cover).

Drainages often serve as wildlife corridors and travel routes; however, the riparian vegetation on the site is not continuous. The site is largely surrounded by scattered existing development and

there is no connectivity between the site and conserved lands to the east (Diamond Valley Lake) and southwest (Santa Rosa Plateau, Cleveland National Forest).

The California Essential Habitat Connectivity Project (CDFW 2021d) maps the Project site and surrounding areas as "limited connectivity opportunity." Although there may be limited local movement of wildlife on and across the site, it is not within or adjacent to a wildlife corridor or potential corridor.

3.5) Jurisdictional Waters/Wetlands and MSHCP Riparian/Riverine and Vernal Pool Habitat

Under MSHCP Volume 1, Section 6.1.2, areas associated with wetland and streambed systems must be evaluated for consideration as riparian/riverine or vernal pool habitat. Riparian/riverine areas are defined within the MSHCP as:

> ". . . lands which contain Habitat dominated by trees, shrubs, persistent emergents, or emergent mosses and lichens, which occur close to or which depend upon soil moisture from a nearby fresh water source; or areas with fresh water flow during all or a portion of the year."

Vernal pools are defined within the MSHCP as:

> ". . . seasonal wetlands that occur in depression areas that have wetlands indicators of all three parameters (soils, vegetation and hydrology) during the wetter portion of the growing season but normally lack wetlands indicators of hydrology and/or vegetation during the drier portion of the growing season. Obligate hydrophytes and facultative wetlands plant species are normally dominant during the wetter portion of the growing season, while upland species (annuals) may be dominant during the drier portion of the growing season. . ."

An ephemeral drainage is present on the site and mapped as a USGS blue-line stream (Figure 11). This drainage includes riparian vegetation such as arroyo willow, Fremont cottonwood, and mulefat (see Section 3.2.3). A jurisdictional delineation was completed in 2011 and updated in 2018 and 2019.

The delineation found 0.153 acre of unvegetated state streambed (which is also MSHCP riverine habitat) and 1.208 acre of state wetland (which is also MSHCP riparian habitat). The survey also identified 0.065 acre of federal Waters of the U.S. (WoUS), none of which is federal wetland (Table 7).

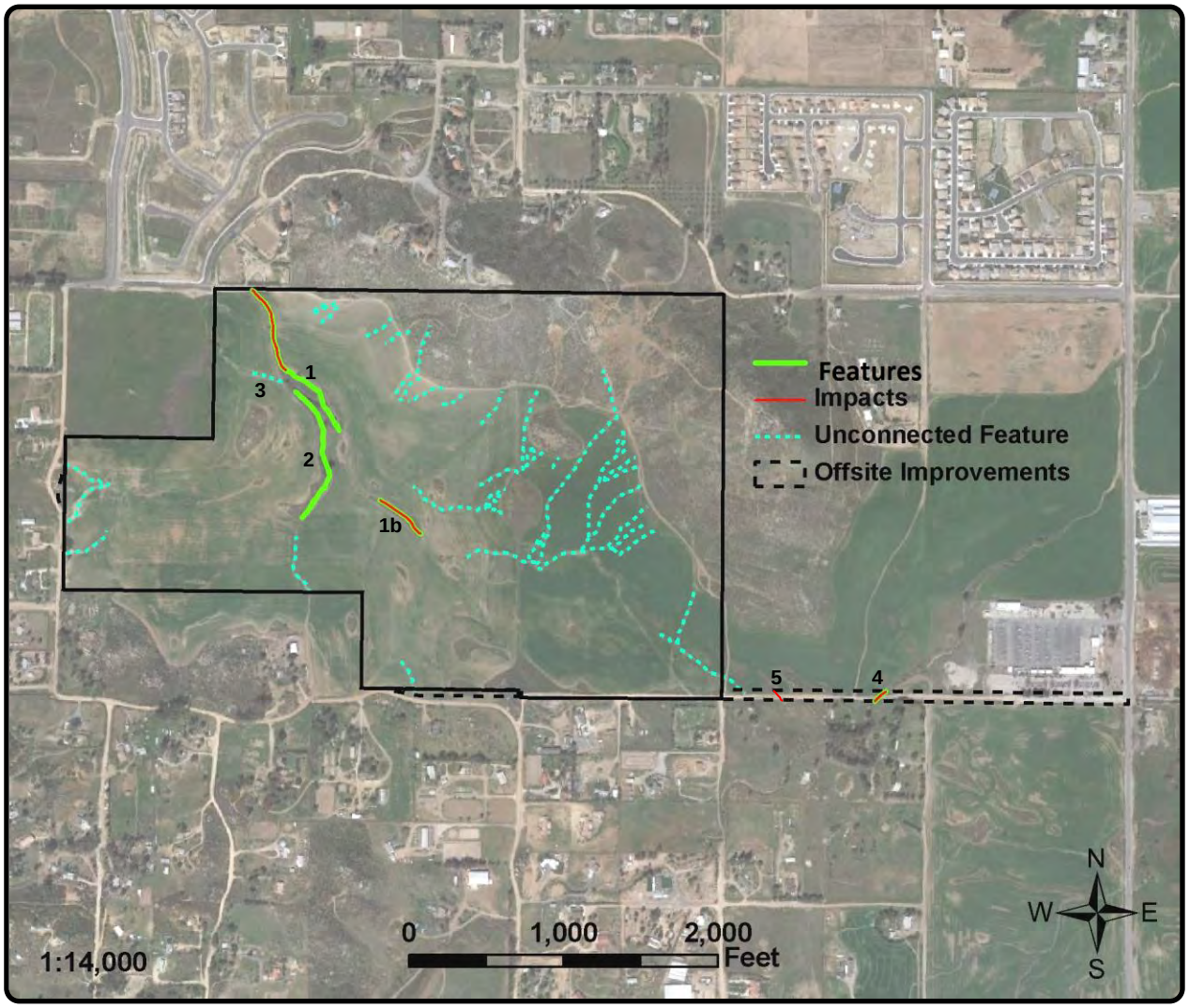
All jurisdictional areas onsite will either be impacted by Project development or incorporated into the Avoidance Area (Figure 12). The Avoidance Area will retain native riparian habitat.

Pools or depressions characteristic of vernal habitat were not observed on the site and no wetland or vernal pool plant species were present. No evidence of ponding areas (i.e., cracked soils, tire ruts, etc.) were observed on the site during surveys.

Table 7. Summary of Jurisdictional Resources Present

Feature	Total Present (acres)			
	State Streambed / MSHCP Riverine	State Wetland / MSHCP Riparian	Federal Waters	Federal Wetland
1	0.037	0.373	0.005	0
1b	0.025	0.148	0.025	0
2	0.065	0.642	0.025	0
3	0	0	0	0
4 (offsite)	0.023	0.046	0.009	0
5 (offsite)	0.004	0	0.001	0
TOTALS*	0.153	1.208	0.065	0

*Any discrepancy in totals due to rounding error.



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BIOLOGICAL AND CULTURAL INVESTIGATIONS AND MONITORING

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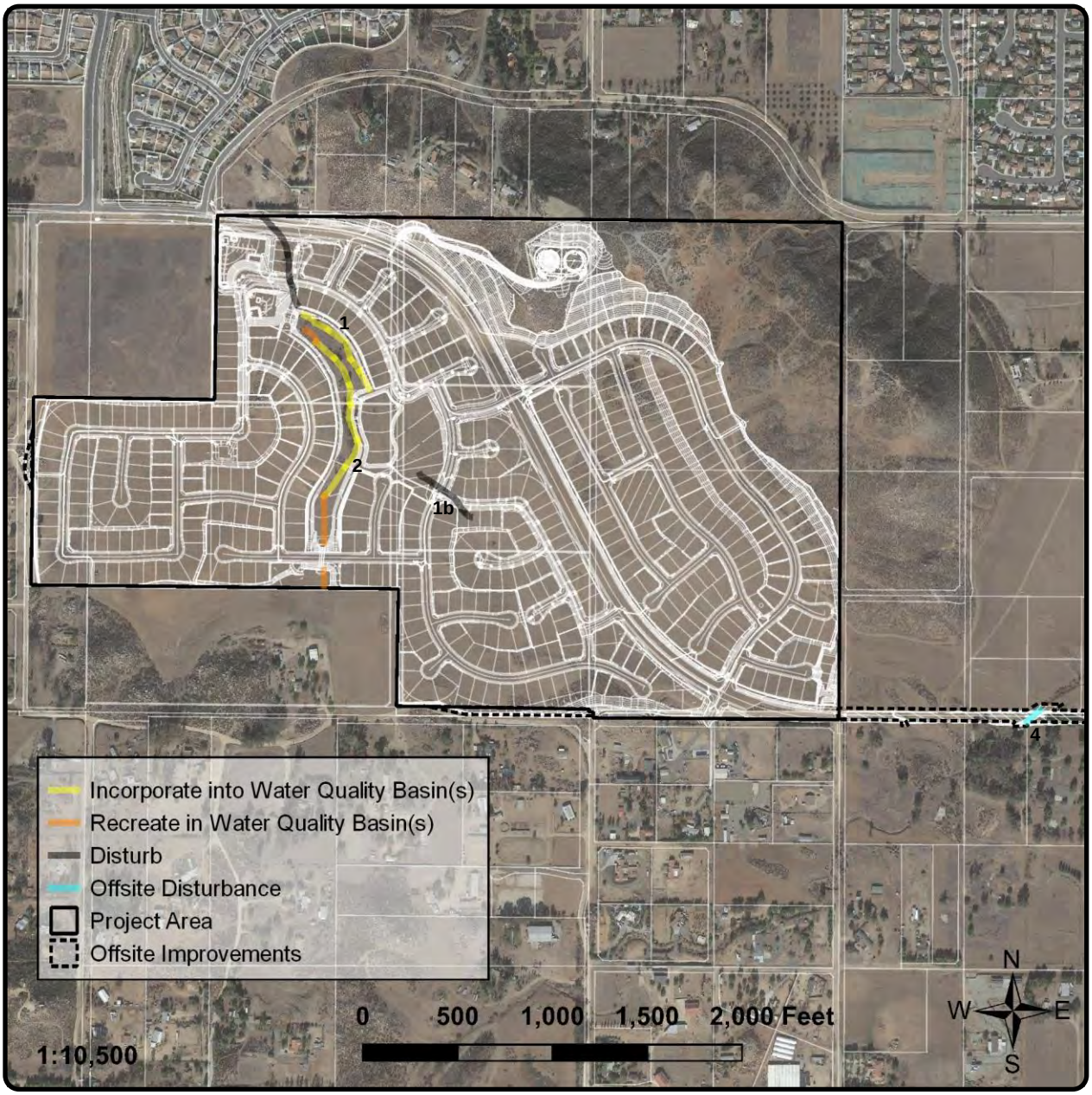
Figure 11

Jurisdictional Areas
(Photo obtained from Google Earth, 3-9-2011)

Golden Meadows, TT 31194
City of Menifee, California



L&L Environmental, Inc.

BIOLOGICAL AND CULTURAL INVESTIGATIONS AND MONITORING

RLCC-03-187
December 2021

Figure 12

Jurisdictional Areas with Development Plan

(Plan obtained from Hunsaker & Assoc. Irvine, Inc., 2021)

Menifee Assemblage, TT 31194
City of Menifee, California

4.0) URBAN WILDLANDS INTERFACE ANALYSIS

The Project proposes an Avoidance Area along the riparian area on the site as well as an Open Space Area in the northeast corner of the site. An Urban Wildlands Interface Analysis is included here in case the MSHCP requires implementation of the Urban Wildlands Interface Guidelines (Section 6.1.4 of the MSHCP). If these areas are not conserved and/or the Urban Wildlands Interface Guidelines are not applicable, this section will be withdrawn.

The main portion of the Avoidance Area will be a channel about five (5) feet deep with 4:1 slopes. At the south end is a smaller portion that will be contoured as a basin about five (5) feet deep with 4:1 slopes. Offsite flows from the south will be picked up by v-ditches along the tract boundary and the ditches will convey the flows to this basin. Water will flow from the basin underneath an internal street and into the main portion of the Avoidance Area through a box culvert. The Avoidance Area will retain native riparian habitat.

The Avoided Area and Open Space Area will be owned and maintained by the Homeowners Association (HOA) according to HOA guidelines.

4.1) Drainage

Runoff from the development will be treated in water quality basins to remove common pollutants and reduce peak flows before being discharged into the Avoidance Area.

During construction, all contractors and subcontractors will use Best Management Practices (BMPs) to manage, capture, control, eliminate, and prevent sediment, debris, and pollutants from being discharged into streambeds and drainages. A Storm Water Pollution Prevention Plan (SWPPP) has been prepared for the Project. Construction BMPs address sediment and erosion control, non-sediment pollutants, and non-storm water BMPs.

If grading occurs when the ephemeral streambed is wetted, a bypass will be required. A Bypass Plan will be developed by the SWPPP consultant prior to initiation of grading unless all grading can occur when the ephemeral streambed is dry.

Post-construction BMPs include minimizing urban runoff, minimizing the impervious footprint, conserving natural areas, and minimizing Directly Connected Impervious Areas (DCIAs). Project plans incorporate BMPs to address water quality in low flows and first flush storm runoff, as well as to control post-construction peak flow volumes. These BMPs include three (3)

detention basins, two (2) infiltration basins, three (3) sand filter basins, two (2) modular wetland systems, and a CDS (Continuous Deflective Separation) stormwater treatment unit.

4.2) Toxics

Land uses proposed in proximity to the Avoidance Area that use chemicals that are potentially toxic, or that may adversely affect wildlife species, habitat, or water quality shall incorporate measures to ensure that application of such chemicals does not result in discharge to the Avoidance Area. The greatest risk is from landscaping fertilizer and herbicide/pesticide runoff.

4.3) Fencing

The siting and design of fencing should not impede wildlife movement. Given the location of the Avoidance Area within the residential development, wildlife using the site are likely to be common species that are comfortable with proximity to human disturbance.

The Project boundary and back and side yards will be fenced according to a fencing plan approved by the lead agency. No direct access between residences and the Open Space Area or the Avoidance Area will occur or be allowed.

Mitigation Measure 4.3-7 in the 2006 EIR requires individual lot fencing to be used to restrict access to the on-site wetland areas. Back yard gates from individual residential lots that open onto the wetland area shall be prohibited.

4.4) Barriers

Proposed land uses adjacent to the Avoidance Area and Open Space Area shall incorporate barriers in Project designs, where appropriate, to minimize unauthorized public access, domestic animal predation, illegal trespass, or trash dumping. Such barriers may include native landscaping, rocks/boulders, fencing, walls, signage, and/or other appropriate mechanisms.

The Project will install two (2) or more information boards (to be located at each end of the Avoidance Area and at other access points, as needed) providing a description of suitable uses and asking residents to remain on existing trails and to keep pets on a leash.

4.5) Lighting

Night lighting shall be directed away from the Avoidance Area and Open Space Area to protect species from direct night lighting. Shielding shall be incorporated in Project designs to ensure ambient lighting in the Avoidance Area and Open Space Area is not substantially increased.

Mitigation Measure 4.3-8 in the 2006 EIR requires that night lighting during and after project construction shall be directed away from onsite wetland areas and, except for safety and other requirements, lighting shall be limited from the boundaries of onsite wetland areas. In the event that lighting in an area adjacent to the wetland area is necessary, a shield shall be incorporated in Project designs to ensure ambient lighting in the wetland area is not increased.

4.6) Noise

Proposed noise-generating land uses affecting the Avoidance Area and Open Space Area shall incorporate setbacks, berms, or walls to minimize the effects of noise on wildlife resources pursuant to applicable rules, regulations, and guidelines related to land use noise standards.

4.7) Invasives

Invasive species (refer to MSHCP Table 6-2, below) shall not be used in development or restoration plan activities. Mitigation Measure 4.3-9 in the 2006 EIR requires that the landscape plans for the Project in areas adjacent or tributary to wetland areas shall not include those species listed in the MSHCP as “Plants That Should Be Avoided Adjacent to The MSHCP Conservation Area” (MSHCP Table 6-2).

4.8) Grading/Land Development

Manufactured slopes will be required to extend into the Avoidance Area to support the Project design. Grading should not extend into the Open Space Area.

4.9) Weed Abatement/Fuel Modification

Weed abatement and fuel modification zones may encroach into portions of the Avoidance Area. Weed abatement and fuel modification zones should not encroach into the Open Space Area.

MSHCP Table 6-2. Plants That Should Be Avoided Adjacent to the MSHCP Conservation Area (Taken Directly from MSHCP Section 6.1.4)

BOTANICAL NAME	COMMON NAME
Acacia spp. (all species)	acacia
Achillea millefolium var. *millefolium*	common yarrow
Ailanthus altissima	tree of heaven
Aptenia cordifolia	red apple
Arctotheca calendula	cape weed
Arctotis spp. (all species & hybrids)	African daisy
Arundo donax	giant reed or arundo grass
Asphodelus fistulosus	asphodel
Atriplex glauca	white saltbush
Atriplex semibaccata	Australian saltbush
Carex spp. (all species*)	sedge
Carpobrotus chilensis	ice plant
Carpobrotus edulis	sea fig
Centranthus ruber	red valerian
Chrysanthemum coronarium	annual chrysanthemum
Cistus ladanifer (incl. hybrids/varieties)	gum rockrose
Cortaderia jubata [*syn.C. Atacamensis*]	jubata grass, pampas grass
Cortaderia dioica [syn. *C. sellowana*]	pampas grass
Cotoneaster spp. (all species)	cotoneaster
Cynodon dactylon (incl. hybrids varieties)	Bermuda grass
Cyperus spp. (all species*)	nutsedge, umbrella plant
Cytisus spp. (all species)	broom
Delosperma 'Alba'	white trailing ice plant
Dimorphotheca spp. (all species)	African daisy, Cape marigold
Drosanthemum floribundum	rosea ice plant
Drosanthemum hispidum	purple ice plant
Eichhornia crassipes	water hyacinth
Elaegnus angustifolia	Russian olive
Eucalyptus spp. (all species)	eucalyptus or gum tree
Eupatorium coelestinum [syn. *Ageratina* sp.]	mist flower
Festuca arundinacea	tall fescue
Festuca rubra	creeping red fescue
Foeniculum vulgare	sweet fennel
Fraxinus uhdei (and cultivars)	evergreen ash, shamel ash
Gaura (spp.) (all species)	gaura
Gazania spp. (all species & hybrids)	gazania
Genista spp. (all species)	broom
Hedera canariensis	Algerian ivy
Hedera helix	English ivy
Hypericum spp. (all species)	St. John's Wort
Ipomoea acuminata	Mexican morning glory
Lampranthus spectabilis	trailing ice plant
Lantana camara	common garden lantana
Lantana montevidensis [syn. *L. sellowiana*]	lantana
Limonium perezii	sea lavender
Linaria bipartita	toadflax
Lolium multiflorum	Italian ryegrass
Lolium perenne	perennial ryegrass
Lonicera japonica (incl. 'Halliana')	Japanese honeysuckle
Lotus corniculatus	birdsfoot trefoil

MSHCP Table 6-2. Plants That Should Be Avoided Adjacent to the MSHCP Conservation Area (Continued)

BOTANICAL NAME	COMMON NAME
Lupinus arboreus	yellow bush lupine
Lupinus texanus	Texas blue bonnets
Malephora crocea	ice plant
Malephora luteola	ice plant
Mesembryanthemum nodiflorum	little ice plant
Myoporum laetum	myoporum
Myoporum pacificum	shiny myoproum
Myoporum parvifolium (incl. 'Prostratum')	ground cover myoporum
Oenothera berlandieri	Mexican evening primrose
Olea europea	European olive tree
Opuntia ficus-indica	Indian fig
Osteospermum spp. (all species)	trailing African daisy, African daisy,
Oxalis pes-caprae	Bermuda buttercup
Parkinsonia aculeata	Mexican palo verde
Pennisetum clandestinum	Kikuyu grass
Pennisetum setaceum	fountain grass
Phoenix canariensis	Canary Island date palm
Phoenix dactylifera	date palm
Plumbago auriculata	cape plumbago
Polygonum spp. (all species)	knotweed
Populus nigra 'italica'	Lombardy poplar
Prosopis spp. (all species*)	mesquite
Ricinus communis	castorbean
Robinia pseudoacacia	black locust
Rubus procerus	Himalayan blackberry
Sapium sebiferum	Chinese tallow tree
Saponaria officinalis	bouncing bet, soapwart
Schinus molle	Peruvian pepper tree, California pepper
Schinus terebinthifolius	Brazilian pepper tree
Spartium junceum	Spanish broom
Tamarix spp. (all species)	tamarisk, salt cedar
Trifolium tragiferum	strawberry clover
Tropaelolum majus	garden nasturtium
Ulex europaeus	prickly broom
Vinca major	periwinkle
Yucca gloriosa	Spanish dagger

An asterisk (*) indicates some native species of the genera exist that may be appropriate.

Sources: California Exotic Pest Plant Council, United States Department of Agriculture-Division of Plant Health and Pest Prevention Services, California Native Plant Society, *Fremontia* Vol. 26 No. 4, October 1998, *The Jepson Manual: Higher Plants of California*, and County of San Diego Department of Agriculture.

5.0) SUMMARY AND RECOMMENDATIONS

The purpose of this study was to identify biological resources present or potentially present on the site. The MSHCP requires a habitat assessment to address riparian/riverine and vernal pool habitats and associated species and burrowing owl. Focused surveys are required if suitable habitat is present.

L&L also analyzed the potential for impacts to state and federal jurisdictional waters, special status species, and sensitive vegetation communities. The recommendations are based on the literature review, L&L's knowledge of species and habitats in the region, the biological field survey, and analysis of aerial images.

MSHCP

The site is located within the area covered by the MSHCP but is not within the Criteria Area. There is one area of PQP Conserved Lands approximately 0.68 miles north-northeast of the site (Ringing Rock Archaeological Site). There are no other PQP or MSHCP Conserved Lands within a mile of the site. The site is not within or near any MSHCP Core Areas or Linkages.

Sensitive Vegetation Communities

The site is composed of agricultural lands and disturbed/ruderal areas, California buckwheat scrub, chamise chaparral, arroyo willow thickets, and mulefat thickets. Arroyo willow thickets and mulefat thickets are riparian vegetation communities and arroyo willow thicket is considered sensitive. The majority of arroyo willow thicket will be retained in the Avoidance Area.

Listed and Special Status Plant Species

No state or federally listed plants were observed during surveys and the Project site is not within USFWS designated critical habitat for any listed plant species. Two special status plant species were observed on the site during surveys, long-spined spineflower and southern California black walnut. Both are covered species under the MSHCP and considered adequately conserved.

Trees

There is a single immature coast live oak tree present on the site within the riparian area. Other native and non-native trees are also present. The City may regulate removal or replacement of trees and a tree survey may be required.

Listed and Fully Protected Wildlife Species

Surveys detected two listed or fully protected wildlife species on the site, coastal California gnatcatcher and white-tailed kite.

Multiple surveys from 2004 through 2021 have documented coastal California gnatcatchers on the Project site, including observations of breeding pairs and nesting. All observations were in the California buckwheat scrub habitat in the northeastern portion of the site. Under Mitigation Measure 4.3-1 of the 2006 EIR, the northeastern portion of the property shall be preserved as open space and covered by a conservation easement or similar mechanism. Coastal California gnatcatcher is a covered species under the MSHCP and considered adequately conserved. Focused surveys for this species are not required under the MSHCP. Scheduling Project activities outside the nesting season and/or conducting preconstruction nesting bird clearance surveys and establishing avoidance buffers around any active nests is recommended, as described below. Monitoring of active nest sites during Project activities is recommended.

Two white-tailed kites were observed on the Project site in 2005 and one in 2011. No kites have been observed during more recent surveys. Although this species may forage on the Project site and potentially suitable nesting habitat is present, no nesting has been observed there. White-tailed kite is a covered species under the MSHCP and considered adequately conserved.

Under Mitigation Measure 4.3-5 of the 2006 EIR, if construction activities occur between February 1 and August 31 and within 150 feet of suitable nesting locations, a focused raptor survey will be required prior to issuance of grading permits. If active nests are located within the portion of the site to be disturbed or within 150 feet of the area to be disturbed, measures shall be initiated to avoid any impacts to nesting raptors, including avoidance buffers around active nests. Under this mitigation measure, if white-tailed kite nesting is found on the Project site, an incidental take permit from CDFW is required.

Two other listed species have not been observed on the Project site during surveys but have a moderate or high potential to occur, Stephens' kangaroo rat and tricolored blackbird (foraging). Stephens' kangaroo rat is a covered species under the MSHCP and considered adequately conserved. Focused trapping surveys for this species are not required by the MSHCP. Tricolored blackbird is also a covered species under the MSHCP and considered adequately conserved.

Fairy Shrimp

Pools or depressions characteristic of vernal habitat were not observed on the site and no wetland or vernal pool plant species were present. No evidence of ponding areas (i.e., cracked soils, tire ruts, etc.) were observed on the site during surveys. No fairy shrimp or potential fairy shrimp habitat was observed during current or previous surveys.

Riparian Birds

No least Bell's vireo, southwestern willow flycatcher, or western yellow-billed cuckoo have been incidentally detected during surveys. Riparian vegetation onsite is scattered and degraded, the understory is poorly developed, and the streambed does not have persistent water flow. Typical habitat to support least Bell's vireo, southwestern willow flycatcher, and yellow-billed cuckoo is not present and these species are considered absent from the site.

Quino Checkerspot Butterfly

No Quino checkerspot butterfly adults, larvae, or pupae were observed onsite during focused surveys in 2004, although potentially suitable habitat and larval host and nectaring plants are present. This species has not been incidentally observed during any subsequent surveys. Quino checkerspot butterfly is a covered species under the MSHCP and considered adequately conserved. Focused surveys are not required by the MSHCP.

Special Status Wildlife Species

Biological surveys from 2003 to 2021 detected 19 special status wildlife species on the site: orange-throated whiptail, coastal (western) whiptail, coast horned lizard, Cooper's hawk, southern California rufous-crowned sparrow, great egret, great blue heron (fly over), Bell's sage sparrow, burrowing owl, Costa's hummingbird, wrentit, northern harrier, Nuttall's woodpecker, California horned lark, loggerhead shrike, rufous hummingbird, Lawrence's goldfinch, California thrasher, and San Diego black-tailed jackrabbit.

All of these species are covered under the MSHCP and considered adequately conserved, with the exception of great egret, Costa's hummingbird, wrentit, Nuttall's woodpecker, rufous hummingbird, Lawrence's goldfinch, and California thrasher, which are not covered under the MSHCP. Burrowing owl is discussed below. Scheduling Project activities outside the nesting season or conducting preconstruction nesting bird clearance surveys and establishing avoidance buffers around any active nests is recommended, as described below.

Five (5) additional special status wildlife species have not been observed on the Project site during L&L surveys but have a low to moderate potential to occur. These species are Crotch bumble bee, southern California legless lizard, Dulzura pocket mouse, northwestern San Diego pocket mouse, and western mastiff bat (foraging). Northwestern San Diego pocket mouse is covered under the MSHCP and considered adequately conserved. The remaining four species are not covered under the MSHCP.

Crotch bumble bee was previously a candidate for state listing, but in November 2020 the Sacramento Superior Court ruled that insects are not eligible for listing under the California Endangered Species Act. The California Fish and Game Commission filed an intent to appeal this decision in February 2021. The status of this species may be affected by subsequent litigation or changes to regulations. If Crotch bumble bee becomes a listed or candidate species, focused surveys and incidental take permitting may be required.

Burrowing Owl

One (1) adult burrowing owl and an occupied burrow were observed onsite in 2018. No owls or owl sign were observed in 2019 or 2021. Because suitable habitat is present, the MSHCP requires a preconstruction clearance survey for burrowing owl within 30 days prior to the start of site disturbance. If burrowing owls are found on the site at that time, additional mitigation is required under the MSHCP and Mitigation Measure 4.3-2 of the 2006 EIR.

Nesting Birds

There is habitat suitable for nesting birds (including raptors) within and adjacent to the site. Nesting birds may utilize trees, shrubs, and other vegetation, and open ground on and adjacent to the site for nesting.

Nesting birds are protected under state and federal laws. Project activities, including initial vegetation trimming/clearing, tree trimming/removal, ground disturbance, etc., should be avoided during the nesting season (generally February 1 to August 31). If the nesting season cannot be avoided, a nesting bird clearance survey is recommended within three (3) days prior to the start of Project activities within the nesting season. If active nests are present, avoidance of nest sites is required and a buffer of 300 to 500 feet (or as determined by a biologist) is recommended until a biologist has verified that juvenile birds are no longer dependent on the nest or the nest has otherwise become inactive. An active nest is defined as a nest with eggs, chicks, or dependent juveniles, or a nest actively being constructed or utilized for reproduction.

Wildlife Corridors

The site is largely surrounded by scattered existing development and there is no connectivity between the site and conserved lands to the east and southwest. Although there may be limited local movement of wildlife on and across the site, it is not within or adjacent to a wildlife corridor or potential corridor.

Jurisdictional Waters/Wetlands and MSHCP Riparian/Riverine and Vernal Pool Habitat

An ephemeral drainage with scattered riparian vegetation is present on the site and mapped as a USGS blue-line stream. A jurisdictional delineation found 0.153 acre of unvegetated state streambed (which is also MSHCP riverine habitat) and 1.208 acre of state wetland (which is also MSHCP riparian habitat). The survey also identified 0.065 acre of federal waters. There is no federal wetland.

All jurisdictional areas onsite will either be impacted by Project development or incorporated into the Avoidance Area. Monitoring of Project activities adjacent to the Avoidance Area is recommended.

Pools or depressions characteristic of vernal habitat were not observed on the site and no wetland or vernal pool plant species were present. No evidence of ponding areas (i.e., cracked soils, tire ruts, etc.) were observed on the site during surveys.

Regulatory permits from USACE, RWQCB, and CDFW will be required for impacts to jurisdictional areas. A DBESP will be required for impacts to MSHCP riparian/riverine habitat. Mitigation Measure 4.3-6 also requires on or off-site replacement of CDFW and federal jurisdictional waters and wetlands at a ratio of no less than 1:1 and incorporation of design features that will avoid biological impacts to offsite blue-line streams that flow to Canyon Lake. Monitoring of Project activities that disturb vegetation or soil in and adjacent to the Avoidance Area is recommended.

6.0) REGULATORY ENVIRONMENT

The following summary of the regulatory environment is provided for information purposes and is not intended for review or comment by the lead or wildlife agencies.

6.1) Federal Endangered Species Act

Section 9 of the federal Endangered Species Act (FESA), 1973 (as amended) prohibits "take" of federally listed threatened and endangered species. Candidate species receive no protection under FESA, but the USFWS encourages conservation of these species. "Take" is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct. "Harm" is further defined to include habitat modification or degradation when it actually kills or injures wildlife by impairing essential behavioral patterns including breeding, feeding, or sheltering.

Incidental take is take that results from, but is not the purpose of, carrying out an otherwise lawful activity. Incidental take of federally listed species may be authorized under Section 7 of FESA for federal properties or where federal actions (i.e., federal permitting or federal funding) are involved or under Section 10 of FESA for non-federal actions.

Section 7 requires all Federal agencies, in "consultation" with the USFWS, to ensure that their actions are not likely to jeopardize the continued existence of listed species or result in destruction or adverse modification of critical habitat. The Section 7 process requires preparation of a federal Biological Assessment to determine whether a proposed major construction activity under the authority of a Federal action agency is likely to adversely affect listed species, proposed species, or designated critical habitat. After formal consultation, the USFWS will issue a Biological Opinion stating whether or not a federal action is likely to jeopardize the continued existence of listed species or result in the destruction or adverse modification of critical habitat.

Section 10 lays out the guidelines under which a permit may be issued to authorize take of endangered or threatened species (in the absence of any federal nexus). Application for an incidental take permit under Section 10 is subject to certain requirements, including preparation by the permit applicant of a conservation plan, generally known as a "Habitat Conservation Plan" or "HCP." An HCP is a plan that outlines ways of maintaining, enhancing, and protecting a given habitat type needed to protect species. The plan usually includes measures to minimize

impacts, such as provisions for permanently protecting land, restoring habitat, and relocating plants or animals to another area.

6.2) Jurisdictional Waters and Wetlands

Three agencies generally regulate activities within streams, wetlands, and riparian areas in California: (1) the U.S. Army Corps of Engineers (USACE) regulates activities under Section 404 of the federal Clean Water Act; (2) the Regional Water Quality Control Board (RWQCB) regulates activities under Section 401 of the federal Clean Water Act and the State Porter-Cologne Water Quality Control Act; and (3) the California Department of Fish and Wildlife (CDFW) regulates activities under California Fish and Game Code Sections 1600-1616.

6.2.1) Federal Clean Water Act, Section 404

Section 404 of the federal Clean Water Act applies to "Waters of the United States" (WoUS). By definition these include waterways that could be used for interstate commerce and their tributaries, including any waters that flow into traditional navigable waters. In non-tidal waters, the limits of jurisdiction are "ordinary high water marks" (OHWM) such as stream banks.

There have been recent changes to the definition of WoUS and the agencies are interpreting WoUS consistent with the pre-2015 regulatory regime until further notice. Under this rule, WoUS includes:

1. All waters which are currently used, or were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters which are subject to the ebb and flow of the tide;

2. All interstate waters including interstate wetlands;

3. All other waters such as intrastate lakes, rivers, streams (including intermittent streams), mudflats, sandflats, wetlands, sloughs, prairie potholes, wet meadows, playa lakes, or natural ponds, the use, degradation or destruction of which could affect interstate or foreign commerce including any such waters:

    a. Which are or could be used by interstate or foreign travelers for recreational or other purposes; or

    b. From which fish or shellfish are or could be taken and sold in interstate or foreign commerce; or

c. Which are used or could be used for industrial purposes by industries in interstate commerce;

4. All impoundments of waters otherwise defined as waters of the United States under this definition;

5. Tributaries of waters identified in paragraphs (s)(1) through (4) of this section;

6. The territorial sea;

7. Wetlands adjacent to waters (other than waters that are themselves wetlands) identified in paragraphs (s)(1) through (6) of this section; waste treatment systems, including treatment ponds or lagoons designed to meet the requirements of CWA (other than cooling ponds as defined in 40 CFR 423.11(m) which also meet the criteria of this definition) are not waters of the United States.

Final determination and delineation of federal jurisdiction is made by the USACE and not by the project biologists. Therefore, fieldwork and documentation of the site conditions are done as a preliminary delineation until the USACE reviews and concurs with the results.

6.2.2) Federal Clean Water Act, Section 401 and Porter-Cologne

The RWQCB has jurisdiction over wetlands, WoUS, and Waters of the State under Section 401 of the CWA and the Porter-Cologne Water Quality Control Act (Porter-Cologne) under the California Water Code (§ 13000, et seq.) Permitting is required for activities that will result in a discharge of soils, nutrients, chemicals, detrital materials, or other pollutants into WoUS, Waters of the State, or adjacent wetlands that will affect the water quality of those bodies and the watershed.

6.2.3) California Fish and Game Code, Section 1600

The CDFW, through provisions of the California Fish and Game Code (Sections 1600-1616), is empowered to issue agreements ("Lake and Streambed Alteration Agreements") for projects that will adversely affect wildlife habitat associated with any river, stream, or lake edges. The Lake and Streambed Alteration Agreement will typically include required measures to mitigate impacts.

Sections 1600-1616 of the California Fish and Game Code apply to stream channels, defined elsewhere in the Code as follows:

"A stream is a body of water that flows at least periodically through a bed or channel having banks and supports fish or other aquatic life. This includes watercourses having a surface or subsurface flow that supports or has supported riparian vegetation."

The state definition does not specify a flow rate or inundation frequency and provides no clear distinction between jurisdictional and non-jurisdictional lands.

While the federal USACE criteria (hydrology, soils, and vegetation) are used to evaluate the presence or absence of wetlands within the project site, the determination of state wetland status is not based on the combined presence of the three criterion because the state can take jurisdiction of any one of the three: (1) the presence of open water or saturated soils, (2) presence of vegetation including riparian or wetland species, and/or (3) water-modified or oxygen-depleted soils.

6.3) California Endangered Species Act

California Endangered Species Act (CESA) definitions of endangered and threatened species parallel those defined in the FESA. The CESA defines an endangered species as ". . . a native species or subspecies of a bird, mammal, fish, amphibian, reptile or plant which is in serious danger of becoming extinct throughout all, or a significant portion, of its range due to one or more causes including loss of habitat, change in habitat, over exploitation, predation, competition or disease." Endangered species are in serious danger of becoming extinct and threatened species are likely to become endangered species in the foreseeable future (according to Sections 2062 and 2067, respectively, of the California Fish and Wildlife Code). Candidate species are those under formal review by the CDFW for listing as endangered or threatened (Section 2067). Prior to being considered for protected status, the CDFW designates a species as being of special concern. Species of Special Concern are those for which the CDFW has information indicating population decline.

6.4) California Environmental Quality Act

The California Environmental Quality Act (CEQA) and CEQA Guidelines (§ 15000 et seq.) require identification of environmental effects from discretionary projects. Significant effects are to be mitigated by avoidance, minimization, rectification, or compensation whenever possible.

Effects to all state and federal listed species are considered significant under CEQA. In addition to formally listed species, CEQA considers effects to species that are demonstrably endangered or rare as important or significant. These definitions can include state designated species of

special concern, federal candidate and proposed species, California Natural Diversity Database (CNDDB) tracked species, and California Rare Plant Rank (CRPR) 1B and 2 plants.

Appendix G of the CEQA Guidelines specifically addresses biological resources and encompasses a broad range of resources to be considered.

6.5) California Natural Diversity Database

The California Natural Diversity Database (CNDDB) is a database that ranks overall condition of listed and special status species and sensitive vegetation communities on global (throughout its range) and state (within California) levels. The CNDDB includes documented occurrences of listed and special status species that have been reported to CDFW. State ranking is numerical, ranging from one to five (S1 to S5), with one indicating very few remaining individuals or little remaining habitat and five indicating a demonstrably secure to ineradicable population condition. State ranks (S ranks) may also include an extension (e.g., S1.x) indicating current threats ranging from one (very threatened) to three (no current threats known).

6.6) California Rare Plant Rank

The California Native Plant Society (CNPS) Inventory of Rare and Endangered Species includes documented occurrences of special status plant species that are available through the Consortium of California Herbaria and other sources. The CNPS, in coordination with CDFW, has cataloged California's rare and endangered plants into lists according to population distributions and viability. These lists are numbered and indicate the following California Rare Plant Ranks (CRPR): (1A) presumed extinct in California; (1B) rare, threatened, or endangered throughout their range; (2A) presumed extirpated in California, but more common in other states; (2B) threatened or endangered in California, but more common in other states; (3) more information is needed to establish rarity; and (4) plants of limited distribution in California (i.e., naturally rare in the wild), but whose populations do not appear to be susceptible to threat. A CRPR may also have an extension (e.g., 1B.x) that indicates current level of threat: seriously threatened (x.1), moderately threatened (x.2), or not very threatened (x.3).

6.7) Information for Planning and Consultation

The U.S. Fish and Wildlife Service (USFWS) Information for Planning and Consultation (IPaC) is a database that includes federally listed endangered or threatened species and species proposed for listing, designated critical habitat, Birds of Conservation Concern, and other federally regulated lands and biological resources.

6.8) Migratory Bird Treaty Act

The federal Migratory Bird Treaty Act (MBTA) of 1918 (16 USC 703-711) is an international treaty that made it unlawful to take, possess, buy, sell, purchase, or barter any migratory bird listed in 50 CFR Part 10, including feathers or other parts, nests, eggs, or products, except as allowed by implementing regulations (50 CFR 21). Executive Order 13186 ensures that environmental analyses of federal actions required by the National Environmental Policy Act (NEPA) or other established environmental review processes evaluate the effects of actions on migratory birds, with emphasis on species of concern. Disturbance that causes nest abandonment and/or loss of reproductive effort (e.g., killing or abandonment of eggs or young) or loss of habitat upon which the birds depend could be considered "take."

6.9) California Fish and Game Code, Sections 3503 and 3513

California Fish and Game Code Section 3503 prohibits take, possession, or needless destruction of bird nests or eggs except as otherwise provided by the Code; Section 3503.5 prohibits take or possession of birds of prey or their eggs except as otherwise provided by the Code; and Section 3513 provides for the adoption of the provisions of the federal Migratory Bird Treaty Act, described above.

6.10) Western Riverside County Multiple Species Habitat Conservation Plan

The County of Riverside, including eight (8) additional land jurisdictions and 14 cities, have prepared a Multiple Species Habitat Conservation Plan (MSHCP) for western Riverside County. The MSHCP will build upon existing preserves and provide connectivity and wildlife corridors throughout the region. The MSHCP proposes to conserve approximately 500,000 acres and 146 different species.

The MSHCP was approved by the county on June 17, 2003 and an Implementation Agreement (IA) between the USFWS, the CDFW, and the County was executed and an associated USFWS Section 10(a)(1)(B) Permit (No. TE-088609) was issued on June 22, 2004. The permit grants take authorization for certain species identified in the permit as "Covered Species Adequately Conserved."

The MSHCP establishes seven (7) core reserve areas and associated linkages between proposed and existing core areas. The MSHCP divides these areas into Cells using USGS coordinates.

Focused surveys are required for species identified as not adequately conserved under the MSHCP if suitable habitat is present onsite. If focused surveys are determined necessary and species identified as not adequately conserved under the MSHCP occur onsite, the proponent may be required to undergo a Habitat Acquisition and Negotiation Strategy (HANS) determination with the County of Riverside. If a single-family home or mobile home is to be placed on an existing legal lot, permitting will be reviewed according to the procedures outlined in MSHCP Section 6.1.1, *Expedited Review Process for Single-Family Homes or Mobile Homes to Be Located on an Existing Lot within the Criteria Area*.

MSHCP Section 6.1.2 (Riparian/Riverine Habitat)

Section 6.1.2 of the MSHCP requires an assessment of the potentially significant effects of the proposed project on Riparian/riverine areas, and vernal pools as currently required by CEQA using available information augmented by project-specific mapping. Riparian/riverine areas and vernal pools are defined as follows:

- Riparian/riverine Areas are lands that have flow for all or a portion of the year and which contain habitat dominated by trees, shrubs, persistent emergents, or emergent mosses and lichens, which occur close to or which depend upon soil moisture from a nearby fresh water source; or areas with fresh water flow during all or a portion of the year.

- Vernal pools are seasonal wetlands that occur in depression areas that have wetlands indicators of all three parameters (soils, vegetation, and hydrology) during the wetter portion of the growing season but normally lack wetlands indicators of hydrology and/or vegetation during the drier portion of the growing season. Obligate hydrophytes and facultative wetlands plant species are normally dominant during the wetter portion of the growing season, while upland species (annuals) may be dominant during the drier portion of the growing season. The determination that an area exhibits vernal pool characteristics, and the definition of the watershed supporting vernal pool hydrology, must be made on a case-by case basis. Such determinations should consider the length of the time the area exhibits upland and wetland characteristics and the manner in which the area fits into the overall ecological system as a wetland. Evidence concerning the persistence of an area's wetness can be obtained from its history, vegetation, soils, and drainage characteristics, uses, to which it has been subjected, and weather and hydrologic records.

With the exception of wetlands created for the purpose of providing wetlands habitat or resulting from human actions to create open waters or from the alteration of natural stream courses, areas demonstrating characteristics as described above which are artificially created are not included in these definitions.

Burrowing Owl

Section B (Species Accounts) of Volume 2 of the MSHCP (Dudek 2003) lists the following objectives for burrowing owl conservation/protection:

Objective 1

Include within the MSHCP Conservation Area at least 27,470 acres of suitable primary habitat for the burrowing owl including grasslands.

Objective 2

Include within the MSHCP Conservation Area at least 5 Core Areas and interconnecting linkages. Core areas may include the following: (1) Lake Skinner/Diamond Valley Lake area (Existing Core C plus Proposed Extension of Existing Cores 5, 6, 7; 29,060 acres); (2) playa west of Hemet (Proposed Noncontiguous Habitat Block 7; 1,250 acres); (3) San Jacinto Wildlife Area/Mystic Lake area including Lake Perris area (Existing Core H; 17,470 acres); (4) Lake Mathews (Existing Core C plus Proposed Extension of Existing Cores 2; 23,710 acres); and (5) along the Santa Ana River (9,670 acres). The Core Areas should support a combined total breeding population of approximately 120 burrowing owls with no fewer than five pairs in any one Core area.

Objective 3

Include within the MSHCP Conservation Area at least 22,120 acres of suitable secondary habitat for the burrowing owl including playas and vernal pools, and agriculture outside of the Core Areas identified above. Areas where additional suitable habitat could be conserved include west of the Jurupa Mountains, near Temescal Wash (i.e., vicinity of Alberhill), near Temecula Creek, within the Lakeview Mountains, Banning, the Badlands, Gavilan Hills, and Quail Valley.

Objective 4

Include within the MSHCP Conservation Area the known nesting locations of the burrowing owl at Lake Perris, Mystic Lake/San Jacinto Wildlife area, Lake Skinner area, the area around Diamond Valley Lake, playa west of Hemet, Lakeview Mountains, Lake Mathews/Estelle Mountain Reserve and Sycamore Canyon Regional Park.

Objective 5

Surveys for burrowing owl will be conducted as part of the project review process for public and private projects within the burrowing owl survey area where suitable habitat is present (see Burrowing Owl Survey Area Map, Figure 6-4 of the MSHCP, Volume I). The locations of this species determined as a result of survey efforts shall be conserved in accordance with procedures described within Section 6.3.2, MSHCP, Volume I and the guidance provided below:

Burrowing owl surveys shall be conducted utilizing accepted protocols as follows. If burrowing owls are detected on the project site then the action(s) taken will be as follows:

If the site is within the Criteria Area, then at least 90 percent of the area with long-term conservation value will be included in the MSHCP Conservation Area. Otherwise:

1) If the site contains, or is part of an area supporting less than 35 acres of suitable habitat or the survey reveals that the site and the surrounding area supports fewer than 3 pairs of burrowing owls, then the on-site burrowing owls will be passively or actively relocated following accepted protocols.

2) If the site (including adjacent areas) supports three or more pairs of burrowing owls, supports greater than 35 acres of suitable habitat and is non-contiguous with MSHCP Conservation Area lands, at least 90 percent of the area with long-term conservation value and burrowing owl pairs will be conserved onsite.

The survey and conservation requirements stated in this objective will be eliminated when it is demonstrated that Objectives 1 – 4 have been met.

Objective 6

Pre-construction presence/absence surveys for burrowing owl within the survey area where suitable habitat is present will be conducted for all Covered Activities through the life of the permit. Surveys will be conducted within 30 days prior to disturbance. Take of active nests will be avoided. Passive relocation (use of one-way doors and collapse of burrows) will occur when owls are present outside the nesting season.

Objective 7

Translocation sites for the burrowing owl will be created in the MSHCP Conservation Area for the establishment of new colonies. Translocation sites will be identified, taking into consideration unoccupied habitat areas, presence of burrowing mammals to provide suitable burrow sites, existing colonies and effects to other Covered Species. Reserve Managers will consult with the Wildlife Agencies regarding site selection prior to translocation site development.

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APPENDIX A: PLANT AND WILDLIFE SPECIES

Plant and wildlife species identified on the Golden Meadows site during surveys from 2003 to 2021. One asterisk (*) indicates a non-native species; two asterisks (**) indicates a special status species; a question mark (?) indicates uncertainty regarding identification or native status. The list includes common butterfly species that were observed during Quino checkerspot butterfly surveys in 2004 but does not represent a complete inventory of insects present.

	Scientific Name	**Common Name**
	VASCULAR PLANTS	
	DICOTYLEDONS	
	ADOXACEAE	MUSKROOT FAMILY
	Sambucus nigra ssp. cerulea (S. mexicana)	Mexican elderberry, blue elderberry
	AMARANTHACEAE	AMARANTH FAMILY
*	*Amaranthus albus*	Tumbleweed, tumbling pigweed
	ANACARDIACEAE	SUMAC or CASHEW FAMILY
*	*Schinus molle*	Peruvian pepper tree
	APIACEAE	CELERY FAMILY
	Daucus pusillus	Rattlesnake weed, wild carrot
	ASTERACEAE	ASTER FAMILY
	Acourtia microcephala (Perezia microcephala)	Scapellote, perezia
	Ambrosia acanthicarpa	Annual bur-sage, annual sandbur
*	*Anthemis cotula*	Mayweed, dog mayweed
	Artemisia californica	California sagebrush
	Baccharis salicifolia (B. glutinosa)	Mulefat
	Bebbia juncea	Sweetbush
*	*Centaurea melitensis*	Tocalote
	Chaenactis artemisiifolia	White pincushion, wormwood pincushion
	Corethrogyne filaginifolia var. filaginifolia (Lessingia filaginifolia)	California-aster, sand-aster
	Deinandra fasciculata (Hemizonia fasciculata)	Fascicled tarplant, slender tarweed
	Encelia farinosa	Brittlebush
*	*Erigeron bonariensis (Conyza bonariensis)*	Flax-leaved horseweed
	Erigeron canadensis (Conyza canadensis)	Horseweed, mare's tail
	Eriophyllum confertiflorum	Golden-yarrow

	Scientific Name	**Common Name**
	Eriophyllum multicaule	Many-stem woolly daisy
	Gutierrezia californica (G. bracteata)	California matchweed
	Helianthus annuus	Western sunflower
	Helianthus gracilentus	Slender sunflower
*	*Lactuca serriola*	Prickly lettuce
	Lasthenia californica (L. chrysostoma)	California goldfields
	Layia platyglossa	Tidy-tips
	Logfia filaginoides (Filago californica)	California filago
*	*Matricaria discoidea (Chamomilla suaveolens, M. matricarioides)*	Pineapple weed
*	*Oncosiphon pilulifer (Matricaria globosa)*	Stinknet
	Rafinesquia californica	California chicory
*	*Senecio vulgaris*	Common groundsel
*	*Sonchus oleraceus*	Common sow thistle
	Stephanomeria virgata	Wreath plant
	Stylocline gnaphaloides	Everlasting neststraw
	Tetradymia comosa	Hairy horsebrush, common-thorn
	Uropappus lindleyi (Microseris lindleyi, M. linearifolia)	Silverpuffs
*?	*Xanthium spinosum*	Spiny cocklebur
	BORAGINACEAE	BORAGE OR WATERLEAF FAMILY
	Amsinckia intermedia (A. menziesii var. intermedia)	Large flower rancher's fiddleneck
	Cryptantha species	Unid. cryptantha
	Cryptantha intermedia	Common cryptantha
	Heliotropium curassavicum	Wild heliotrope
	Pectocarya linearis	Slender pectocarya
	Phacelia minor	Wild Canterbury bells
	Phacelia ramosissima	Branching phacelia
	Plagiobothrys species	Popcornflower
	BRASSICACEAE	MUSTARD FAMILY
*	*Brassica nigra*	Black mustard
*	*Hirschfeldia incana (Brassica geniculata)*	Shortpod mustard
	Lepidium nitidum	Shining peppergrass
*	*Raphanus sativus*	Wild radish
*	*Sisymbrium irio*	London rocket
*	*Sisymbrium orientale*	Wild mustard, hare's ear cabbage
	Thysanocarpus curvipes	Fringepod

	Scientific Name	**Common Name**
	CACTACEAE	CACTUS FAMILY
	Cylindropuntia californica var. parkeri (Opuntia parryi)	Valley cholla
	CHENOPODIACEAE	GOOSEFOOT FAMILY
*	*Atriplex suberecta*	Sprawling saltbush, Australian saltbush
*	*Chenopodium murale*	Nettle-leaved goosefoot, lamb's quarters
*	*Salsola tragus*	Russian thistle
	CONVOLVULACEAE	MORNING-GLORY FAMILY
	Calystegia macrostegia	Morning-glory
	Cuscuta californica	Chaparral dodder, witch's hair
	CRASSULACEAE	STONECROP FAMILY
	Crassula connata (C. erecta)	Pygmy-weed, pygmy stonecrop
	CUCURBITACEAE	GOURD FAMILY, CUCUMBER FAMILY
	Cucurbita foetidissima	Calabazilla
	Marah macrocarpa	Chilicothe, wild cucumber
	EUPHORBIACEAE	SPURGE FAMILY
	Croton setiger (C. setigerus, Eremocarpus setiger, E. setigerus)	Turkey-mullein, doveweed
	Euphorbia albomarginata (Chamaesyce albomarginata)	Rattlesnake sandmat, rattlesnake weed
	FABACEAE	LEGUME FAMILY, PEA FAMILY
	Acmispon americanus (Lotus purshianus, L. unifoliatus)	"Spanish" clover
	Acmispon glaber (Lotus scoparius)	Deerweed
	Lupinus species	Unid. lupine
	Lupinus bicolor	Miniature lupine, dove lupine
*	*Medicago polymorpha*	California burclover
*	*Vicia villosa*	Winter vetch
	FAGACEAE	OAK FAMILY
	Quercus agrifolia	Coast live oak
	GERANIACEAE	GERANIUM FAMILY
*	*Erodium botrys*	Long-beak filaree
*	*Erodium cicutarium*	Redstem filaree
	JUGLANDACEAE	WALNUT FAMILY
**	*Juglans californica*	Southern California black walnut

	Scientific Name	**Common Name**
	LAMIACEAE	MINT FAMILY
*	*Lamium amplexicaule*	Common henbit
*	*Marrubium vulgare*	Horehound
	Salvia apiana	White sage
	Salvia columbariae	Chia
	Salvia mellifera	Black sage
	Trichostema lanceolatum	Vinegar weed
	MALVACEAE	MALLOW FAMILY
*	*Malva parviflora*	Cheeseweed
	MYRSINACEAE	MYRSINE FAMILY
*	*Lysimachia (Anagallis) arvensis*	Scarlet pimpernel
	MYRTACEAE	MYRTLE FAMILY, EUCALYPTUS FAMILY
*	*Eucalyptus species*	Ornamental eucalyptus, gumtree
	NYCTAGINACEAE	FOUR O'CLOCK FAMILY
	Mirabilis laevis var. crassifolia (M. californica)	Wishbone bush
	ONAGRACEAE	EVENING-PRIMROSE FAMILY
	Camissonia species	Unid. evening-primrose
	Eulobus californica (Camissonia californica)	California false mustard, mustard evening primrose
	PAPAVERACEAE	POPPY FAMILY
	Eschscholzia californica	California poppy
	PHRYMACEAE	LOPSEED FAMILY
	Diplacus (Mimulus) aurantiacus (M. puniceus, M. longiflorus)	Bush monkeyflower, sticky monkeyflower
	Erythranthe (Mimulus) guttatus	Seep monkeyflower
	PLANTAGINACEAE	PLANTAIN FAMILY
	Antirrhinum nuttallianum	Nuttall snapdragon, violet snapdragon
	Keckiella antirrhinoides	Yellow bush-penstemon
	Plantago erecta	California plantain
	POLEMONIACEAE	PHLOX FAMILY
	Eriastrum sapphirinum	Sapphire woollystar
	Navarretia hamata	Hooked navarretia
	POLYGONACEAE	BUCKWHEAT FAMILY
	Chorizanthe fimbriata	Fringed spineflower
**	*Chorizanthe polygonoides var. longispina*	Long-spined spineflower
	Eriogonum fasciculatum var. foliolosum	Leafy California wild buckwheat, interior California buckwheat

	Scientific Name	**Common Name**
	Eriogonum fasciculatum var. polifolium	Mojave Desert California buckwheat
*	*Polygonum aviculare (P. arenastrum)*	Common knotweed
*	*Rumex crispus*	Curly dock
	PORTULACACEAE	PURSLANE FAMILY
*	*Portulaca oleracea*	Common purslane
	ROSACEAE	ROSE FAMILY
	Adenostoma fasciculatum	Chamise
	RUBIACEAE	MADDER FAMILY, COFFEE FAMILY
*?	*Galium aparine*	Goose grass, annual bedstraw
	SALICACEAE	WILLOW FAMILY
	Populus fremontii ssp. fremontii	Fremont cottonwood
	Salix gooddingii	Goodding's black willow
	Salix lasiolepis	Arroyo willow
	SCROPHULARIACEAE	FIGWORT FAMILY, SNAPDRAGON FAMILY
	Scrophularia californica	California figwort, coast figwort
	SOLANACEAE	NIGHTSHADE FAMILY
	Datura wrightii (D. meteloides)	Jimsonweed, tolguacha
*	*Nicotiana glauca*	Tree tobacco
	Solanum americanum (S. nodiflorum)	White nightshade
	TAMARICACEAE	TAMARISK FAMILY
*	*Tamarix species*	Unid. tamarisk
	URTICACEAE	NETTLE FAMILY
*	*Urtica urens*	Dwarf nettle
	ZYGOPHYLLACEAE	CALTROP FAMILY
*	*Tribulus terrestris*	Puncture vine
	MONOCOTYLEDONS	
	AGAVACEAE	CENTURY PLANT FAMILY, AGAVE FAMILY
	Hesperoyucca whipplei (Yucca whipplei)	Chaparral yucca
	LILIACEAE	LILY FAMILY
	Calochortus splendens	Splendid mariposa lily
	POACEAE	GRASS FAMILY
*	*Avena barbata*	Slender wild oat
*	*Avena fatua*	Wild oat

	Scientific Name	**Common Name**
*	*Bromus species*	Non-native brome
*	*Bromus diandrus (B. rigidus)*	Ripgut brome
*	*Bromus rubens (B. madritensis ssp. rubens)*	Red brome
*	*Digitaria sanguinalis*	Hairy crabgrass
*	*Festuca species (Vulpia species)*	Annual fescue
*	*Hordeum murinum*	Wall barley, hare barley
*	*Lamarckia aurea*	Goldentop grass
*	*Phalaris species*	Unid. canary grass
*	*Schismus barbatus*	Mediterranean grass
*	*Triticum aestivum*	Wheat
	THEMIDACEAE	BRODIAEA FAMILY
	Dichelostemma capitatum (D. pulchella, Brodiaea pulchella)	Blue dicks, wild hyacinth
	Muilla maritima	Common muilla, rough muilla

	Scientific Name	**Common Name**
	VERTEBRATES	
	Reptiles	
	Colubridae	Colubrid Snakes
	Pituophis catenifer	Gopher snake
	Phrynosomatidae	Spiny Lizards
**	*Phrynosoma blainvillii*	Coast horned lizard
	Sceloporus occidentalis	Western fence lizard
	Sceloporus orcutti	Granite spiny lizard
	Uta stansburiana	Side-blotched lizard
	Teiidae	Teiid Lizards
**	*Aspidoscelis hyperythra*	Orange-throated whiptail
**	*Aspidoscelis tigris stejnegeri*	Coastal (western) whiptail
	Birds	
	Accipitridae	Hawks, Eagles, and Harriers
**	*Accipiter cooperii*	Cooper's hawk
	Buteo jamaicensis	Red-tailed hawk
	Buteo lineatus	Red-shouldered hawk
**	*Circus hudsonius (C. cyaneus)*	Northern harrier
**	*Elanus leucurus*	White-tailed kite
	Aegithalidae	Long-tailed Tits
	Psaltriparus minimus	Bushtit
	Alaudidae	Larks
**	*Eremophila alpestris actia*	California horned lark
	Anatidae	Ducks, Geese, Swans
	Anas platyrhynchos	Mallard (fly over)
	Apodidae	Swifts
	Aeronautes saxatalis	White-throated swift
	Ardeidae	Herons
**	*Ardea alba*	Great egret
**	*Ardea herodias*	Great blue heron (fly over)
	Cardinalidae	Cardinals
	Passerina amoena	Lazuli bunting
	Cathartidae	Vultures
	Cathartes aura	Turkey vulture

Charadriidae		Plovers
	Charadrius vociferus	Killdeer
Columbidae		Pigeons and Doves
*	*Columba livia*	Rock dove, common pigeon
	Zenaida macroura	Mourning dove
Corvidae		Crows and Jays
	Aphelocoma californica	California scrub jay
	Corvus brachyrhynchos	American crow
	Corvus corax	Common raven
Cuculidae		Cuckoos
	Geococcyx californianus	Greater roadrunner
Falconidae		Falcons
	Falco sparverius	American kestrel
Fringillidae		Finches
**	*Spinus (Carduelis) lawrencei*	Lawrence's goldfinch
	Spinus (Carduelis) psaltria	Lesser goldfinch
	Spinus (Carduelis) tristes	American goldfinch
	Haemorhous (Carpodacus) mexicanus	House finch
Hirundinidae		Swallows
	Hirundo rustica	Barn swallow
	Petrochelidon pyrrhonota tachina	Cliff swallow
	Stelgidopteryx serripennis	Northern rough-winged swallow
	Tachycineta thalassina	Violet-green swallow
Icteridae		Blackbirds
	Agelaius phoeniceus	Red-winged blackbird
	Euphagus cyanocephalus	Brewer's blackbird
	Icterus bullockii	Bullock's oriole
	Sturnella neglecta	Western meadowlark
Laniidae		Shrikes
**	*Lanius ludovicianus*	Loggerhead shrike
Mimidae		Mockingbirds
	Mimus polyglottos	Northern mockingbird
**	*Toxostoma redivivum*	California thrasher
Motacillidae		Wagtails and Pipits
	Anthus rubescens	American pipit
Odontophoridae		Quail
	Callipepla californica	California quail

Parulidae		Wood Warblers
	Geothlypis tolmiei	MacGillivray's warbler
	Oreothlypis celata	Orange-crowned warbler
	Setophaga coronata	Yellow-rumped warbler
Passerellidae		New World Sparrows
**	*Aimophila ruficeps canescens*	Southern California rufous-crowned sparrow
**	*Artemisiospiza belli*	Bell's sage sparrow
	Chondestes grammacus	Lark sparrow
	Melospiza melodia	Song sparrow
	Melozone crissalis	California towhee
	Passerculus sandwichensis	Savannah sparrow
	Pipilo maculatus	Spotted towhee
	Pooecetes gramineus	Vesper sparrow
	Spizella passerina	Chipping sparrow
	Zonotrichia leucophrys	White-crowned sparrow
Passeridae		Old World Sparrows
*	*Passer domesticus*	House sparrow
Picidae		Woodpeckers
	Colaptes auratus	Northern flicker
**	*Dryobates (Picoides) nuttallii*	Nuttall's woodpecker
Polioptilidae		Gnatcatchers
	Polioptila caerulea	Blue-gray gnatcatcher
**	*Polioptila californica*	Coastal California gnatcatcher
Strigidae		Owls
**	*Athene cunicularia*	Burrowing owl
Sturnidae		Starlings
*	*Sturnus vulgaris*	European starling
Timaliidae		Babblers
**	*Chamaea fasciata*	Wrentit
Trochilidae		Hummingbirds
	Calypte anna	Anna's hummingbird
**	*Calypte costae*	Costa's hummingbird
**	*Selasphorus rufus*	Rufous hummingbird
Troglodytidae		Wrens
	Catherpes mexicanus	Canyon wren
	Salpinctes obsoletus	Rock wren
	Thryomanes bewickii	Bewick's wren
	Troglodytes aedon	House wren
Turdidae		Thrushes
	Sialia mexicana	Western bluebird

Tyrannidae	Tyrant Flycatchers
Empidonax wrightii	Gray flycatcher
Myiarchus cinerascens	Ash-throated flycatcher
Sayornis nigricans	Black phoebe
Sayornis saya	Say's phoebe
Tyrannus verticalis	Western kingbird
Tyrannus vociferans	Cassin's kingbird

Mammals

Canidae	Dogs, Foxes, and Coyotes
Canis familiaris	Domestic dog
Canis latrans	Coyote
Geomyidae	Pocket Gophers
Thomomys bottae	Botta's pocket gopher (sign)
Leporidae	Rabbits
** *Lepus californicus bennettii*	San Diego black-tailed jackrabbit
Sylvilagus audubonii	Audubon's cottontail
Sciuridae	Squirrels
Spermophilus beecheyi	California ground squirrel

INVERTEBRATES

Lepidoptera	**Butterflies and Moths**
Papilionidae	Swallowtails
Papilio rutulus	Western tiger swallowtail
Papilio zelicaon	Anise swallowtail
Nymphalidae	Brush-footed butterflies
Euphydryas chalcedona	Chalcedon checkerspot
Junonia coenia	Buckeye
Vanessa cardui	Painted lady
Vanessa annabella	West coast lady
Vanessa virginiensis	Virginia lady
Lycaenidae	Blues, Hairstreaks, Coppers
Glaucopsyche lygdamus australis	Southern blue
Icaricia acmon	Acmon blue
Pieridae	Whites and Sulfurs
Anthocharis sara	Sara orange-tip
Anthocharis cethura	Felder's orange-tip
Pontia protodice	Checkered white

Riodinidae	Metalmarks
Apodemia mormo virgulti	Behr's metalmark
Hesperiidae	Skippers
Erynnis funeralis	Funereal duskywing
Pyrgus communis albescens	Small checkered skipper

APPENDIX B: SPECIAL STATUS SPECIES POTENTIALS FOR OCCURRENCE

Species	Growth Form, Habitat and Distribution	Flowering Season	Conservation Status	Potential for Occurrence
Plants				
Abronia villosa var. aurita Chaparral sand-verbena	Annual herb. Sandy soils in chaparral, coastal scrub, desert dunes at 75-1600m elevation. Riverside, San Bernardino, Imperial, San Diego, Orange Cos. (presumed extirpated in Orange Co.), Arizona, Baja.	(Jan)Mar-Sep	Fed: None Calif: S2 CRPR: 1B.1	Low; potentially suitable habitat, no documented occurrences within 5 mi., not observed during surveys.
Allium marvinii Yucaipa onion	Perennial bulbiferous herb. Clay soils in openings in chaparral at 760-1065m. Riverside, San Bernardino, Orange, San Diego Cos.	Apr-May	Fed: None Calif: S1 CRPR: 1B.2 MSHCP: AC b USFS: S	Not expected; potentially suitable habitat, below elevation range, no documented occurrences within 5 mi., not observed during surveys.
Allium munzii Munz's onion	Perennial bulbiferous herb. Mesic, clay soils in chaparral, cismontane woodland, coastal scrub, pinyon juniper woodland, valley and foothill grassland at 297-1070m elevation. Western Riverside Co.	Mar-May	Fed: END Calif: THR, S1 CRPR: 1B.1 MSHCP: AC b	Low; no or marginal habitat, three documented occurrences within 5 mi. (from 1897, Menifee area – exact location unknown, mapped 4.5 mi. NE of site; 1962, exact location unknown, mapped 2.7 mi. NW; from 2015, 2.5 mi. SE), not observed during surveys.
Almutaster pauciflorus Alkali marsh aster	Perennial herb. Alkaline soils in meadows and seeps at 240 to 800m elevation. Inyo, Kern, Riverside, and San Bernardino Cos., SW and North-Central US, and Mexico.	Jun-Oct	Fed: None Calif: S1S2 CRPR: 2B.2	Not expected; no or marginal habitat, no documented occurrences within 5 mi., not observed during surveys.
Ambrosia pumila San Diego ambrosia	Perennial rhizomatous herb. Sandy or clay soils, often in disturbed areas, sometimes alkaline. Chaparral, coastal scrub, valley and foothill grassland, and vernal pools at 20-415m elevation. Riverside, San Diego Co., Baja.	Apr-Oct	Fed: END Calif: S1 CRPR: 1B.1 MSHCP: AC b	Not expected; potentially suitable habitat, above elevation range, no documented occurrences within 5 mi., not observed during surveys.
Amsinckia douglasiana Douglas' fiddleneck	Annual herb. Monterey shale, dry soils in cismontane woodland, valley and foothill grassland at sea level to 1950m elevation. Central coast of CA, few observations in southern CA. Not tracked in the CNDDB.	Mar-May	Fed: None Calif: S4 CRPR: 4.2	Not expected; no or marginal habitat, no mapped CCH records within 5 mi., not observed during surveys.

Species	Growth Form, Habitat and Distribution	Flowering Season	Conservation Status	Potential for Occurrence
Arctostaphylos rainbowensis Rainbow manzanita	Perennial evergreen shrub. Chaparral at 205-670m elevation. Riverside and San Diego Cos.	Dec-Mar	Fed: None Calif: S2 CRPR: 1B.1 MSHCP: AC BLM: S USFS: S	Absent; potentially suitable habitat, no documented occurrences within 5 mi., conspicuous plant not observed during surveys.
Astragalus pachypus var. jaegeri Jaeger's milk-vetch	Perennial shrub. Sandy or rocky soils in chaparral, cismontane woodland, coastal scrub, valley and foothill grassland at 365-975m elevation. Riverside and San Diego Cos.	Dec-Jun	Fed: None Calif: S1 CRPR: 1B.1 MSHCP: AC USFS: S BLM: S	Low; potentially suitable habitat, no documented occurrences within 5 mi., not observed during surveys.
Atriplex coronata var. notatior San Jacinto Valley crownscale	Annual herb. Alkaline soils in playas, mesic areas of valley and foothill grassland, vernal pools at 139-500m elevation. Western Riverside Co.	Apr-Aug	Fed: END Calif: S1 CRPR: 1B.1 MSHCP: AC d	Not expected; no suitable habitat, no documented occurrences within 5 mi. not observed during surveys.
Atriplex parishii Parish's brittlescale	Annual herb. Alkaline soils in chenopod scrub, playas, vernal pools at 25-1900m elevation; Riverside, San Bernardino, LA, Orange, and San Diego Cos. and Baja. Presumed extirpated in LA, Orange, and San Bernardino Cos.	Jun - Oct	Fed: None Calif: S1 CRPR: 1B.1 MSHCP: AC d USFS: S	Not expected; no suitable habitat, no documented occurrences within 5 mi., not observed during surveys.
Atriplex serenana var. davidsonii Davidson's saltscale	Annual herb. Alkaline soils in coastal bluff scrub, coastal scrub at 10-200m elevation; Channel Islands, LA, Orange, Riverside, San Luis Obispo, Santa Barbara, and Ventura Cos. Presumed extirpated in Santa Barbara Co., possibly extirpated in LA Co.	Apr - Oct	Fed: None Calif: S1 CRPR: 1B.2 MSHCP: AC d	Not expected; no suitable habitat, no documented occurrences within 5 mi., not observed during surveys.
Ayenia compacta California ayenia	Perennial herb. Rocky soils in Mojavean and Sonoran desert scrub at 150-1095m elevation. Riverside, San Bernardino, San Diego Cos., Arizona, Sonora and Baja Mexico.	Mar-Apr	Fed: None Calif: S3 CRPR: 2B.3	Absent; no suitable habitat, no documented occurrences within 5 mi., not observed during surveys.

Species	Growth Form, Habitat and Distribution	Flowering Season	Conservation Status	Potential for Occurrence
Brodiaea filifolia Thread-leaved brodiaea	Perennial bulbiferous herb. Often on clay soils in chaparral openings, cismontane woodland, coastal scrub, playas, valley and foothill grassland, and vernal pools at 25-1120m elevation. LA, Orange, Riverside, San Bernardino, and San Diego Cos.; scattered in Southern CA foothills & valleys.	Mar-Jun	Fed: THR Calif: END, S2 CRPR: 1B.1 MSHCP: AC d	Not expected; no or marginal habitat, no documented occurrences within 5 mi., not observed during surveys.
Brodiaea santarosae Santa Rosa Basalt brodiaea	Perennial bulbiferous herb. Basalt in valley and foothill grassland. Santa Rosa Plateau, Riverside and San Diego Cos.	May-Jun	Fed: None Calif: S1 CRPR: 1B.2 USFS: S	Absent; no suitable habitat, outside geographic range, no documented occurrences within 5 mi., not observed during surveys.
Calochortus catalinae Catalina mariposa-lily	Perennial bulbiferous herb. Chaparral, cismontane woodland, coastal scrub, valley and foothill grassland at 15-700m elevation. LA, Orange, Riverside, San Bernardino, Santa Barbara, Ventura Co, some Channel Islands. Not tracked in CNDDB.	(Feb)Mar-Jun	Fed: None Calif: S3S4 CRPR: 4.2	Low; potentially suitable habitat, no mapped CCH records within 5 mi., not observed during surveys.
Calochortus plummerae Plummer's mariposa lily	Perennial bulbiferous herb. Granitic rocky soils in chaparral, cismontane woodland, coastal scrub, lower montane coniferous forest, valley and foothill grassland at 100-1700m elevation. LA, Orange, Riverside, San Bernardino, San Diego, Ventura Cos.	May-Jul	Fed: None Calif: S4 CRPR: 4.2 MSHCP: AC	Low; potentially suitable habitat, no documented occurrences within 5 mi., not observed during surveys.
Calochortus weedii var. intermedius Intermediate mariposa lily	Perennial bulbiferous herb. Rocky, calcareous soils in chaparral, coastal scrub, valley and foothill grassland at 105-855m elevation. LA, Orange, San Bernardino, and western Riverside Co.	May-Jul	Fed: None Calif: S3 CRPR: 1B.2 USFS: S MSHCP: AC	Low; potentially suitable habitat, two documented occurrences within 5 mi. (2003, 3.5 mi. S; 2015, 4.2 mi. SE), not observed during surveys.
Carex buxbaumii Buxbaum's sedge	Perennial rhizomatous herb. Bogs and fens, mesic meadows and seeps, marshes and swamps at 3-3300m elevation. Most of US, northern CA, one occurrence reported near Lake Elsinore in Riverside Co. Not tracked in CNDDB.	Mar-Aug	Fed: None Calif: S3 CRPR: 4.2	Absent; no suitable habitat, no mapped CCH records within 5 mi., not observed during surveys.

Species	Growth Form, Habitat and Distribution	Flowering Season	Conservation Status	Potential for Occurrence
Caulanthus simulans Payson's jewelflower	Annual herb. Chaparral, coastal scrub at 90-2200m elevation. North-facing slopes and ridgelines on sandy-granitic soils, frequently on steep rocky slopes, in burned areas, or disturbed sites such as streambeds. Orange, western Riverside, San Diego Cos.	(Feb)Mar-May(Jun)	Fed: None Calif: S4 CRPR: 4.2 MSHCP: AC	Not expected; no or marginal habitat, no documented occurrences within 5 mi., not observed during surveys.
Centromadia pungens ssp. *laevis* Smooth tarplant	Annual herb. Alkaline soils in chenopod scrub, meadows and seeps, playas, riparian woodland, valley and foothill grassland at 0-640m elevation. Also fallow fields, drainage ditches; mainly in SW Riverside Co., a few sites in interior valleys of LA, San Bernardino, San Diego Cos.	Apr-Sep	Fed: None Calif: S2 CRPR: 1B.1 MSHCP: AC d	Moderate; potentially suitable habitat, 11 documented occurrences within 5 mi. (1999 thru 2021, closest is 0.7 mi. NNW), not observed during surveys.
Chorizanthe leptotheca Peninsular spineflower	Annual herb. Granitic soils and alluvial fans in chaparral, coastal scrub, lower montane coniferous forest at 300-1900m elevation. Riverside, San Bernardino, LA, San Diego, Kern, San Luis Obispo Cos., Baja. Not tracked in the CNDDB.	May-Aug	Fed: None Calif: S3 CRPR: 4.2 MSHCP: AC	Not expected; no or marginal habitat, one mapped CCH record within 5 mi. (1893, mapped 2.1 mi. NE), not observed during surveys.
Chorizanthe parryi var. *parryi* Parry's spineflower	Annual herb. Sandy or rocky soils and openings in chaparral, cismontane woodland, coastal scrub, valley and foothill grassland at 275-1220m elev. LA, Riverside, San Bernardino Cos.	Apr-Jun	Fed: None Calif: S2 CRPR: 1B.1 USFS: S BLM: S MSHCP: AC	Moderate; potentially suitable habitat, 18 documented occurrences within 5 mi. (1998 thru 2017, closest is 0.9 mi. SW), not observed during surveys.
Chorizanthe polygonoides var. longispina Long-spined spineflower	Annual herb. Often on clay soils in chaparral, coastal scrub, meadows and seeps, valley and foothill grassland, vernal pools at 30-1530m elevation. Orange, Riverside, San Diego Cos., Baja.	Apr-Jul	Fed: None Calif: S3 CRPR: 1B.2 MSHCP: AC	Occurs; observed on site during surveys in 2017.
Clinopodium chandleri San Miguel savory	Perennial shrub. Rocky, gabbroic, or metavolcanic soils in chaparral, cismontane woodlands, coastal scrub, riparian woodland, valley and foothill grassland at 120-1075m elevation. Orange, Riverside, San Diego Co., Baja.	Mar-Jul	Fed: None Calif: S2 CRPR: 1B.2 MSHCP: AC b BLM: S USFS: S	Not expected; no or marginal habitat, no documented occurrences within 5 mi., not observed during surveys.

Species	Growth Form, Habitat and Distribution	Flowering Season	Conservation Status	Potential for Occurrence
Convolvulus simulans Small-flowered morning-glory	Annual herb. Clay soils, serpentinite seeps, chaparral openings, coastal scrub, valley and foothill grassland at 30-740m elevation. LA, Orange, Riverside, San Bernardino, San Diego Cos. and Central CA, Baja. Not tracked in CNDDB.	Mar-Jul	Fed: None Calif: S4 CRPR: 4.2 MSHCP: AC	Low to moderate; potentially suitable habitat, nine mapped CCH records within 5 mi. (1991-2018, all about 2.5 mi. SE), not observed during surveys.
Cryptantha wigginsii Wiggins' cryptantha	Annual herb. Coastal scrub at 20-275m elevation, often on clay soils. LA, Riverside, San Diego Cos., Catalina Island, and Baja.	Feb-Jun	Fed: None Calif: S1 CRPR: 1B.2	Not expected; potentially suitable habitat, above elevation range, no documented occurrences within 5 mi., not observed during surveys.
Deinandra (Hemizonia) paniculata Paniculate tarplant	Annual herb. Usually vernally mesic areas, sometimes sandy. Coastal scrub, valley and foothill grassland, vernal pools at 25-940m elevation. LA, Orange, Riverside, San Bernardino, San Diego, Ventura, Kern, Santa Barbara, San Luis Obispo Cos., Baja. Not tracked in the CNDDB.	(Mar) Apr-Nov	Fed: None Calif: S4 CRPR: 4.2	Low; potentially suitable or marginal habitat, no documented occurrences within 5 mi., not observed during surveys.
Dodecahema leptoceras Slender-horned spineflower	Annual herb. Open, sandy alluvial benches in valleys & canyons. Chaparral, coastal scrub (alluvial fans), cismontane woodland at 200-760m elevation. LA, Riverside, San Bernardino Cos.	Apr-Jun	Fed: END Calif: END, S1 CRPR: 1B.1 MSHCP: AC b	Not expected; no suitable habitat, no documented occurrences within 5 mi., not observed during surveys.
Dudleya multicaulis Many-stemmed dudleya	Perennial herb. Often on clay soils in chaparral, coastal scrub, valley and foothill grassland at 15-790m elevation. LA, Orange, Riverside, San Bernardino, San Diego Cos.	Apr-Jul	Fed: None Calif: S2 CRPR: 1B.2 USFS: S MSHCP: AC b	Not expected; no or marginal habitat, no documented occurrences within 5 mi., not observed during surveys.
Eryngium aristulatum var. parishii San Diego button-celery	Annual/perennial herb. Mesic areas in coastal scrub, valley and foothill grassland, vernal pools at 20-620m elevation. Riverside, LA, Orange, San Diego Cos. and Baja.	Apr-Jun	Fed: END Calif: END, S1 CRPR: 1B.1 MSHCP: AC	Not expected; no or marginal habitat, no documented occurrences within 5 mi., not observed during surveys.
Erythranthe diffusa Palomar monkeyflower	Annual herb. Sandy or gravelly soils in chaparral, lower montane coniferous forest at 1220-1830m elevation. Orange, Riverside, San Diego Co., Baja. Not tracked in the CNDDB.	Apr-Jun	Fed: None Calif: S3 CRPR: 4.3	Absent; no or marginal habitat, well below elevation range, no mapped CCH records within 5 mi., not observed during surveys.
Geothallus tuberosus Campbell's liverwort	Ephemeral liverwort. Grows on soil in mesic coastal scrub, vernal pools at 10-600m elevation. Riverside and San Diego Cos.	Not applicable	Fed: None Calif: S2 CRPR: 1B.1	Absent; no suitable habitat, no documented occurrences within 5 mi., not observed during surveys.

Species	Growth Form, Habitat and Distribution	Flowering Season	Conservation Status	Potential for Occurrence
Harpagonella palmeri Palmer's grapplinghook	Annual herb. Clay soils and open grassy areas within shrubland in chaparral, coastal scrub, valley and foothill grassland at 20-955m elevation. LA, Orange, Riverside, San Diego Co., Catalina Island, AZ, Baja and Sonora, Mexico.	Mar-May	Fed: None Calif: S3 CRPR: 4.2 MSHCP: AC	Not expected; no or marginal habitat, one documented occurrence within 5 mi. (1981, 2.4 mi. SE), not observed during surveys.
Hesperocyparis forbesii Tecate cypress	Perennial evergreen tree. Clay, gabbroic, or metavolcanic soils in closed-cone coniferous forest, chaparral at 80-1500m elevation. Orange, Riverside, San Diego Co., Baja.	Not applicable	Fed: None Calif: S2 CRPR: 1B.1	Absent; no or marginal habitat, no documented occurrences within 5 mi., conspicuous plant not observed during surveys.
Holocarpha virgata ssp. elongata Graceful (curving) tarplant	Annual herb. Chaparral, cismontane woodland, coastal scrub, valley and foothill grassland at 60-1100m elevation. Orange, Riverside, San Diego Cos. Known in Riverside County only from the Santa Rosa Plateau. Not tracked in CNDDB.	May-Nov	Fed: None Calif: S3 CRPR: 4.2 MSHCP: AC	Not expected; potentially suitable habitat, outside geographic range, no mapped CCH records within 5 mi., not observed during surveys.
Hordeum intercedens Vernal barley	Annual grass. Saline flats and depressions in valley and foothill grassland, vernal pools, coastal dunes, coastal scrub at 5-1000m elevation. LA, Orange, Riverside, San Diego Cos., Central CA, Channel Islands. Not tracked in the CNDDB.	Mar-Jun	Fed: None Calif: S3S4 CRPR: 3.2 MSHCP: AC	Absent; no suitable habitat, no documented occurrences within 5 mi., not observed during surveys.
Juglans californica Southern California black walnut	Perennial deciduous tree. Alluvial soils in chaparral, cismontane woodland, coastal scrub, riparian woodland at 50-900m elevation. LA, Orange, Riverside, Santa Barbara, San Bernardino, San Diego, Ventura Cos., Central and Northern CA. Not tracked in CNDDB.	Mar-Aug	Fed: None Calif: S4 CRPR: 4.2 MSHCP: AC	Occurs; observed onsite during surveys.
Juncus acutus ssp. leopoldii Southwestern spiny rush	Perennial rhizomatous herb. Mesic coastal dunes, alkaline seeps, coastal salt marshes at 3-900m elevation. S CA, central coast, AZ, NV, other areas. Not tracked in CNDDB.	(Mar)May-Jun	Fed: None Calif: S4 CRPR: 4.2	Absent; no suitable habitat, no mapped CCH records within 5 mi., not observed during surveys.
Juncus luciensis Santa Lucia dwarf rush	Annual herb. Chaparral, Great Basin scrub, lower montane coniferous forest, meadows and seeps, vernal pools at 300-2040m elevation. Riverside and San Diego Cos., central and northern CA.	Apr-Jul	Fed: None Calif: S3 CRPR: 1B.2 USFS: S	Not expected; no or marginal habitat, no documented occurrences within 5 mi., not observed during surveys.

Species	Growth Form, Habitat and Distribution	Flowering Season	Conservation Status	Potential for Occurrence
Lasthenia glabrata spp. coulteri Coulter's goldfields	Annual herb. Coastal salt marshes and swamps, playas, vernal pools at 1-1220m elevation. Riverside, San Bernardino, LA, Orange, Ventura Cos., Central and Northern CA, Baja. Presumed extirpated in LA, San Bernardino Cos.	Feb-Jun	Fed: None Calif: S2 CRPR: 1B.1 BLM: S MSHCP: AC d	Absent; no suitable habitat, three documented occurrences within 5 mi. (2003, 1.7 mi. N, appears to be developed; 2011, 3.3 mi. SE; 2015, 2.7 mi. NW), not observed during surveys.
Lathyrus splendens Pride-of-California	Perennial herb. Chaparral at 200-1525m elevation. LA, Riverside, San Bernardino Cos., Baja. Not tracked in CNDDB.	Mar-Jun	Fed: None Calif: S4 CRPR: 4.3	Not expected; potentially marginal habitat, no mapped CCH records within 5 mi., not observed during surveys.
Lepidium virginicum var. *robinsonii* Robinson's pepper-grass	Annual herb. Chaparral, coastal scrub at 1-885m elevation. LA, Orange, Riverside, San Bernardino, San Diego, Ventura, Santa Barbara, Mono Cos., Channel Islands, Baja.	Jan-Jul	Fed: None Calif: S3 CRPR: 4.3	Low; potentially suitable habitat, two documented occurrences within 5 mi. (2006, 2.0 mil SSW; 2008, 3.3 mi. N), not observed during surveys.
Lilium humboldtii ssp. ocellatum Ocellated Humboldt lily	Perennial bulbiferous herb. Openings in chaparral, cismontane woodland, coastal scrub, lower montane coniferous forest, riparian woodland at 30-1800m elevation. LA, Orange, Riverside, Santa Barbara, San Bernardino, San Diego, Ventura Co, some Channel Islands. Lower stream benches in riparian corridors in lower montane coniferous forest and coastal chaparral or shaded, dry slopes beneath a dense oak or conifer canopy.	Mar-Jul(Aug)	Fed: None Calif: S4? CRPR: 4.2 MSHCP: NAC f	Absent; no suitable habitat, no mapped CCH records within 5 mi., not observed during surveys.
Lilium parryi Lemon lily	Perennial bulbiferous herb. Mesic soils in upper and lower montane coniferous forest, riparian forest, meadows and seeps at 1220-2745m elevation. LA, Riverside, San Bernardino, San Diego Co, Arizona, Sonora Mex.	Jul-Aug	Fed: None Calif: S3 CRPR: 1B.2 USFS: S MSHCP: NAC f	Absent; no suitable habitat, well below elevation range, no documented occurrences within 5 mi., not observed during surveys.
Limnanthes alba ssp. parishii Parish's meadowfoam	Annual herb. Vernally mesic areas in lower montane coniferous forest, meadows and seeps, vernal pools at 600-2000m elevation. Riverside and San Diego Cos.	Apr-Jun	Fed: None Calif: END, S2 CRPR: 1B.2 USFS: S BLM: S MSHCP: AC	Absent; no suitable habitat, below elevation range, no documented occurrences within 5 mi., not observed during surveys.

Species	Growth Form, Habitat and Distribution	Flowering Season	Conservation Status	Potential for Occurrence
Microseris douglasii ssp. platycarpha Small-flowered microseris	Annual herb. Clay soils in cismontane woodland, coastal scrub, valley and foothill grassland, vernal pools at 15-1070m elevation. LA, Orange, Riverside, San Diego Cos., Channel Islands, Baja. Not tracked in CNDDB.	Mar-May	Fed: None Calif: S4 CRPR: 4.2 MSHCP: AC	Low; potentially suitable habitat, eight mapped CCH records within 5 mi. (2000, 1.5 mi. N, 1996, 2.7 mi. WSW; 1992-2015, all about 2.5 mi. SE), not observed during surveys.
Monardella hypoleuca ssp. intermedia Intermediate monardella	Perennial rhizomatous herb. Chaparral, cismontane woodlands, sometimes lower montane coniferous forest at 400-1250m elevation. Orange, Riverside, San Diego Co.	Apr-Sep	Fed: None Calif: S2? CRPR: 1B.3	Not expected; potentially marginal habitat, no documented occurrences within 5 mi., not observed during surveys.
Myosurus minimus ssp. apus Little mousetail	Annual herb. Valley and foothill grasslands, alkaline vernal pools at 20-640m elevation. Riverside, San Bernardino, San Diego Cos., Central and Northern CA, Oregon, Baja.	Mar-Jun	Fed: None Calif: S2 CRPR: 3.1 MSHCP: AC d	Absent; no suitable habitat, no documented occurrences within 5 mi., not observed during surveys.
Nama stenocarpa Mud nama	Annual/perennial herb. Found in marshy habitat on lake margins and riverbanks at 5-500m elevation. S CA, San Clemente Island, central CA, AZ, TX, Baja, Sonora.	Mar-Oct	Fed: None Calif: S1S2 CRPR: 2B.2 MSHCP: AC d	Absent; no suitable habitat, no documented occurrences within 5 mi., not observed during surveys.
Navarretia fossalis Spreading navarretia	Annual herb. Chenopod scrub, shallow freshwater marshes and swamps, playas, vernal pools at 30-655m elevation. LA, Riverside, San Diego, San Luis Obispo Cos., Baja.	Apr-Jun	Fed: THR Calif: S2 CRPR: 1B.1 MSHCP: AC b	Absent; no suitable habitat six documented occurrences within 5 mi. (1922, exact location unknown, mapped 1.0 mi. SE; 2001-2017, closest is 1.6 mi. N, appears to have been developed), not observed during surveys.
Navarretia prostrata Prostrate vernal pool navarretia	Annual herb. Mesic areas in coastal scrub, valley and foothill grassland (alkaline), meadows and seeps, vernal pools at 3-1210m elevation. Locations in northern, central, and southern CA.	Apr-Jun	Fed: None Calif: S2 CRPR: 1B.2 MSHCP: AC d	Absent; no suitable habitat, no documented occurrences within 5 mi., not observed during surveys.
Orcuttia californica California Orcutt grass	Annual grass. Vernal pools at 15-660m elevation. LA, Orange, Riverside, San Diego, Ventura Co., Baja.	Apr-Aug	Fed: END Calif: END, S1 CRPR: 1B.1 MSHCP: AC b	Absent; no suitable habitat, three documented occurrences within 5 mi. (1941, exact location unknown, mapped 1.2 mi. NNE, possibly extirpated; 2001, 1.8 mi. ESE; 2015, 1.8 mi. E), not observed during surveys.
Polygala cornuta var. fishiae Fish's milkwort	Perennial deciduous shrub. Chaparral, cismontane woodland, riparian woodlands at 100-1000m elevation. LA, Orange, Riverside, Santa Barbara, San Diego, and Ventura Co., Baja. Not tracked in CNDDB.	May-Aug	Fed: None Calif: S4 CRPR: 4.3 MSHCP: AC	Absent; potentially marginal habitat, no mapped CCH records within 5 mi., not observed during surveys.

Species	Growth Form, Habitat and Distribution	Flowering Season	Conservation Status	Potential for Occurrence
Pseudognaphalium leucocephalum White rabbit-tobacco	Perennial herb. Sandy or gravelly soils in chaparral, cismontane woodland, coastal scrub, riparian woodland at 0-2100m elevation. LA, Orange, Riverside, San Bernardino, San Diego, Ventura Cos., AZ, NM, TX, Baja and Sonora Mex.	(Jul)Aug-Nov(Dec)	Fed: None Calif: S2 CRPR: 2B.2	Low; potentially suitable habitat, no documented occurrences within 5 mi., not observed during surveys.
Quercus engelmannii Engelmann oak	Perennial deciduous tree. Chaparral, cismontane woodland, riparian woodland, valley and foothill grassland at 50-1300m elevation. Mostly in foothills of Orange, west Riverside, San Bernardino, and San Diego Counties, also southeast San Gabriel Mountain foothills (LA County). Not tracked in the CNDDB.	Mar-Jun	Fed: None Calif: S3 CRPR: 4.2	Absent; potentially suitable habitat, conspicuous plant not observed during surveys.
Romneya coulteri Coulter's matilija poppy	Large perennial rhizomatous herb. Often in burn areas in chaparral, coastal scrub at 20-1200m elevation. LA, Orange, Riverside, San Bernardino, San Diego, San Luis Obispo Cos. Not tracked in CNDDB.	Mar-Jul(Aug)	Fed: None Calif: S4 CRPR: 4.2 MSHCP: AC	Absent; no or marginal habitat, conspicuous plant not observed during surveys.
Scutellaria bolanderi ssp. austromontana Southern mountains skullcap	Perennial rhizomatous herb. Mesic areas in chaparral, cismontane woodland, lower montane coniferous forest at 425-2000m elevation. Often in meadows and along streams. LA, Riverside, San Bernardino, San Diego Cos. Presumed extirpated in LA and San Bernardino Cos.	Jun-Aug	Fed: None Calif: S3 CRPR: 1B.2 USFS: S	Absent; no suitable habitat, no documented occurrences within 5 mi., not observed during surveys.
Sibaropsis hammittii Hammitt's clay-cress	Annual herb. Clay soils in chaparral openings, valley and foothill grassland at 720-1065m elevation. Riverside and San Diego Co.	Mar-Apr	Fed: None Calif: S2 CRPR: 1B.2 USFS: S MSHCP: AC b	Absent; no or marginal habitat, no documented occurrences within 5 mi., below elevation range, not observed during surveys.
Sidalcea neomexicana Salt spring checkerbloom	Perennial herb. Alkaline, mesic soils in chaparral, coastal scrub, lower montane coniferous forest, Mojavean desert scrub, playas at 15-1530m elevation. Kern, LA, Orange, Riverside, San Bernardino, San Diego, Ventura Cos., western US, Sonora Mex. Presumed extirpated in LA Co.	Mar-Jun	Fed: None Calif: S2 CRPR: 2B.2 USFS: S	Absent; no suitable habitat, no documented occurrences within 5 mi., not observed during surveys.
Sphaerocarpos drewiae Bottle liverwort	Ephemeral liverwort. Grows on soil in openings in chaparral and coastal scrub at 90-600m elevation. Riverside and San Diego Cos.	Not applicable	Fed: None Calif: S1 CRPR: 1B.1	Not expected; potentially suitable habitat, no documented occurrences within 5 mi., not observed during surveys.

Species	Growth Form, Habitat and Distribution	Flowering Season	Conservation Status	Potential for Occurrence
Symphyotrichum defoliatum San Bernardino aster	Perennial rhizomatous herb. Near ditches, streams, springs in cismontane woodland, coastal scrub, lower montane coniferous forest, meadows and seeps, marshes and swamps, valley and foothill grasslands (vernally mesic) at 2-2040m elevation. LA, Orange, Riverside, San Bernardino, San Diego, Imperial, Kern, Santa Barbara, San Luis Obispo Cos.	Jul-Nov	Fed: None Calif: S2 CRPR: 1B.2 USFS: S BLM: S	Absent; no suitable habitat, no documented occurrences within 5 mi., not observed during surveys.
Texosporium sancti-jacobi Woven-spored lichen	Crustose lichen. Grows on soil, small mammal pellets, dead twigs, and *Selaginella* species, in chaparral openings at 60-660m elevation. LA, Riverside, San Diego, Ventura, Santa Barbara, San Benito Cos., San Clemente Island, ID, OR, WA.	Not applicable	Fed: None Calif: S2 CRPR: 3	Not expected; no or marginal habitat, no documented occurrences within 5 mi., not observed during surveys.
Tortula californica California screw-moss	Moss. Sandy soil in chenopod scrub, valley and foothill grassland at 10-1460m elevation. LA, Riverside, San Diego, Ventura Cos., Central and Northern CA, Channel Islands.	Not applicable	Fed: None Calif: S2? CRPR: 1B.2 BLM: S	Absent; no suitable habitat, no documented occurrences within 5 mi., not observed during surveys.
Trichocoronis wrightii var wrightii Wright's trichocoronis	Annual herb. Alkaline soils in meadows and seeps, marshes and swamps, riparian forest, vernal pools at 5-435m elevation. Riverside Co., Central Valley, TX, Baja.	May-Sep	Fed: None Calif: S1 CRPR: 2B.1 MSHCP: AC b	Absent; no suitable habitat, no documented occurrences within 5 mi., not observed during surveys.
Viguiera laciniata San Diego County viguiera	Perennial shrub. Chaparral, coastal scrub at 60-750m elevation. Riverside, Orange, San Diego Cos (occurrences outside of San Diego Co are introduced), Baja and Sonora, Mexico. Not tracked in CNDDB.	Feb-Jun(Aug)	Fed: None Calif: S4 CRPR: 4.3	Absent; potentially suitable habitat, no mapped CCH records within 5 mi., not observed during surveys.
References: CDFW (2021a, 2021c), USFWS (2021), CNPS (2021), Dudek (2003), RCA (2020)				

Species	Habitat and Distribution	Conservation Status	Potential for Occurrence
Invertebrates			
Bombus crotchii Crotch bumble bee	Coastal CA E to Sierra-Cascade crest & S into Mexico. Open grassland and scrub habitats. Food plant genera include *Antirrhinum, Asclepias, Chaenactis, Lupinus, Medicago, Salvia, Phacelia, Clarkia, Dendromecon, Eschscholzia,* and *Eriogonum*. Lives in colonies that may be underground in rodent holes or above ground in rock piles, tree cavities, etc.	Fed: None Calif: SA[3], S1S2	Low to moderate; potentially suitable habitat, food plants present, two documented occurrences within 5 mi. (2001, 1.5 mi. WNW; 1975, exact location unknown, mapped 3.5 mi. NW), no bee colonies incidentally observed during surveys.
Branchinecta lynchi Vernal pool fairy shrimp	Vernal pools or similar vernal habitats, requires cool water pools (≤50ºF to hatch, ≤75ºF to survive); disjunct locations in Riverside Co. and the Coast Ranges thru Central Valley to Tehama Co., southern Oregon, up to elevation of 1159m.	Fed: THR Calif: SA, S3 MSHCP: AC a	Absent; no suitable habitat, no documented occurrences within 5 mi.
Branchinecta sandiegonensis San Diego fairy shrimp	Vernal pool complexes; endemic to San Diego and Orange County mesas. One occurrence in Murrieta is a transplant to a mitigation pool outside of native range.	Fed: END Calif: SA, S2	Absent; no suitable habitat, one documented occurrence within 5 mi. (2017, Clayton Ranch Mitigation Site; transplant outside of native range).
Cincindela senilis frosti Senile tiger beetle	Coastal salt marshes, tidal mud flats, interior alkali mud flats. CA and northern Mexico, San Diego Co. to Sonoma and Lake Co.	Fed: None Calif: SA, S1	Absent; no suitable habitat, no documented occurrences within 5 mi.
Danaus plexippus pop. 1 Monarch butterfly	California overwintering population.	Fed: CAN State: SA, S2S3 USFS: S (Los Padres NF)	Absent; individual butterflies may be present, but too far inland for overwintering.

[3] Crotch bumble bee was previously a candidate for state listing, but the Sacramento Superior Court ruled that insects are not eligible for listing under the California Endangered Species Act: *Almond Alliance of California v. California Department of Fish and Wildlife*, Sacramento Superior Court No. 34-2019-80003216 (Nov. 13, 2020). The California Fish and Game Commission filed an intent to appeal this decision in February 2021. The status of this species may be affected by subsequent litigation or changes to regulations.

Species	Habitat and Distribution	Conservation Status	Potential for Occurrence
Euphydryas editha quino Quino checkerspot butterfly	Coastal scrub, open chaparral, juniper woodland, native grassland. Western Riverside Co., southern San Diego Co., Baja. Flight season from mid-Jan to late May. Host plants are dwarf plantain (*Plantago erecta*), purple owl's clover (*Castilleja exserta*), white snapdragon (*Antirrhinum coulterianum*), wooly plantain (*Plantago patagonica*), thread-leaved bird's beak (*Cordylanthus rigidus*). USFWS considers species extirpated in San Bernardino Co.	Fed: END Calif: SA, S1S2 MSHCP: AC	Low; potentially marginal habitat, one host plant species present (*Plantago erecta*), 11 documented occurrences within 5 mi. (1997-2003, closest is 2.6 mi. SE), not observed during focused surveys in 2004 and not incidentally observed during later surveys.
Linderiella occidentalis California linderiella	Vernal pools, seasonal pools in unplowed grasslands with old alluvial soils underlain by hardpan or in sandstone depressions. Water in the pools has very low alkalinity, conductivity, and total dissolved solids. N and Central CA, Riverside (Santa Rosa Plateau) and Ventura Cos.	Fed: None Calif: SA, S2S3	Absent; no suitable habitat, outside known geographic range.
Linderiella santarosae Santa Rosa Plateau fairy shrimp	Found only in the basalt vernal pools on Santa Rosa Plateau in Riverside County.	Fed: None Calif: SA, S1 MSHCP: AC a	Absent; no suitable habitat, outside known geographic range.
Neolarra alba White cuckoo bee	Cleptoparasitic in the nests of perdita bees. Known only from localities in Southern California. All occurrences are historical.	Fed: None Calif: SA, SH	Not expected; no documented occurrences within 5 mi., all occurrences are historical.
Socalchemmis icenoglei Icenogle's socalchemmis spider	Coastal scrub; known only from the type locality in the vicinity of Winchester, Riverside Co.	Fed: None Calif: SA, S1	Not expected; no documented occurrences within 5 mi.
Streptocephalus woottoni Riverside fairy shrimp	Endemic to Western Riverside, Orange, and San Diego counties in areas of tectonic swales/earth slump basins in grassland and coastal sage scrub. Coastal scrub, valley & foothill grassland, vernal pool, wetland. Inhabit seasonally astatic pools filled by winter/spring rains. Hatch in warm water later in the season. Generally restricted to pools greater than 12 inches deep. All known populations lie between 30 and 415 meters elevation.	Fed: END Calif: SA, S1S2 MSHCP: AC a	Absent; no suitable habitat, 8 documented occurrences within 5 mi. (2002-2017, closest extant is 1.8 mi. ESE).
Fish			
Gila orcuttii Arroyo chub	Slow-moving or backwater sections of warm/ cool streams with mud or sand substrates. LA, San Gabriel, San Luis Rey, Santa Ana & Santa Margarita Riv & Malibu & San Juan creeks.	Fed: None Calif: SSC, S2 MSHCP: AC USFS: S	Absent; no perennial aquatic habitat.

Species	Habitat and Distribution	Conservation Status	Potential for Occurrence
Amphibians			
Anaxyrus californicus Arroyo toad	Washes & intermittent streams of semi-arid regions, sandy-banked rivers, riparian woodlands, & loose gravel. Rivers with sandy banks, willows, cottonwoods, and sycamores; loose, gravelly areas of streams in drier parts of range, below 4600 ft. Southern California to tip of Baja California. Desert pop. along Mojave River.	Fed: END Calif: SSC, S2S3 MSHCP: AC c	Absent; no suitable habitat, no documented occurrences within 5 mi., not observed during surveys.
Rana draytonii California red-legged frog	Lowlands and foothills in or near permanent sources of deep water with dense, shrubby or emergent riparian vegetation. Requires 11-20 weeks of permanent water for larval development. Must have access to estivation habitat.	Fed: THR Calif: SSC, S2S3 MSHCP: AC c	Absent; no perennial aquatic habitat.
Spea hammondii Western spadefoot toad	Cismontane woodland, coastal scrub, valley & foothill grassland, vernal pool. Breeds in quiet streams & vernal pools, burrows beneath sand during dry season. W CA, Central Valley to Baja California. From near sea level up to 4,500 ft elev.	Fed: None Calif: SSC, S3 BLM: S MSHCP: AC	Absent; no suitable habitat, 17 documented occurrences within 5 mi. (1998-2019, closest is 1.1 mi. NE), not observed during surveys.
Taricha torosa Coast Range newt	Valley-foothill hardwood and hardwood-conifer, coastal scrub, chaparral, grassland, mixed conifer. Coast Ranges from N San Diego Co. to central Mendocino Co., southern Sierra Nevada foothills S of Kaweah River. Spends most of the year in subterranean refuges, migrates to aquatic breeding areas in the fall and returns in the spring.	Fed: None Calif: SSC, S4 MSHCP: AC	Absent; no suitable aquatic breeding habitat on or adjacent to the site, no documented occurrences within 5 mi., not observed during surveys but is secretive.
Reptiles			
Anniella stebbinsi (Anniella pulchra pulchra) Southern California legless lizard	Various habitats, mainly shrublands, <6500 ft. elev. Coast Ranges from Bay area to N Baja CA, SW Sierra Nevada, parts of the Central Valley, Transverse & Peninsular Ranges.	Fed: None Calif: SSC, S3 USFS: S	Low to moderate; potentially suitable habitat, one documented occurrence within 5 mi. (2011, 3.9 mi. SW), not observed during surveys but is secretive.
Arizona elegans occidentalis California glossy snake	Arid scrub, rocky washes, grasslands, chaparral, often with loose or sandy soils. Patchily distributed from the eastern portion of San Francisco Bay, southern San Joaquin Valley, and the Coast, Transverse, and Peninsular Ranges, south to Baja California. Sea level to 7200' elev. Nocturnal.	Fed: None Calif: SSC, S2	Low; potentially marginal habitat, three documented occurrences within 5 mi. (1977, exact location unknown, mapped 3.4 mi. NW; 1946, exact location unknown, mapped 4.7 mi. SW; 1946, exact location unknown, mapped 4.2 mi. W), not observed during surveys but is nocturnal.

Species	Habitat and Distribution	Conservation Status	Potential for Occurrence
Aspidoscelis hyperythra Orange-throated whiptail	Low-elevation coastal scrub, chaparral, valley-foothill hardwood, sea level to 1040m. Sandy areas, patches of rock. S CA, west of desert to tip of Baja CA.	Fed: None Calif: WL, S2S3 USFS: S MSHCP: AC	Occurs; observed on the site during surveys.
Aspidoscelis tigris stejnegeri Coastal whiptail	Primarily hot, dry open areas with sparse foliage, chaparral, woodland, riparian; coastal So CA, mostly west of Peninsular Ranges and south of Transverse Ranges, north into Ventura County, below ±7000' elev. and into Baja.	Fed: None Calif: SSC, S3 MSHCP: AC	Occurs; observed on the site during surveys.
Coleonyx variegatus abbotti San Diego banded gecko	Rock outcrops in shrublands, to 5000' elevation; southwest Calif. through much of n. Baja Calif.	Fed: None Calif: SSC, S1S2 MSHCP: AC	Low; potentially marginal habitat, no documented occurrences within 5 mi., not observed during surveys.
Crotalus ruber Red-diamond rattlesnake	Desert scrub, thorn scrub, chaparral below 4,000ft. San Bernardino County S through most of Baja California, Mexico.	Fed: None Calif: SSC, S3 USFS: S MSHCP: AC	Low; no or marginal habitat, two documented occurrences within 5 mi. (2001, 2.5 mi. WSW; 2001, 1.5 mi. NW), not observed during surveys.
Diadophis punctatus modestus San Bernardino ringneck snake	Open relatively rocky areas within valley-foothill locales, mixed chaparral/annual grasslands. Prefers moist habitats. W San Diego & Riv. Cos., SW San Bern., Vent. & LA Cos., NW Baja CA.	Fed: None Calif: SA, S2? USFS: S	Low; no or marginal habitat, no documented occurrences within 5 mi., not observed during surveys.
Emys marmorata Western pond turtle	Perennial ponds, streams, marshes, irrigation ditches. Coastal S & cent. CA, NW Baja CA, below about 4800 ft. elev. (few higher elev. pops.)	Fed: None Calif: SSC, S3 BLM: S USFS: S MSHCP: AC	Absent; no perennial aquatic habitat.
Phrynosoma blainvillii Coast horned lizard	Coastal sage scrub, low elevation chaparral, annual grassland, riparian scrub and woodlands, desert wash, pinyon and juniper woodland, valley and foothill grassland, 0-2438m elevation. SW California to NW Baja California, Mexico.	Fed: None Calif: SSC, S3S4 BLM: S MSHCP: AC	Occurs; observed on the site during surveys.
Salvadora hexalepis virgultea Coast patch-nosed snake	Shrublands, washes, sandy flats, rocky areas; Santa Barbara County through southwest Calif., to northwest Baja Calif. Diurnal.	Fed: None Calif: SSC, S2S3	Low; no or marginal habitat, no documented occurrences within 5 mi., not observed during surveys.

Species	Habitat and Distribution	Conservation Status	Potential for Occurrence
Thamnophis hammondii Two-striped gartersnake	Usually in or near perennial fresh water & adjacent riparian habitat, pools in streams. SW CA & NW Baja California. Usually in or near perennial fresh water & adjacent riparian habitat, pools in streams. SW CA & NW Baja California. Primarily aquatic. Diurnal. Also active at night and at dusk during hot weather in some areas. Can be active most of the year depending on weather conditions. Has been found from January to November.	Fed: None Calif: SSC, S3S4 BLM: S USFS: S	Absent; no suitable habitat, no documented occurrences within 5 mi., not observed during surveys.
Birds			
Accipiter cooperii Cooper's hawk	Cismontane woodland, riparian forest, riparian woodland, upper montane coniferous forest. Forages in open areas over scrublands; California, Mexico, Central America. Nests in trees, often in dense woods. Year-round resident in most of southern California range. CNDDB only tracks nesting.	Fed: None Calif: WL, S4 MSHCP: AC	Occurs (foraging), low (nesting); observed on the site during surveys, no or marginal nesting habitat, no documented occurrences (nesting) within 5 mi.
Aechmophorus clarkii Clark's grebe	Requires large, open waters for courtship, feeding, and flocking, and extensive beds of tall, emergent vegetation such as tules or cattails for nesting; generally nests in colonies. Not tracked in CNDDB.	Fed: BCC Calif: None	Absent (foraging and nesting); no suitable habitat, may be seen in migration or moving between large lakes in the region, not observed during surveys.
Agelaius tricolor Tricolored blackbird	Breeds colonially in freshwater marshes, nomadic among marshes and fields in winter; almost completely endemic to Calif. Year-round resident in southern California range. CNDDB only tracks nesting.	Fed: BCC Calif: THR, SSC, S1S2 BLM: S MSHCP: AC	Low to moderate (foraging), absent (nesting); potentially suitable wintering habitat, no suitable nesting habitat, one documented occurrence (nesting) within 5 mi. (2008, 4.9 mi. SE), several eBird records in vicinity, not observed during surveys.
Aimophila ruficeps canescens Southern California rufous-crowned sparrow	Sparse, mixed chaparral, scrub, rocky, brushy slopes. Central California to Baja California. Year-round resident in southern California range.	Fed: None Calif: WL, S3 MSHCP: AC	Occurs (foraging), high (nesting); observed on the site during surveys, potentially suitable nesting habitat.
Aquila chrysaetos Golden eagle	Found in a variety of habitats from sea level to 11,500 feet, rugged open habitats preferred. Large platform nests constructed on secluded cliffs, large trees, and occasionally structures (i.e., electrical transmission towers). CNDDB tracks nesting and wintering.	Fed: BGEPA, BCC Calif: FP, WL, S3 BLM: S MSHCP: AC	Not expected (foraging), absent (nesting); potentially marginal foraging habitat, no suitable nesting habitat, one documented occurrence (nesting) within 5 mi. (1974, 2.5 mi. N), multiple eBird records in vicinity (may be seen soaring overhead), not observed during surveys.

Species	Habitat and Distribution	Conservation Status	Potential for Occurrence
Ardea alba Great egret	Brackish and freshwater marshes, estuary, riparian forest, wetland. Colonial nester in large trees. Rookery sites located near marshes, tide-flats, irrigated pastures, and margins of rivers and lakes. CNDDB only tracks nesting colonies.	Fed: none Calif: SA, S4	Occurs (foraging or fly over), absent (nesting); observed onsite during surveys, no nesting habitat or nesting colonies present.
Ardea herodias Great blue heron	Brackish and freshwater marshes, estuary, riparian forest, wetland. Colonial nester in tall trees, cliffsides, and sequestered spots on marshes. Rookery sites in close proximity to foraging areas: marshes, lake margins, tide-flats, rivers and streams, wet meadows. CNDDB only tracks nesting colonies.	Fed: none Calif: SA, S4 MSHCP: AC	Occurs (fly over), not expected (foraging), absent (nesting); no or marginal foraging habitat, no suitable nesting habitat, no documented occurrences (nesting) within 5 mi., multiple eBird records in vicinity.
Artemisiospiza belli Bell's sage sparrow	Sage scrub and chaparral communities. Nests mainly in shrubs, also in grass, and occasionally on ground under shrub. Found in coastal sage scrub in south of range. Central Washington southward to Baja California, Mexico. Year-round resident in southern CA.	Fed: BCC Calif: WL, S3 MSHCP: AC	Occurs (foraging), high (nesting); observed on the site during surveys, potentially suitable nesting habitat.
Asio otus Long-eared owl	Conifer, oak, riparian, pinyon-juniper, and desert woodlands that are open or adjacent to grasslands, meadows, or shrublands. Most of CA *except* Central Valley, coastal LA and Orange Co., western Imperial Co., and central Riverside Co. Very limited breeding range in southern CA. CNDDB only tracks nesting.	Fed: None Calif: SSC, S3?	Not expected (foraging and nesting); no or marginal habitat, no documented occurrences (nesting) within 5 mi., no eBird records in vicinity, not observed during surveys.
Athene cunicularia Burrowing owl	Nests in rodent burrows, usually in grasslands. Forages in open habitat; increasingly uncomm. in S CA. Occurs through W US/Mex. Sparse in desert scrub but common around irrigated lands. CNDDB tracks burrow sites and some wintering sites.	Fed: BCC Calif: SSC, S3 BLM: S MSHCP: AC c	Occurs; observed on site during focused surveys in 2018. Not observed during focused surveys in 2019 and 2021.
Buteo regalis Ferruginous hawk	Open grasslands, sagebrush flats, desert scrub, low foothills and fringes of pinyon and juniper habitats. Great Basin grassland and scrub, pinyon and juniper woodlands, valley and foothill grassland. Eats mostly lagomorphs, ground squirrels, and mice. Population trends may follow lagomorph population cycles. Does not breed in southern CA.	Fed: BCC Calif: WL, S3S4 MSHCP: AC	Low (foraging), absent (nesting); potentially suitable habitat foraging habitat (when fields are fallow), outside of breeding range, three documented occurrences within 5 mi. (2008, 4.1 mi. NE; 2007, 3.9 mi ENE; 2008, 2.4 mi. E), a few eBird records in vicinity, not observed during surveys.

Species	Habitat and Distribution	Conservation Status	Potential for Occurrence
Buteo swainsoni Swainson's hawk	Grassland/agricultural, large trees for nesting, desert scrub with Joshua tree & Fremont cottonwood overstory, near streams & open fields. Breeds overwhelmingly in Great Basin & Central Valley of California. Seen in migration in southern California. CNDDB only tracks nesting.	Fed: BCC Calif: THR, S3 BLM: S MSHCP: AC	Low (foraging), absent (nesting), may be seen in migration; potentially marginal foraging habitat, outside current breeding range, a few eBird records in vicinity, not observed during surveys.
Calypte costae Costa's hummingbird	Desert and coastal scrub and chaparral in desert, semi-desert and mountain foothills and seasonally in mountains, adjacent open meadows and gardens. Found in NV, UT, AZ, CA and Mexico. Year-round resident in southern CA. CNDDB only tracks nesting.	Fed: BCC Calif: SA, S4	Occurs (foraging), high (nesting); observed on the site during surveys, potentially suitable nesting habitat.
Campylorhynchus brunneicapillus sandiegensis Coastal cactus wren	Desert scrub and coastal sage scrub with cactus patches; Southern CA and northwestern Baja. Non-migratory. Pairs defend territories throughout the year. Limited to San Diego and Orange Cos.	Fed: BCC Calif: SSC, S3 USFS: S MSHCP: AC	Absent (foraging and nesting); no suitable habitat, outside current range, not observed during surveys.
Chamaea fasciata Wrentit	Chaparral, oak woodland, shrublands, western CA, northwestern Baja, western Oregon. Year-round resident in southern CA range. CNDDB does not track this species.	Fed: BCC Calif: None	Occurs (foraging), high (nesting); observed on the site during surveys, potentially suitable nesting habitat.
Charadrius nivosus Western snowy plover	Coastal beaches, sand spits, salt pans, river bars. Coastal areas from Washington State south to Baja. Federal listing applies only to the Pacific coastal population. CNDDB only tracks nesting. Year-round resident in southern CA range except for eastern deserts where it is seen in migration.	Fed: THR, BCC Calif: SSC, S2	Absent (foraging and nesting); no suitable habitat, no documented occurrences (nesting) within 5 mi., no eBird records in vicinity, not observed during surveys.
Circus hudsonius (C. cyaneus) Northern harrier	Open habitats with hunting perches, marshes, meadows, grasslands, pastures, croplands, lake and river edges. Nests on the ground. Breeds widely but locally in North America, various portions of CA including Central Valley, central and northern coast, northeastern CA, and southern coastal CA. Does not breed in most of southern CA range. CNDDB only tracks nesting.	Fed: None Calif: SSC, S3 MSHCP: AC	Occurs (foraging), low to moderate (nesting); observed on the site during surveys, potentially suitable nesting habitat, no documented occurrences (nesting) within 5 mi.

Species	Habitat and Distribution	Conservation Status	Potential for Occurrence
Dryobates (Picoides) nuttallii Nuttall's woodpecker	Found in low elevation riparian and oak woodlands, rarely in conifers. Central Valley, Transverse and Peninsular Ranges, Coast Ranges north to Sonoma Co., lower portions of the Cascade Range and Sierra Nevada. Year-round resident throughout coastal mountains of CA. Not tracked in CNDDB.	Fed: BCC Calif: None	Occurs (foraging), moderate (nesting); observed on the site during surveys, potentially marginal nesting habitat.
Elanus leucurus White-tailed kite	Breeds in woodlands and riparian forests, forages over open terrain; Pacific Coast (Calif, northern Baja, Oregon), other scattered localities. Year-round resident in southern CA range. CNDDB only tracks nesting.	Fed: None Calif: FP, S3S4 BLM: S MSHCP: AC	Occurs (foraging), low (nesting); observed on the site during surveys, no or marginal nesting habitat, no documented occurrences (nesting) within 5 mi., five nests within 10 mi. of the site (see Section 3.4.1).
Empidonax traillii extimus Southwestern willow flycatcher	Dense riparian forests, wet mountain meadow systems with standing water for at least part of the breeding season (May to July) & with ample numbers of willow & other associated trees & shrubs. Rare & local in S CA. SW US & N Baja California. CNDDB only tracks nesting.	Fed: END Calif: END, S1 MSHCP: AC a	Absent (foraging and nesting); no suitable habitat, no documented occurrences within 5 mi., not observed during surveys. Habitat assessment found no suitable habitat on the site.
Eremophila alpestris actia California horned lark	Variety of open habitats with low growing vegetation or bare ground, grasslands, rangelands, "bald" hills, mtn. meadows, open coastal plains, fallow fields, alkali flats. Within coastal Sonoma Co. to San Diego Co., San Joaquin Valley & E to foothills.	Fed: None Calif: WL, S4 MSHCP: AC	Occurs (foraging), high (nesting); observed on the site during surveys, potentially suitable nesting habitat.
Haliaeetus leucocephalus Bald eagle	Breed in large trees, usually near major rivers or lakes. Winters more widely. Wide but scattered distribution in N America, esp. coastal regions. CNDDB tracks nesting and wintering.	Fed: Delisted, BGEPA, BCC Calif: END, FP, S3 MSHCP: AC BLM: S USFS: S	Absent (foraging and nesting); no suitable habitat, not observed during surveys.
Icteria virens Yellow-breasted chat	Summer resident, inhabits riparian thickets of willow near watercourses, low dense riparian willow. Migrant and summer resident in CA, northern CA, central coast, eastern Central Valley, coastal southern CA, Colorado River, western US, Canada, Mexico, Central America. CNDDB only tracks nesting.	Fed: None Calif: SSC, S3 MSHCP: AC	Not expected (foraging and nesting); no or marginal habitat, no documented occurrences (nesting) within 5 mi., few eBird records in vicinity, not observed during surveys.

Species	Habitat and Distribution	Conservation Status	Potential for Occurrence
Lanius ludovicianus Loggerhead shrike	Open areas where small trees, shrubs, and fences can provide suitable perches. Nests in small trees and large shrubs. Throughout much of North America. CNDDB only tracks nesting.	Fed: BCC Calif: SSC, S4 MSHCP: AC	Occurs (foraging), moderate (nesting); observed on the site during surveys, potentially suitable nesting habitat, one documented occurrence (nesting) within 5 mi. (2007, 4.5 mi. NE).
Plegadis chihi White-faced ibis	Freshwater wetlands, shallow lakes, wet meadows, flooded pastures and croplands. Nests in dense, fresh emergent wetland. Salton Sea, local winter visitor along coast, uncommon elsewhere in southern CA and Central Valley. CNDDB only tracks nesting colonies.	Fed: None Calif: WL, S3S4 MSHCP: AC	Not expected (foraging), absent (nesting); no suitable habitat, no documented occurrences (nesting) within 5 mi., few eBird records in vicinity, not observed during surveys.
Polioptila californica Coastal California gnatcatcher	Sage scrub, also chaparral, grasslands, riparian adjacent to or mixed with sage scrub below 2,500 ft elevation. S Ventura Co. to LA, Orange, Riv., San Bern., San D. Cos into Baja CA, Mexico.	Fed: THR Calif: SSC, S2 MSHCP: AC	Occurs (foraging and nesting); observed on the site during surveys including nest sites and breeding pairs.
Selasphorus rufus Rufous hummingbird	Breeds in open or shrubby areas, forest openings, yards and parks. Sometimes forests, thickets, swamps, meadows. Elev. range 0-6000 ft. Migrating birds can be up to 12,600 ft. Wintering birds in oak, pine, and juniper woodlands. Found in Western US and Canada. Generally migrates through southern CA during pre-breeding migratory season (mid-Feb to mid-May). CNDDB only tracks nesting.	Fed: BCC Calif: SA, S1S2	Occurs (foraging), not expected (nesting); observed onsite during surveys, outside breeding range, no documented occurrences (nesting) within 5 mi.
Setophaga petechia Yellow warbler	Migrant and summer resident in southern CA. Riparian, including willow, cottonwood, sycamore, alder, aspen for nesting & foraging, also conifer forest. CNDDB only tracks nesting.	Fed: BCC Calif: SSC, S3S4	Low (foraging and nesting); potentially marginal habitat, no documented occurrences (nesting) within 5 mi., few eBird records in vicinity, not observed during surveys.
Spinus lawrencei Lawrence's goldfinch	Summer breeder, may overwinter. Coastal side of southern and central CA, western edge of southern deserts, east side of Central Valley into northern CA, Colorado River, SW US and northern Mex. Valley foothill hardwood and hardwood-conifer, desert riparian, pinyon juniper, palm oasis, lower montane. Nests in oaks, conifers. CNDDB only tracks nesting.	Fed: BCC Calif: SA, S4	Occurs (foraging), low (nesting); observed on the site during surveys, potentially suitable or marginal nesting habitat, no documented occurrences (nesting) within 5 mi.
Toxostoma redivivum California thrasher	Chaparral. Coastal and foothill areas of California and NW Baja California, Mexico. Resident throughout its range. Not tracked in CNDDB.	Fed: BCC Calif: none	Occurs (foraging), moderate (nesting); potentially suitable or marginal nesting habitat.

Species	Habitat and Distribution	Conservation Status	Potential for Occurrence
Vireo bellii pusillus Least Bell's vireo	Riparian woodlands, bottomlands. N Mex. & Baja CA into S CA & the S mid-western US. CNDDB only tracks nesting.	Fed: END Calif: END, S2 MSHCP: AC a	Absent (foraging and nesting); no suitable habitat, two documented occurrences within 5 mi. (both along San Jacinto River - 2010, 4.6 mi. ENE; 2002, 4.2 mi. ENE), not observed during surveys. Habitat assessment found no suitable habitat on the site.
Xanthocephalus xanthocephalus Yellow-headed blackbird	Marsh, swamp, wetland. Nests in freshwater emergent wetlands with dense vegetation and deep water. Often along borders of lakes or ponds. Nests only where large insects are abundant. CNDDB only tracks nesting.	Fed: None Calif: SSC, S3	Absent (foraging and nesting); no suitable habitat, few eBird records in vicinity, not observed during surveys.
Mammals			
Chaetodipus californicus femoralis Dulzura pocket mouse	Variety of habitats including coastal scrub, chaparral & grassland. Attracted to grass-chaparral edges. Chaparral, coastal scrub, valley and foothill grassland.	Fed: None Calif: SSC, S3	Low to moderate; potentially suitable or marginal habitat, no documented occurrences within 5 mi.
Chaetodipus (Perognathus) fallax Northwestern San Diego pocket mouse	Sandy herbaceous areas, usually in association with rocks or coarse gravel, chaparral, coastal scrub, grasslands. SW CA & NW Baja California (inland to San Bernardino Valley).	Fed: None Calif: SSC, S3S4 MSHCP: AC	Low to moderate; potentially marginal habitat, two documented occurrences within 5 mi. (1992, 3.4 mi. NE; 2009, 3.8 mi. S).
Dipodomys merriami parvus San Bernardino kangaroo rat	Alluvial floodplains and adjacent upland habitats within the San Bernardino, Menifee, and San Jacinto valleys, Riversidean alluvial fan sage scrub.	Fed: END Calif: CanE, SSC, S1 MSHCP: AC c	Absent; no suitable habitat, one documented occurrence within 5 mi. (1938, exact location unknown, mapped 4.4 mi. NNE).
Dipodomys stephensi Stephens' kangaroo rat	Sparse, gently sloping grassland, sometimes at margins of cultivated or disturbed lands; prefers grassland dominated by forbs rather than annual grasses, prefers sparse perennial vegetation; firm soil for burrowing (not too hard or too sandy); may use abandoned gopher burrows; W Riverside Co. and adjacent San Diego Co. San Bernardino County occurrences extirpated. No critical habitat has been designated.	Fed: END Calif: THR, S2 MSHCP: AC	High; potentially suitable habitat, 22 documented occurrences within 5 mi. (1938-2005, closest is 1.2 mi. N).

Species	Habitat and Distribution	Conservation Status	Potential for Occurrence
Eumops perotis californicus Western mastiff bat	Lowlands (with rare exceptions), many open, semi-arid to arid habitats, conifer and deciduous woodlands, coastal scrub, grasslands, chaparral. Central & S CA, S AZ, NM, SW TX. Roosts in deep rock crevices, high buildings, trees, and tunnels; forages over wide area.	Fed: None Calif: SSC, S3S4 BLM: S	Low to moderate (foraging), low (roosting); potentially suitable foraging habitat, no or marginal roosting habitat, two documented occurrences within 5 mi. (1990, exact location unknown, mapped 2.6 mi. N; 2001, 1.5 mi. NW).
Lasiurus xanthinus Western yellow bat	Valley foothill riparian, desert riparian, desert wash, palm oasis. Roosts in trees, particularly palms. Forages over water and among trees. Desert regions of the SW US. Distributed in S CA, AZ, NM, & TX, into Mexico.	Fed: None Calif: SSC, S3	Not expected (foraging and roosting); no or marginal habitat, one documented occurrence within 5 mi. (1982, exact location unknown, mapped 2.7 mi. N).
Lepus californicus bennettii San Diego black-tailed jackrabbit	Chaparral, coastal, or Riversidean sage scrub with adjacent open grassland. Los Angeles Co. S to San Quintin, Baja California, Mexico.	Fed: None Calif: SSC, S3S4 MSHCP: AC	Occurs; observed on the site during surveys.
Neotoma lepida intermedia San Diego desert woodrat	Arid shrublands, rocky outcrops, & crevices. Cismontane CA., San Luis Obispo to San Diego Co. & NW Baja California. 0-7000 ft. elev. Variety of shrub and desert habitats, primarily associated with rock outcroppings, boulders, cacti, or areas of dense undergrowth. Constructs elaborate middens of sticks and other materials.	Fed: None Calif: SSC, S3S4 MSHCP: AC	Not expected; potentially marginal habitat, no documented occurrences within 5 mi., no middens observed during surveys.
Nyctinomops femorosaccus Pocketed free-tailed bat	Deserts & arid lowlands, pinyon juniper woodlands, desert scrub, riparian scrub, Joshua tree woodland, rocky areas with high cliffs. E Riverside & San Diego Cos. and Imperial Co., through SW US, Baja California, mainland Mexico. Roost mainly in crevices of high cliffs. Few records in So CA. Prefers rocky desert areas with high cliffs or rock outcrops. Feeds over ponds, streams, and arid desert.	Fed: None Calif: SSC, S3	Not expected (foraging and roosting); no suitable habitat, no documented occurrences within 5 mi.
Onychomys torridus ramona Southern grasshopper mouse	Nocturnal, active year-round. Desert scrub, coastal scrub, mixed chaparral, sagebrush, especially scrub habitats with friable soil, prefers low to moderate shrub cover. LA through San Diego counties and northwest Baja.	Fed: None Calif: SSC, S3	Low; potentially marginal habitat, one documented occurrence within 5 mi. (1932, exact location unknown, mapped 4.4 mi. NE).

Species	Habitat and Distribution	Conservation Status	Potential for Occurrence
Perognathus longimembris brevinasus Los Angeles pocket mouse	Nocturnal, active Apr-Aug. Annual grassland, sage scrub, alluvial sage scrub. S California from Rancho Cucamonga (W boundary), San Gorgonio (E), Aguanga & Oak Grove, San Diego (S). Open ground with fine, sandy soils.	Fed: None Calif: SSC, S1S2 MSHCP: AC c	Low; potentially marginal habitat, no documented occurrences within 5 mi.
Perognathus longimembris internationalis Jacumba pocket mouse	Desert riparian, desert scrub, desert wash, coastal scrub and sagebrush. Rarely found on rocky sites.	Fed: None Calif: SSC, S2	Low; potentially marginal habitat, no documented occurrences within 5 mi.
Taxidea taxus American badger	Mountains, deserts, interior valleys where burrowing animals are available as prey & soil permits digging. Throughout Central & W North America.	Fed: None Calif: SSC, S3	Low; potentially suitable habitat, no badger burrows or diggings observed during surveys.

References: CDFW (2021b, 2021c), USFWS (2021), Dudek (2003), RCA (2020); Cornell (2021); eBird (2021); USFS (2013).

"Documented occurrences" refers to species occurrences in the California Natural Diversity Database (CNDDB) unless otherwise noted. For plant species that are not tracked in the CNDDB, records from the Consortium of California Herbaria (CCH) may be used (only CCH records that include map coordinates are utilized). EBird (eBird.org) is an online database of bird distribution and abundance sponsored by the Cornell Laboratory of Ornithology and compiled from observations submitted by citizen scientists. eBird records of bird observations are noted but should be interpreted with caution. eBird records "in vicinity" means records within about a 5-mile radius of the site.

Federal designations: (Federal Endangered Species Act, U.S. Fish and Wildlife Service):

- END: Federally listed, endangered; an animal or plant in danger of extinction within the foreseeable future throughout all or a significant portion of its range.
- THR: Federally listed, threatened; an animal or plant which is likely to become an Endangered species within the foreseeable future throughout all or a significant portion of its range.
- Cand Candidate for federal listing as threatened or endangered; species that has been studied by the U.S. Fish and Wildlife Service, and the Service has concluded that it should be proposed for addition to the Federal Endangered and Threatened species list.
- Prop Proposed for federal listing as Endangered or Threatened under Section 4 of the Endangered Species Act.
- Delisted: Previously federally listed as endangered or threatened, but is no longer listed (e.g., due to recovery).
- None: The species has no federal conservation status.
- BGEPA: Federal Bald and Golden Eagle Protection Act; protects bald and golden eagles.
- BCC: USFWS Bird of Conservation Concern; migratory and non-migratory bird species (beyond those already designated as Federally threatened or endangered) that represent USFWS highest conservation priorities.

State designations: (California Endangered Species Act, California Dept. of Fish and Wildlife)

- END: State listed, endangered; a native species or subspecies of a bird, mammal, fish, amphibian, reptile, or plant which is in serious danger of becoming extinct throughout all, or a significant portion, of its range due to one or more causes, including loss of habitat, change in habitat, overexploitation, predation, competition, or disease.

CanE: Candidate Endangered; a native species or subspecies of a bird, mammal, fish, amphibian, reptile, or plant that the Fish and Game Commission has formally noticed as being under review by the Department of Fish and Wildlife for addition to the list of endangered species, or a species for which the commission has published a notice of proposed regulation to add the species to the list of endangered species.

CanT: Candidate Threatened; a native species or subspecies of a bird, mammal, fish, amphibian, reptile, or plant that the Fish and Game Commission has formally noticed as being under review by the Department of Fish and Wildlife for addition to the list of threatened species, or a species for which the commission has published a notice of proposed regulation to add the species to the list of threatened species.

THR: State listed, threatened; a native species or subspecies of a bird, mammal, fish, amphibian, reptile, or plant that, although not presently threatened with extinction, is likely to become an endangered species in the foreseeable future in the absence of special protection and management efforts.

RARE: State listed as rare: a native plant species, subspecies, or variety when, although not presently threatened with extinction, it is in such small numbers throughout its range that it may become endangered if its present environment worsens (Native Plant Protection Act of 1977).

SSC: CDFW Species of Special Concern; vertebrate species of concern due to declining population levels, limited ranges, and/or continuing threats that have made them vulnerable to extinction.

FP: Fully Protected; California Fish and Game Code states that Fully Protected species "...may not be taken or possessed at any time and no provision of this code or any other law shall be construed to authorize the issuance of permits or licenses to take any fully protected" species, although take may be authorized for necessary scientific research.

Delisted: Previously state listed as threatened or endangered, but no longer listed (e.g., due to recovery).

SA: CDFW Special Animal; wildlife of state conservation concern.

SH: All California sites are historical, still some hope of rediscovery.

SX: All California sites are historical, presumed extirpated.

PFB: Protected Fur-bearing Mammal under Title 14 of the California Code of Regulations.

None: The species has no state conservation status.

State Rank (S Rank): A reflection of the condition and imperilment of an element (plant, animal, vegetation community) throughout its range within the state. The S ranks are determined through a combination of rarity, threat, and trend factors, weighted more heavily on the rarity factors. Where correct category is uncertain, the S rank includes two categories or a question mark. Older ranks, which need to be updated, may still contain a decimal "threat" rank of .1, .2, or .3, where .1 indicates very threatened status, .2 indicates moderate threat, and .3 indicates few or no current known threats.

S1: Critically imperiled; imperiled in the state because of extreme rarity or some factor(s) making it especially vulnerable to extirpation from the state.

S2: Imperiled; imperiled in the state because of rarity due to very restricted range, very few populations, steep declines, or other factors making it very vulnerable to extirpation from the state or nation.

S3: Vulnerable; vulnerable in the state due to a restricted range, relatively few populations, recent and widespread declines, or other factors making it vulnerable to extirpation. S4: Apparently secure; uncommon but not rare, some cause for long-term concern due to declines or other factors.

S5: Secure; common, widespread, and abundant in the state.

SH: Possibly extirpated; species or community occurred historically in the state, and there is some possibility that it may be rediscovered. The element has not been seen for at least 20 years, but suitable habitat still exists.

SX: Presumed extirpated; species or community is believed to be extirpated from the state.

California Rare Plant Rank (CRPR): The *California Rare Plant Ranks* are a ranking system originally developed by the California Native Plant Society (CNPS) to better define and categorize rarity in California's plants. These ranks were previously known as the CNPS lists but were renamed to the *California Rare Plant Ranks* to better reflect the joint effort among the CNPS, the CDFW, and a wide range of botanical experts, who work together to assign a rarity ranking.

1A: Plants presumed extinct in California and rare/extinct elsewhere.
1B: Plants rare, threatened, or endangered in California and elsewhere.
2A: Plants presumed extirpated in California, but more common elsewhere.
2B: Plants rare, threatened, or endangered in California but more common elsewhere.
3: Plants about which we need more information.
4: Plants of limited distribution.
X.1: Extension to CRPR (e.g., 1B.1); seriously threatened in California.
X.2: Extension to CRPR (e.g., 1B.2); fairly threatened in California.
X.3: Extension to CRPR (e.g., 1B.3); not very threatened in California.
CBR: Considered but rejected.

U.S. Forest Service (USFS) designation:

S: Sensitive; plant and animal species identified by a regional forester that are not listed or proposed for listing under the Federal Endangered Species Act for which population viability is a concern, as evidenced by significant current or predicted downward trends in population numbers or density, or significant current or predicted downward trends in habitat capability that would reduce a species' existing distribution.

Bureau of Land Management (BLM designation:

S: Sensitive; plant and animal species requiring special management consideration to promote their conservation and reduce the likelihood for future listing under the Federal Endangered Species Act. Includes species designated as sensitive by the BLM State Director and all Federal Candidate species and Federal delisted species in the 5 years following delisting. Sensitive species are managed as special status species.

Western Riverside County Multiple Species Habitat Conservation Plan: Applied to species that are covered under state and federal permits for the MSHCP.

NAC: Species Not Adequately Conserved
AC: Species Adequately Conserved
(a): Surveys may be required for these species as part of wetlands mapping as described in Section 6.1.2 of the MSHCP.
(b): Surveys may be required for these species within Narrow Endemic Plant Species survey area as described in Section 6.1.3 of the MSHCP.
(c): Surveys may be required for these species within locations shown on survey maps as described in Section 6.3.2 of the MSHCP.
(d): Surveys may be required for these species within Criteria Area as described in Section 6.3.2 of the MSHCP.
(e): These Covered Species will be considered Adequately Conserved when conservation requirements identified in species-specific conservation objectives have been met. Species-specific conservation objectives for these species are presented in Section 9.0 of the MSHCP. Please refer to Table 9-3 of the MSHCP for specific conservation objectives that must be met for these species prior to including them on the list of Covered Species Adequately Conserved.
(f): These Covered Species will be considered Adequately Conserved when a Memorandum of Understanding is executed with the U.S. Forest Service that addresses management for these species on Forest Service Land. Refer to Table 9-3 of the MSHCP.
No entry: Not a Covered Species

Definitions of occurrence probability:

These definitions provide general guidance. Classifications for individual species may be modified based on biologists' experience and expert opinion.

Occurs: Species was detected during surveys or previously documented on the Project site or adjacent areas.
High: Species documented in the vicinity (i.e., within 5 miles) of the Project site and suitable habitat is present, but species not detected during surveys.
Moderate: Species documented in the vicinity of the Project site or suitable habitat present and site is within geographic and elevational range of the species.

Low:	Species not documented in the vicinity of the Project site or suitable habitat is marginal.
Not Expected:	Species not documented in the vicinity of the Project site and suitable habitat marginal or absent, or site is not within geographic and elevational range of the species.
Absent:	No potential for the species to occur due to lack of habitat, geographic or elevation range, species life history, survey results, etc.
Unknown:	No focused surveys have been performed in the region, and the species' distribution and habitat are poorly known.

APPENDIX C: PRECIPITATION DATA

Precipitation data from the Clark Remote Automatic Weather Station for October 2002 through September 2021, by water year (October 1 through September 30) (WRCC 2021).

Water Year	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Total
2003	0.07	0.79	1.83	0.02	5.08	2.99	1.70	0.33	0.06	0.06	0.04	0	12.97
2004	0	0.92	0.62	0.29	3.22	0.92	0.39*	*	*	*	0.60*	0*	6.96*
2005	4.96	0.64	2.41	5.39	6.45	1.10	0.57	0.29	0.04	*	0.01*	0.37*	22.23*
2006	1.12	1.12*	0.35	0.62	1.59	1.55	1.32	0.28	0	0.25	0	0	8.20*
2007	0.03	0.05	0.70	0.16	0.42	0.38	0.49	0.03	0	0	0	0.03	2.29
2008	0.20	1.82	0.70	2.61	0.79	0.59	0.03	0.49	0.01	0	0	0	7.24
2009	0	1.18	2.83	0.05	0.95	0.03	0	0	0	0	0	0.01	5.05
2010	0	0.10	1.68	6.01	1.83	0.21	0.87	0.01	0	0	0	0.11	10.82
2011	0.48	0.55	8.23	0.38	2.37	1.44	0.19	0.22	0	0.29	0	0	14.15
2012	0.22	1.34	0.33	0.45	0.56	1.09*	1.17	0.02	0	0.15	0.46	0.04	5.83*
2013	0.16	0.40	2.02	0.58	0.93	0.59	0	0.29	0	0.04	0.12	0	5.13
2014	0.66	0.94	0.34	0	1.25	0.59	0.58	0	0	0	0.20	0	4.56
2015	0.20	0.23	3.18	0.68	0.47	0.73	0.17	0.97	0	0.99	0	0.75	8.37
2016	0.42	0.29	0.35	2.35	0.14	0.72	1.20	0.27	0	0	0	0.03	5.77
2017	0.64	1.10*	3.44	4.44	2.36	0.07	0	0.07	0	0.03	0.24	0	12.39*
2018	0	0.09	0	1.85	0.27	1.13	0.01	0.20	0	0	0	0	3.55
2019	1.02	1.08	1.33	2.27	4.37	1.96	0.02	0.87	0	0	0	0	12.92
2020	0	2.19	2.69	0.04	0.32	3.65	3.73	0	0.04	0	0	0	12.66
2021	0	0.14	1.18	2.00	0.01	1.30	0	0*	0.07*	0.10	0	0.16	4.96*

*missing or suspect data.

Precipitation data from the Sage Remote Automatic Weather Station for October 2010 through September 2021[4], by water year (October 1 through September 30) (WRCC 2021).

Water Year	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Total
2011	1.13	0.96	7.73	0.52	4.12	1.65	0.32	0.48	0.04	0.52	0	0.02	17.49
2012	0.89	2.02	0.95	0.55	1.88	1.65	1.68	0.04	0	0.22	2.06	0.15	12.09
2013	0.16	0.39	1.74	0.83	1.27	1.04	0.06	0.51	0	0.01	0.20	0.13	6.34
2014	0.90	0.62	0.45	0.04	1.69	0.69	0.32	0	0	0	1.22	0.56	6.49
2015	0.10	0.77	4.22	0.68	0.87	0.70	0.18	1.99	0	1.36	0	0.85	11.72
2016	0.57	0.59	1.23	3.10	0.11*	0.93	0.40	0.11	0	0	0	0.75	7.79*
2017	0.19	1.20	4.18	4.97	4.05	0.13	0	0.42	0	0.01	0.18	0.06	15.39
2018	0.02	0.09	0	2.63	0.46	2.35	0	0.12	0.01	0.04	0	0	5.72
2019	0.92	1.18	1.61	2.54	7.34	1.84	0.20	1.41	0.02	0	0	0.10	17.16
2020	0	3.01	2.39	0.53	0.40	4.78	4.44	*	0.04	0.01	0	0	15.60*
2021	0.09	0.62	1.43	1.62	0.20	1.54	0.31	0	0	0.31	0	0.07	6.19

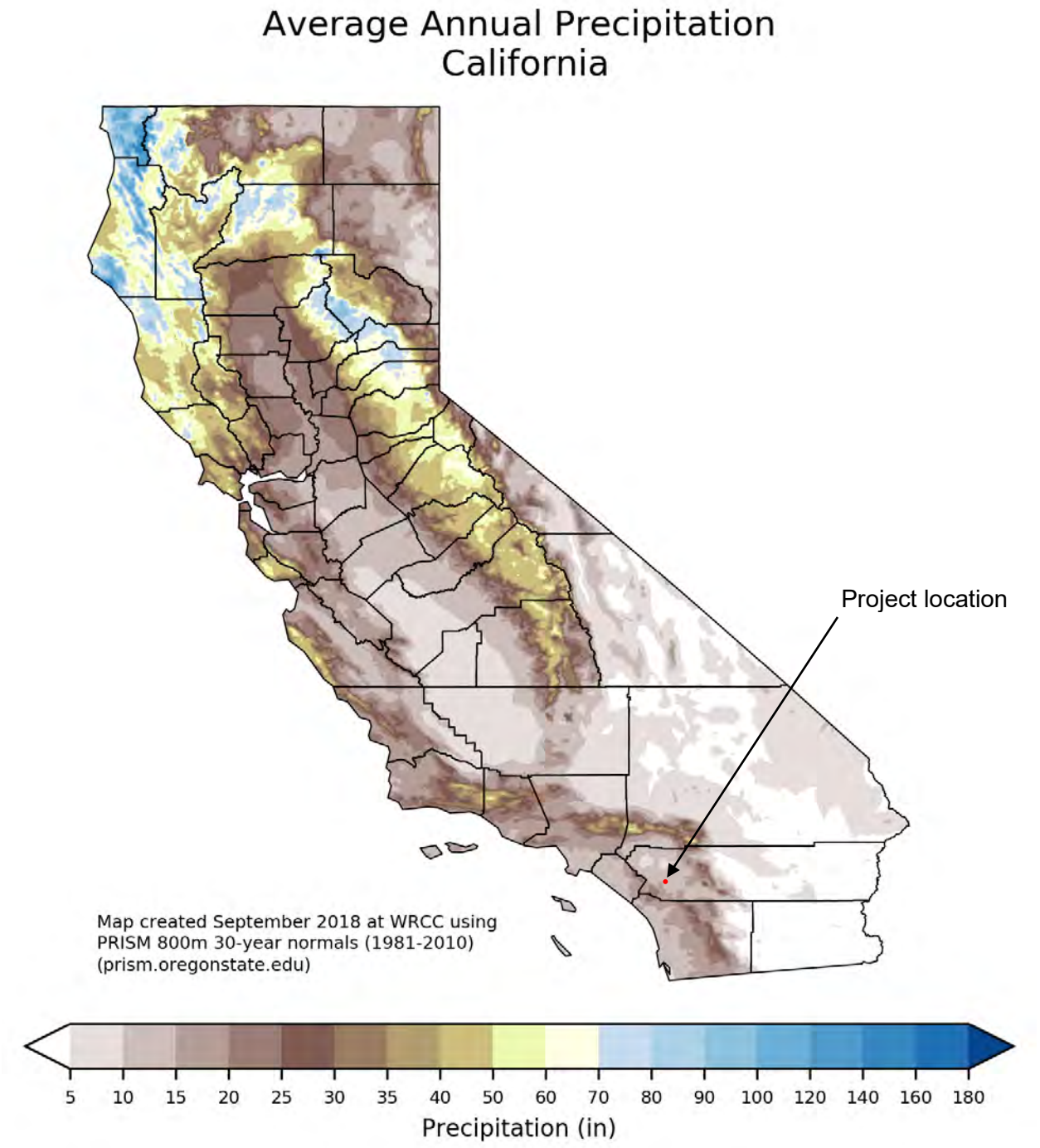
*missing or suspect data.

[4] The record for the Sage Weather Station begins in 2010.

Precipitation data from the Cranston Remote Automatic Weather Station for October 2002 through September 2021, by water year (October 1 through September 30) (WRCC 2021).

Water Year	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Total
2003	0.01	1.41	2.62	0.08	4.18	3.26*	1.71	0.12	0.08	0.37	0.10	0.08	14.02*
2004	0	2.18	0.83	0.33	3.72	2.86	0.97	0.02	0	0*	0.02	0	10.93*
2005	6.34	1.85	3.83	8.17	5.38	1.20	1.58	0.85	0	1.38	1.42	0.17	32.17
2006	1.46	0	0.22	0.92	2.06	3.15	2.29	0.32	0	0.33	0	1.02	11.77
2007	0.21	0.07	0.45	0.24	1.95	0.25	0.69	0.03	0	0.01	0.04	0.20	4.14
2008	0	2.31	1.36	4.77	1.92	0.47	0	1.21*	0*	0.15*	0*	0*	12.19*
2009	0*	0.39*	0.26*	0.34*	1.56*	0.03*	0.62*	0.08*	0.03*	0*	0*	0.02*	3.33*
2010	0.04*	0.26*	0.57*	2.80*	2.42*	0.80*	0.76*	0*	0*	0.10*	0.39	0.04	8.18*
2011	2.09	1.14	8.98	0.74	3.83	1.69	0.19	0.23	0.03	0.48	0	0.03	19.43
2012	0.33	2.33	0.53	0.38	1.77	1.71	1.45	0.03	0	0.03	2.30	0.89	11.75
2013	0.26	0.16	1.39	1.15	0.98	1.29	0.08	0.22	0	0	0.57	0.21	6.31
2014	0.74	0.58	0.31	0.01	2.23	1.35	0.60	0.01	0	0.32	1.35	2.09	9.59
2015	0.06	0.55	4.53	0.25	0.81	0.84	0.35	1.94	0.31	3.54	0	0.82	14.00
2016	0.85	0.47	1.66	3.41	0.12*	0.80	0.39	0.84	0	0	0.03	0.68	9.25*
2017	0.55*	1.26	4.21	5.56	3.93	0.21	0	0.41	0.01	0	0.21	0	16.35*
2018	0.01	0.06	0	2.15	0.62	2.79	0.01	0.28	0	0.28	0	0	6.2
2019	0.87	0.80	1.74	3.05	9.02	2.07	0.32*	1.87	0.01	0	0	0.08	19.83*
2020	0	3.38	2.44	0.34	0.54	5.04	3.85	0.06	0.03	0	0.21	0	15.89
2021	0	0.52	1.39	2.39	0.28	1.33	0.36	0.05	0.03	0.37	0	0.03	6.75

*missing or suspect data.



From WRCC (2018)

APPENDIX D: SITE PHOTOGRAPHS



Agricultural fields, south-central area of site facing northwest (05.25.2021).



Agricultural fields, central area of site facing north; slopes with coastal scrub visible in background (05.25.2021).



Agricultural fields after mowing, south-central area of site facing east (11.08.2021).



Overview of site after agricultural fields mowed, from slope at north-central edge of site facing south; coastal scrub in foreground (11.08.2021).



California buckwheat scrub, northeastern area of site facing south (05.21.2021).



California buckwheat scrub, northeastern corner of site facing southwest (05.21.2021).



California buckwheat scrub/ruderal, east-central area of site facing southeast (05.21.2021).



California buckwheat scrub/ruderal, northwest area of site facing south (05.25.2021).



Chamise chaparral, south-central edge of site facing northwest (05.25.2021).



Area of chamise chaparral after it was mowed, south-central edge of site facing west (11.08.2021).



Scattered riparian vegetation along blue-line stream, northwest area of site facing southeast (11.08.2021).



Scattered riparian vegetation along blue-line stream, northwest-central area of site facing north (11.08.2021).



Offsite area along Wickerd Road, facing west (05.21.2021).



Offsite area along Wickerd Road, facing west (05.21.2021).





Areas of long-spined spineflower observation in 2017, facing east (11.08.2021). This area has been impacted by OHV use and the species was not observed during surveys in 2018, 2019, and 2021.



Southern California black walnut tree in riparian area, facing north (11.08.2021).



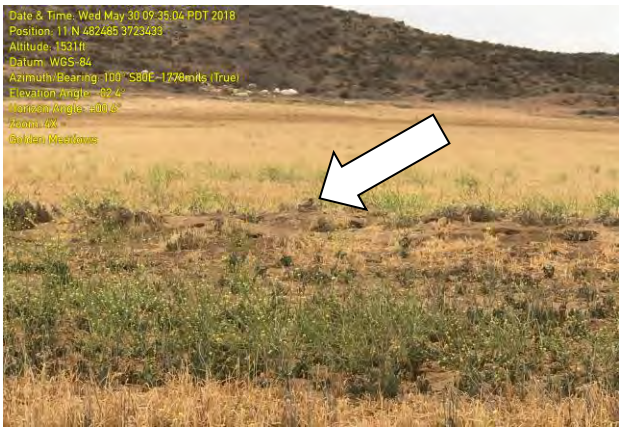
Southern California black walnut tree in riparian area, facing northwest, eucalyptus tree at right (11.08.2021).



Non-native pepper trees along western boundary of site, facing north (05.25.2021). Tree on left is offsite.



Scattered trees in the riparian area, facing south (05.25.2021).





Burrowing owl observed onsite on May 30, 2018. The owl was not observed during subsequent surveys in 2018. No owls or owl sign were observed during surveys in 2019 and 2021.





Burrowing owl burrow in 2018. This burrow was not occupied during surveys in 2019 and 2021.



Location of 2018 burrow in 2021 after agricultural fields were mowed, facing south (11.08.2021). There was no evidence of occupation before or after mowing.



Potentially suitable burrow with no signs of occupation, after agricultural fields mowed, southeast area of site facing east (11.08.2021).





Potentially suitable habitat for burrowing owl and potential burrow locations were thoroughly searched and no evidence of occupation was found in 2019 and 2021.

APPENDIX E: CNDDB FORMS

CNDDB forms for 2021 observations are provided below. The forms were submitted to CDFW online. The CNDDB only tracks nesting for Cooper's hawk and nesting was not observed, so a CNDDB form for this species is not required. The CNDDB does not track Nuttall's woodpecker or wrentit, so CNDDB forms for these species are not required.

CNDDB Online Field Survey Form Report

California Natural Diversity Database
Department of Fish and Wildlife
1416 9th Street, Suite 1266
Sacramento, CA 95814
Fax: 916.324.0475
cnddb@wildlife.ca.gov
www.dfg.ca.gov/biogeodata/cnddb/

This data has been reported to the CNDDB, but may not have been evaluated by the CNDDB staff

Source code BRU21F0015
Quad code 3311762
Occ. no.
EO index no.
Map index no.

Scientific name: *Lepus californicus bennettii*

Common name: San Diego black-tailed jackrabbit

Date of field work (mm-dd-yyyy): 05-25-2021

Comment about field work date(s):

OBSERVER INFORMATION

Observer: Guy Bruyea

Affiliation: L&L Environmental, Inc.

Address: 700 E. Redlands Blvd, Suite U-351 , Redlands, CA 92373

Email: cwakeman@llenviroinc.com

Phone: (909) 335-9897

Other observers:

DETERMINATION

Keyed in:

Compared w/ specimen at:

Compared w/ image in:

By another person:

Other: Identified by experienced field biologist

Identification explanation:

Identification confidence: Very confident

Species found: Yes **If not found, why not?**

Level of survey effort: General biological survey

Total number of individuals: 1

Collection? **Collection number:**

Museum/Herbarium:

ANIMAL INFORMATION

How was the detection made? Seen

Number detected in each age class:

adults	juveniles	larvae	egg mass	unknown
1				

Age class comment:

Site use description:

What was the observed behavior?

Describe any evidence of reproduction:

Submitted: 11/09/2021 BRU21F0015 Page 1 of 2

SITE INFORMATION

Habitat description: California buckwheat scrub adjacent to agricultural fields (dry farmed wheat)

Slope: Land owner/manager: Private

Aspect:

Site condition + population viability: Fair

Immediate & surrounding land use: Agriculture

Visible disturbances:

Threats: Planned development

General comments:

MAP INFORMATION



ID	County	24K Quadrangle	Elev. (ft)	Latitude NAD83	Longitude NAD83	UTME NAD83	UTMN NAD83	UTM Zone
	Riverside	Romoland	1563	33.65359	-117.18804	482565	3723765	11
1	**Public Land Survey**	**Feature Comment**						
	S T06S R03W 15							

The mapped feature is accurate within: 5 m

Source of mapped feature: GPS app on phone

Mapping notes:

Location/directions comments:

Attachment(s):

CNDDB Online Field Survey Form Report

California Natural Diversity Database
Department of Fish and Wildlife
1416 9th Street, Suite 1266
Sacramento, CA 95814
Fax: 916.324.0475
cnddb@wildlife.ca.gov
www.dfg.ca.gov/biogeodata/cnddb/

This data has been reported to the CNDDB, but may not have been evaluated by the CNDDB staff

Source code BRU21F0019
Quad code 3311762
Occ. no.
EO index no.
Map index no.

Scientific name: *Polioptila californica californica*

Common name: coastal California gnatcatcher

Date of field work (mm-dd-yyyy): 06-07-2021

Comment about field work date(s): Species also observed at this location on 05.31.2021

OBSERVER INFORMATION

Observer: Guy Bruyea

Affiliation: L&L Environmental, Inc.

Address: 700 E. Redlands Blvd, Suite U-351 , Redlands, CA 92373

Email: cwakeman@llenviroinc.com

Phone: (909) 335-9897

Other observers:

DETERMINATION

Keyed in:

Compared w/ specimen at:

Compared w/ image in:

By another person:

Other: Identified by experienced field biologist holding a USFWS permit for this species.

Identification explanation:

Identification confidence: Very confident

Species found: Yes **If not found, why not?**

Level of survey effort: General biological survey

Total number of individuals: 3

Collection? **Collection number:**

Museum/Herbarium:

ANIMAL INFORMATION

How was the detection made? Seen

Number detected in each age class:

adults	juveniles	larvae	egg mass	unknown
3				

Age class comment: 2 adult males and 1 adult female observed

Submitted: 11/09/2021 BRU21F0019 Page 1 of 3

Bird site use:

☐ Nesting ☐ Rookery ☐ Nesting colony ☐ Burrow site ☐ Lek
☐ Non-breeding (over-wintering) ☐ Communal roost ☑ Other

Site use description: Foraging, nesting not observed

What was the observed behavior? Foraging

Describe any evidence of reproduction:

SITE INFORMATION

Habitat description: California buckwheat scrub

Slope: Land owner/manager: Private

Aspect:

Site condition + population viability:

Immediate & surrounding land use: Agriculture

Visible disturbances: OHV trails

Threats: Planned development

General comments: CNDDB EO#736

MAP INFORMATION



ID	County	24K Quadrangle	Elev. (ft)	Latitude NAD83	Longitude NAD83	UTME NAD83	UTMN NAD83	UTM Zone
	Riverside	Romoland	1643	33.65496	-117.18490	482855	3723916	11
1	**Public Land Survey**	**Feature Comment**						
	S T06S R03W 15							

The mapped feature is accurate within: 5 m

Source of mapped feature: GPS app on phone

Submitted: 11/09/2021 BRU21F0019 Page 2 of 3

Mapping notes:

Location/directions comments:

Attachment(s):

CNDDB Online Field Survey Form Report

California Natural Diversity Database
Department of Fish and Wildlife
1416 9th Street, Suite 1266
Sacramento, CA 95814
Fax: 916.324.0475
cnddb@wildlife.ca.gov
www.dfg.ca.gov/biogeodata/cnddb/

This data has been reported to the CNDDB, but may not have been evaluated by the CNDDB staff

Source code BRU21F0018
Quad code 3311762
Occ. no.
EO index no.
Map index no.

Scientific name: *Eremophila alpestris actia*

Common name: California horned lark

Date of field work (mm-dd-yyyy): 05-25-2021

Comment about field work date(s):

OBSERVER INFORMATION

Observer: Guy Bruyea

Affiliation: L&L Environmental, Inc.

Address: 700 E. Redlands Blvd, Suite U-351 , Redlands, CA 92373

Email: cwakeman@llenviroinc.com

Phone: (909) 335-9897

Other observers:

DETERMINATION

Keyed in:

Compared w/ specimen at:

Compared w/ image in:

By another person:

Other: Identified by experienced field biologist

Identification explanation:

Identification confidence: Very confident

Species found: Yes **If not found, why not?**

Level of survey effort: General biological survey

Total number of individuals: Flock of several

Collection? **Collection number:**

Museum/Herbarium:

ANIMAL INFORMATION

How was the detection made? Seen

Number detected in each age class:

adults	juveniles	larvae	egg mass	unknown
Several				

Age class comment:

Submitted: 11/09/2021 BRU21F0018 Page 1 of 3

Bird site use:

☐ Nesting ☐ Rookery ☐ Nesting colony ☐ Burrow site ☐ Lek
☐ Non-breeding (over-wintering) ☐ Communal roost ☑ Other

Site use description: Foraging

What was the observed behavior? Foraging

Describe any evidence of reproduction:

SITE INFORMATION

Habitat description: Agricultural field (dry farmed wheat)

Slope: Land owner/manager: Private

Aspect:

Site condition + population viability:

Immediate & surrounding land use: Agriculture

Visible disturbances:

Threats: Planned development

General comments:

MAP INFORMATION



ID	County	24K Quadrangle	Elev. (ft)	Latitude NAD83	Longitude NAD83	UTME NAD83	UTMN NAD83	UTM Zone
	Riverside	Romoland	1537	33.65118	-117.19723	481711	3723499	11
1	**Public Land Survey**	**Feature Comment**						
	S T06S R03W 16							

The mapped feature is accurate within: 5 m

Source of mapped feature: GPS app on phone

Submitted: 11/09/2021 BRU21F0018 Page 2 of 3

Mapping notes:

Location/directions comments:

Attachment(s):

CNDDB Online Field Survey Form Report

California Natural Diversity Database
Department of Fish and Wildlife
1416 9th Street, Suite 1266
Sacramento, CA 95814
Fax: 916.324.0475
cnddb@wildlife.ca.gov
www.dfg.ca.gov/biogeodata/cnddb/

This data has been reported to the CNDDB, but may not have been evaluated by the CNDDB staff

Source code BRU21F0017
Quad code 3311762
Occ. no.
EO index no.
Map index no.

Scientific name: *Eremophila alpestris actia*

Common name: California horned lark

Date of field work (mm-dd-yyyy): 06-05-2021

Comment about field work date(s): Also observed on 05.21.2021

OBSERVER INFORMATION

Observer: Guy Bruyea

Affiliation: L&L Environmental, Inc.

Address: 700 E. Redlands Blvd, Suite U-351 , Redlands, CA 92373

Email: cwakeman@llenviroinc.com

Phone: (909) 335-9897

Other observers:

DETERMINATION

Keyed in:

Compared w/ specimen at:

Compared w/ image in:

By another person:

Other: Identified by experienced field biologist

Identification explanation:

Identification confidence: Very confident

Species found: Yes If not found, why not?

Level of survey effort: General biological survey

Total number of individuals: Flock of several

Collection? **Collection number:**

Museum/Herbarium:

ANIMAL INFORMATION

How was the detection made? Seen

Number detected in each age class:

adults	juveniles	larvae	egg mass	unknown
Several				

Age class comment:

Submitted: 11/09/2021 BRU21F0017 Page 1 of 3

Bird site use:

☐ Nesting ☐ Rookery ☐ Nesting colony ☐ Burrow site ☐ Lek
☐ Non-breeding (over-wintering) ☐ Communal roost ☑ Other

Site use description: Foraging

What was the observed behavior? Foraging

Describe any evidence of reproduction:

SITE INFORMATION

Habitat description: Agricultural field (dry farmed wheat)

Slope: Land owner/manager: Private

Aspect:

Site condition + population viability:

Immediate & surrounding land use: Agriculture

Visible disturbances:

Threats: Planned development

General comments:

MAP INFORMATION



ID	County	24K Quadrangle	Elev. (ft)	Latitude NAD83	Longitude NAD83	UTME NAD83	UTMN NAD83	UTM Zone
1	Riverside	Romoland	1558	33.65088	-117.18529	482819	3723463	11
	Public Land Survey	**Feature Comment**						
	S T06S R03W 15							

The mapped feature is accurate within: 5 m

Source of mapped feature: GPS app on phone

Mapping notes:

Location/directions comments:

Attachment(s):

CNDDB Online Field Survey Form Report

California Natural Diversity Database
Department of Fish and Wildlife
1416 9th Street, Suite 1266
Sacramento, CA 95814
Fax: 916.324.0475
cnddb@wildlife.ca.gov
www.dfg.ca.gov/biogeodata/cnddb/

This data has been reported to the CNDDB, but may not have been evaluated by the CNDDB staff

Source code BRU21F0016
Quad code 3311762
Occ. no.
EO index no.
Map index no.

Scientific name: *Eremophila alpestris actia*

Common name: California horned lark

Date of field work (mm-dd-yyyy): 07-06-2021

Comment about field work date(s):

OBSERVER INFORMATION

Observer: Guy Bruyea

Affiliation: L&L Environmental, Inc.

Address: 700 E. Redlands Blvd, Suite U-351 , Redlands, CA 92373

Email: cwakeman@llenviroinc.com

Phone: (909) 335-9897

Other observers:

DETERMINATION

Keyed in:

Compared w/ specimen at:

Compared w/ image in:

By another person:

Other: Identified by experienced field biologist

Identification explanation:

Identification confidence: Very confident

Species found: Yes **If not found, why not?**

Level of survey effort: General biological survey

Total number of individuals: Flock of several

Collection? **Collection number:**

Museum/Herbarium:

ANIMAL INFORMATION

How was the detection made? Seen

Number detected in each age class:

adults	juveniles	larvae	egg mass	unknown
Several				

Age class comment:

Submitted: 11/09/2021 BRU21F0016 Page 1 of 3

Bird site use:

☐ Nesting ☐ Rookery ☐ Nesting colony ☐ Burrow site ☐ Lek
☐ Non-breeding (over-wintering) ☐ Communal roost ☑ Other

Site use description: Foraging

What was the observed behavior? Foraging

Describe any evidence of reproduction:

SITE INFORMATION

Habitat description: Agricultural fields (dry farmed wheat)

Slope: Land owner/manager: Private

Aspect:

Site condition + population viability:

Immediate & surrounding land use: Agriculture

Visible disturbances:

Threats: Planned development

General comments:

MAP INFORMATION



ID	County	24K Quadrangle	Elev. (ft)	Latitude NAD83	Longitude NAD83	UTME NAD83	UTMN NAD83	UTM Zone
	Riverside	Romoland	1542	33.64972	-117.18907	482468	3723335	11
1	**Public Land Survey**	**Feature Comment**						
	S T06S R03W 16							

The mapped feature is accurate within: 5 m

Source of mapped feature: GPS app on phone

Mapping notes:

Location/directions comments:

Attachment(s):

APPENDIX F: RIVERSIDE COUNTY DOCUMENTATION

Certification

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

DATE: December 17, 2021 SIGNED: _____

Leslie Irish, Principal, L&L Environmental, Inc.
909-335-9897

1) Fieldwork Performed By:

Guy Bruyea
Name

2) Fieldwork Performed By:

John Konecny
Name

3) Fieldwork Performed By:

_____
Name

4) Fieldwork Performed By:

_____
Name

5) Fieldwork Performed By:

_____
Name

6) Fieldwork Performed By:

_____
Name

Check here __ if adding any additional names / signatures below or on other side of page.

BIOLOGICAL REPORT SUMMARY SHEET

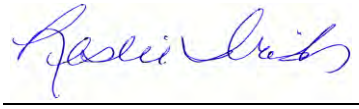
Applicant Name: Richland Communities
Assessor's Parcel Number(s): 360-300-002, -003, -004, -005, -006, -009, 360-350-001
Section, Township and Range: Sections 15 and 16, Township 6 South, Range 3 West
Building and Safety Log Number: _____
Case Number: TR 31194 Lot/Parcel _____ EA Number _____

MARK ITEM(S) SURVEYED FOR	SPECIES or ENVIRONMENTAL ISSUE of CONCERN	*(Mark Yes, No, or N/A regarding species findings on the referenced site)*		
		Yes	**No**	**n/a**
	Arroyo Southwestern Toad			X
X	Blue-line Stream(s)	X		
X	Burrowing Owl	X (2018)	X (2021)	
	Coachella Valley Fringed-toed Lizard			X
X	Coastal California Gnatcatcher	X		
X	Coastal Sage Scrub	X		
	Delhi Sands Flower-loving Fly			X
	Desert Pupfish			X
	Desert Slender Salamander			X
	Desert Tortoise			X
	Flat-tailed Horned Lizard			X
X	Least Bell's Vireo (habitat)		X	
X	Oak Woodlands		X	
X	Quino Checkerspot Butterfly (2004 survey)		X	
X	Riverside Fairy Shrimp (habitat)		X	
X	Santa Ana River Woolystar		X	
	San Bernardino Kangaroo Rat			X
X	Slender-horned Spineflower		X	
	Stephens' Kangaroo Rat			X
X	Vernal Pools		X	
X	Wetlands	X		
X	Long-spined spineflower	X (2017)	X (2021)	
X	Southern California black walnut	X		
X	Coast Horned Lizard (previous survey)	X		
X	Orange-throated Whiptail (previous survey)	X		
X	Coastal (Western) Whiptail (previous survey)	X		
X	Cooper's Hawk	X		
X	Northern Harrier (previous survey)	X		
X	White-tailed Kite (previous survey)	X		
X	California Horned Lark	X		
X	Great Egret (previous survey)	X		
X	Great Blue Heron (previous survey)	X		
X	Lawrence's Goldfinch (previous survey)	X		
X	Loggerhead Shrike (previous survey)	X		
X	California Thrasher (previous survey)	X		

MARK ITEM(S) SURVEYED FOR	SPECIES or ENVIRONMENTAL ISSUE of CONCERN	*(Mark Yes, No, or N/A regarding species findings on the referenced site)*		
		Yes	No	n/a
X	Southern California Rufous-crowned Sparrow (previous survey)	X		
X	Bell's Sage Sparrow (previous survey)	X		
X	Nuttall's Woodpecker	X		
X	Wrentit	X		
X	Costa's Hummingbird (previous survey)	X		
X	Rufous Hummingbird (previous survey)	X		
X	San Diego Black-tailed Jackrabbit	X		

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 Wildlife Natural Diversity Data Base (CNDDB).

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 or habitat assessment.



L & L Environmental, Inc. — Signature and Company Name

December 17, 2021 — Date

_____ — 10(a) Permit Number (if applicable)

_____ — Permit Expiration Date

County Use Only

Received By: _____ Date: _____

PD-B# _____

Attachment E-4

LEVEL OF SIGNIFICANCE CHECKLIST
For Biological Resources

Case Number: TR 31194 Lot/Parcel No. _____ EA Number _____

Assessor's Parcel Number(s): 360-300-002, -003, -004, -005, -006, -009, 360-350-001

Date: December 17, 2021

Biological Resources: (Check the level of impact that applies to the following questions.)

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

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 Wildlife, 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?

☐ ■ ☐ ☐

LEVEL OF SIGNIFICANCE CHECKLIST
For Biological Resources

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 Wildlife, or the 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 pools, coastal, etc.) through direct removal, filling, hydrological interruption)?

☐ ■ ☐ ☐

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

☐ ■ ☐ ☐

Findings of Fact:

The site is located within the area covered by the MSHCP but is not within the Criteria Area. There is one area of PQP Conserved Lands approximately 0.68 miles north-northeast of the site (Ringing Rock Archaeological Site). Other than the Ringing Rock Site, there are no other PQP or MSHCP Conserved Lands within a mile of the site. The site is not within or near any MSHCP Core Areas or Linkages.

There is one sensitive vegetation community present, arroyo willow thicket.

No state or federally listed plants were observed. Two special status plant species were observed, long-spined spineflower and southern California black walnut.

There is one immature coast live oak and other native and non-native trees present.

Coastal California gnatcatcher present and nesting on the site. White-tailed kite observed during previous surveys, but no nesting detected.

No vernal pools or ponding areas and no fairy shrimp habitat.

Riparian birds (least Bell's vireo, southwestern willow flycatcher, western yellow-billed cuckoo) considered absent.

Special status wildlife species detected: orange-throated whiptail, coastal (western) whiptail, coast horned lizard, Cooper's hawk, southern California rufous-crowned sparrow, great egret, great blue heron (fly over), Bell's sage sparrow, burrowing owl, Costa's hummingbird, wrentit, northern harrier, Nuttall's woodpecker, California horned lark, loggerhead shrike, rufous hummingbird, Lawrence's goldfinch, California thrasher, and San Diego black-tailed jackrabbit.

One (1) adult burrowing owl and an occupied burrow observed in 2018. No owls or owl sign observed in 2019 or 2021.
There is habitat suitable for nesting birds (including raptors) within and adjacent to the site.

The site is not within or adjacent to a wildlife corridor.

A mapped blue-line stream is present and includes MSHCP riparian/riverine habitat as well as state waters/wetlands and federal waters. Regulatory permitting and a DBESP will be required.

Proposed Mitigation:

Preconstruction surveys for burrowing owl.

Preconstruction surveys for nesting birds during nesting season.

Avoidance of riparian habitat and offsite compensation for impacts.

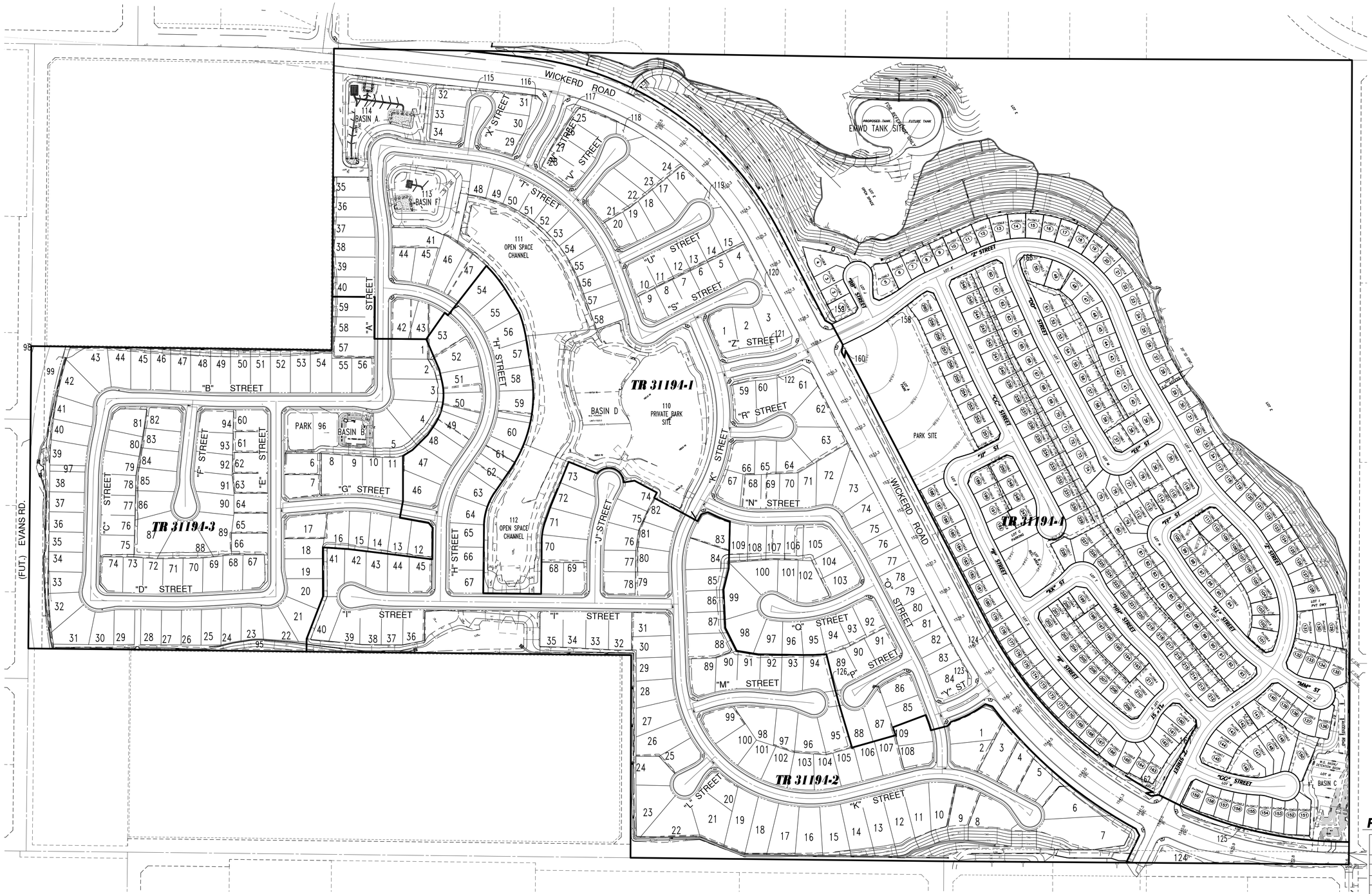
Monitoring Recommended:

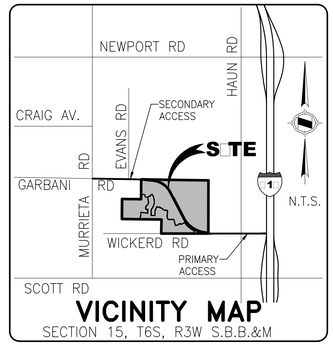
Monitoring of active coastal California gnatcatcher nest sites during Project activities recommended.

Monitoring of Project activities that disturb vegetation or soil in and adjacent to the Avoidance Area is recommended.

Source: CGP Fig. VI.36-VI.40
Revised October 1999

APPENDIX G: SITE PLAN





VICINITY MAP

SECTION 15, T6S, R3W S.B.B.&M

SCALE: 1" = 150'

RESIDENTIAL LOT COUNT

	EXIST.No. OF RES. LOTS	PROP. NO. OF RES. LOTS
PHASE 1 (MINOR MOD.)	105 LOTS	109 LOTS
PHASE 2 (MINOR MOD.)	111 LOTS	109 LOTS
PHASE 3	94 LOTS	94 LOTS
PHASE 4 (MAJOR MOD.)	156 LOTS	260 LOTS
TOTAL	466 LOTS	572 LOTS

GOLDEN MEADOWS
TENTATIVE TRACT MAP NO. 31194
PROPOSED LOT ADJUSTMENT
SITE PLAN EXHIBIT

SHEET 1 OF 1

DATE: Aug 12, 2021

H:\00546\Engineering\Project Exhibits\Lot Line Adjustments Exhibits\TR 31194_Proposed Adjustments Overall Exhibit.dwg 8/12/2021 10:57 AM

APPENDIX C

Phase 1 Cultural Resources Assessment, L&L Environmental, Inc.

L&L ENVIRONMENTAL, INC.
REGULATORY SERVICES
BIOLOGICAL & CULTURAL INVESTIGATIONS & MONITORING

PHASE 1 CULTURAL RESOURCES ASSESSMENT: GOLDEN MEADOWS PROJECT (TRACT 31194, PHASE IV) CITY OF MENIFEE, RIVERSIDE COUNTY, CALIFORNIA

±86 Acres Surveyed

APNs 360-300-002, -003, -006, and 360-350-001, Tract 31194 Phase IV, City of Menifee,
Sections 15 and 16, Township 6 South, Range 3 West,
USGS Romoland, 7.5' Topographic Quadrangle

Prepared On Behalf Of:

Brian Hardy
Richland Communities
3161 Michelson Drive, Suite 425
Irvine, CA 92612
949-261-7010

Prepared For:

The City of Menifee
Community Development
29844 Haun Road
Menifee, CA 92586

Prepared By:

John J. Eddy, M.A., RPA and William R. Gillean, B.S. L&L Environmental, Inc.
700 East Redlands Blvd, Suite U PMB #351
Redlands, CA 92373
909-335-9897

March 8, 2021, Updated June 22, 2022

Keywords: ±86 Acres; Menifee; Golden Meadows; Riverside County; Cultural Resource Assessment; Archaeological Resources – Prehistoric Isolated Artifact (RLCC-01-ISO); Bedrock Milling Sites (RLCC-02, -04, and -05); Gallinaceous Guzzler (RLCC-06H); and-Hewn Wood Post and Barbed Wire Fence (RLCC-07H); Bedrock Milling Features, Flaked Stone Debitage, Jasper, Concrete Gallinaceous Guzzler, Fence

Celebrating 20 Years of Service to Southern CA and the Great Basin, WBE Certified (Caltrans, CPUC, WBENC)
Mailing Address: 700 East Redlands Blvd., Suite U, PMB#351, Redlands, CA 92373
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Phone: 951.681.4929 • FAX: 951.681.6531

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MANAGEMENT SUMMARY

At the request of Richland Communities, L&L Environmental, Inc. (L&L) completed a Phase I Cultural Resource Assessment on ±86-acres of land in the City of Menifee, Riverside County, California. Richland Communities proposes the Golden Meadows Project (TR 31194) to subdivide ±204.7-acres of land into 486 single-family residential lots with a minimum lot size of 6,000 square feet, three (3) park lots, seven (7) open space/drainage easement lots, three (3) water quality basins, and 31 open space/landscape lots in addition to roads and associated utility easements. L&L completed cultural resource surveys of the ±204.7-acre Project area in 2003 and 2013. During these surveys the property was in agricultural use and ground visibility was low in the cultivated areas and in dense areas of coastal sage.

The current survey is limited to ±86-acres of land within the Golden Meadows Tract No. 31194 Phase 4 development ("Project"). Phase 4 includes 259 residential lots (28-acres), a park (2.95-acres), recreation center (0.6-acres), open space (41.3-acres), and roads, parking, drainage easements, and water quality basins (13.1-acres).

This report documents efforts to identify historical resources, as defined in Public Resources Code (PRC) §5020.1(j) and complies with provisions of the California Environmental Quality Act (CEQA) to assess a Project's potential to impact historical resources during Project construction, operation, and/or maintenance. These efforts include a cultural resources records search, background research, coordination with the Native American Heritage Commission and local Native American tribes and organizations, and an intensive pedestrian survey of the Golden Meadows TR 31194 Phase 4 Project area.

Cultural Resources Records Search

Record searches at the Eastern Information Center (EIC), located on the campus of the University of California, Riverside, were previously completed by L&L in 2003 and 2013 for the Project area limits and one-mile radius. A supplemental cultural resources records search request was submitted to the EIC on October 18, 2021. The EIC modified its conventional record search in December 2020 due to the COVID19 pandemic restrictions, and many of the recent records and reports are not available. Furthermore, the pandemic caused a backlog in record search requests and delayed the issuance of results. The results of the current records search request, completed by a member of the EIC staff were received on January 28, 2022 (without maps) after publication of the report. This revised report has incorporated the records search results.

The records searches should include EIC maps, previously documented cultural resource records, and historical resource studies on or within a one-mile radius of the Project area. In addition, the records search should include a review of the National Register of Historic Places, Archaeological Determinations of Eligibility (ADOE), and the Built Environment Resources Directory (BERD). However, EIC staffing limitations have impacted results provided.

Six (6) new cultural resources were identified in the Project area. These include one (1) isolated prehistoric artifact (RLCC-01-ISO), three (3) bedrock milling sites (RLCC-02, -04, and -05), a concrete gallinaceous guzzler (RLCC-06H), and a hand-hewn wood post and barbed wire fence line (RLCC-07H). Isolate RLCC-01-ISO and fence line RLCC-07H are recommended not eligible for the CRHR. No further consideration of RLCC-07H is required during Project planning. Conversely, prehistoric isolated finds like RLCC-01-ISO that do not qualify as historical resources under CEQA may have cultural significance to local Native American tribes and therefore efforts should be made to avoid direct impacts that may result in damage to, or destruction of, these isolated resources.

The three (3) bedrock milling sites (RLCC-02, -04, and -05) are recommended not eligible for individual listing on the CRHR, but collectively, their association with Native American settlement and subsistence activities contributes to the historical significance of the potential Christensen Webb village complex under Criterion 1. Furthermore, viewshed and auditory analysis, coupled with limited subsurface exploration and documentation of these sites has the potential to generate important information relating to prehistory and therefore these sites, collectively, also contribute to the significance of the potential district area under Criterion 4. Thus, RLCC-02, -04, and -05 are considered historical resources for the purposes of CEQA.

In its current state, gallinaceous guzzler RLCC-06H does not appear to have sufficient integrity to convey historical significance related to its distinctive character of type, period, and method of construction. As such, RLCC-06H does not appear to qualify for the CRHR and is not considered a historical resource under CEQA. However, a reassessment of its integrity and potential significance may be warranted during Project construction should its apron and other character defining features be found intact.

The results of L&L's investigation indicates that the proposed Project has the potential to cause a substantial adverse change in the significance of historical resources as defined in CEQA Guidelines Section 15064.5. Impacts to historical resources may include physical disturbance or destruction of known resources, disturbance or destruction of unknown buried and potentially significant archaeological deposits, diminishing historical integrity and the ability of a historical

resource to convey its potential significance through visual, atmospheric, vibration, or other indirect impacts, and diminishment of historical integrity and the ability of a historical resource to convey its potential significance through cumulative impacts.

Avoidance is the preferred treatment for any significant resource. If avoidance is not feasible, then efforts to minimize impacts through Project design, additional technical studies including but not limited to data recovery, establishing Environmentally Sensitive Areas and archaeological monitoring, and other forms of mitigation are recommended prior to and during Project implementation. L&L recommends the following conditions/measures to avoid, minimize, and/or mitigate potentially significant impacts to historical resources within the Project area.

The project applicant shall enter into a pre-excavation agreement with the culturally affiliated Luiseño Tribe(s). The agreement shall document archaeological monitoring requirements and specify the disposition of any significant resources discovered during monitoring.

The landowner shall relinquish ownership of all cultural resources, including all Luiseno cultural sacred items, burial goods and all archaeological artifacts that are found on the project site, to the culturally affiliated Luiseño Tribe(s) for proper treatment and disposition.

The Project proponent will hire a qualified archaeologist that meets Secretary of Interior Standards to oversee the surface collection of isolated prehistoric artifact RLCC-01-ISO. The field work shall be completed by an archaeologist and Native American monitor(s) on behalf of the culturally affiliated Luiseño Tribe(s).

Archaeological and tribal monitoring shall be conducted on a full-time basis for all grading and ground disturbing activities, including archaeological testing, until the project archaeologist in consultation with the culturally affiliated Luiseño Tribe(s) and the County of Riverside determines that resources are not likely to be encountered.

If archaeological remains are found by the archaeological monitor, earthmoving shall be diverted temporarily around the deposits until they have been evaluated, recorded, excavated, and/or recovered as necessary. Earthmoving shall be allowed to proceed through the site when the archaeological supervisor, in consultation with the culturally affiliated Luiseño Tribe(s) and the County of Riverside, determines the artifacts are recovered and/or the site is mitigated to the extent necessary.

If possible human remains are encountered during any earthmoving activities, all work shall stop in the area in which the find(s) are present, and the Riverside County Coroner must be notified. State law dictates that the Native American Heritage Commission (NAHC) shall be notified in the event that remains are determined to be human and of Native American decent, in accordance with California Public Resources Code Section 5097.98.

If a previously unknown site is encountered and it requires additional mitigation, a plan or proposal shall be prepared by the archaeologist, in consultation with the culturally affiliated Luiseño Tribe(s) and County of Riverside, outlining the plan of action that needs to be implemented to mitigate the new site.

Any recovered archaeological resources shall be identified, recorded, mapped and artifact catalogued as required by standard archaeological practices. Examination by an archaeological specialist shall be included where necessary, dependent upon the artifacts, features or sites that are encountered. Specialists shall identify, date, and/or determine significance potential.

A final report of findings shall be prepared by the archaeologist for submission to the Eastern Information Center and the County of Riverside. The report shall describe parcel history, summarize field and laboratory methods used, if applicable, and include any testing or special analysis information conducted to support the findings.

The draft archaeological monitoring report will, at a minimum, present the results of monitoring field work including enforcement of Environmentally Sensitive Areas, the WEAP program, efforts to relocate bedrock milling features, include copies daily monitoring logs, and append photogrammetric documentation and viewshed analysis of bedrock milling features. If archaeological resources are discovered while implementing the monitoring program, the final monitoring report may also report on the results of lab analysis, special studies, and document the final treatment and disposition of the artifacts. The archaeological monitoring report will be completed in consultation with the culturally affiliated Luiseño Tribe(s). The Project proponent is responsible for completing a final monitoring report that addresses comments from the Lead Agency, proponent, and/or consulting tribes. Final reports must be submitted to the Lead Agency, Project Proponent, consulting tribes, and the Eastern Information Center located on the campus of the University of California, Riverside.

1.0) INTRODUCTION AND SETTING

1.1) Introduction

This report was prepared by L&L Environmental, Inc. (L&L) for the City of Menifee on behalf of Richland Communities. The report documents the cultural resource assessment of ±86-acres of land (APNs 360-300-002, -003, -006, and 360-350-001) associated with Golden Meadows Tract No. 31194 Phase 4 ("Project") and was completed in accordance with CEQA. The purpose of this study is to identify, evaluate, and assess the Project's potential impacts on cultural resources 45 years or older.

1.2) Location

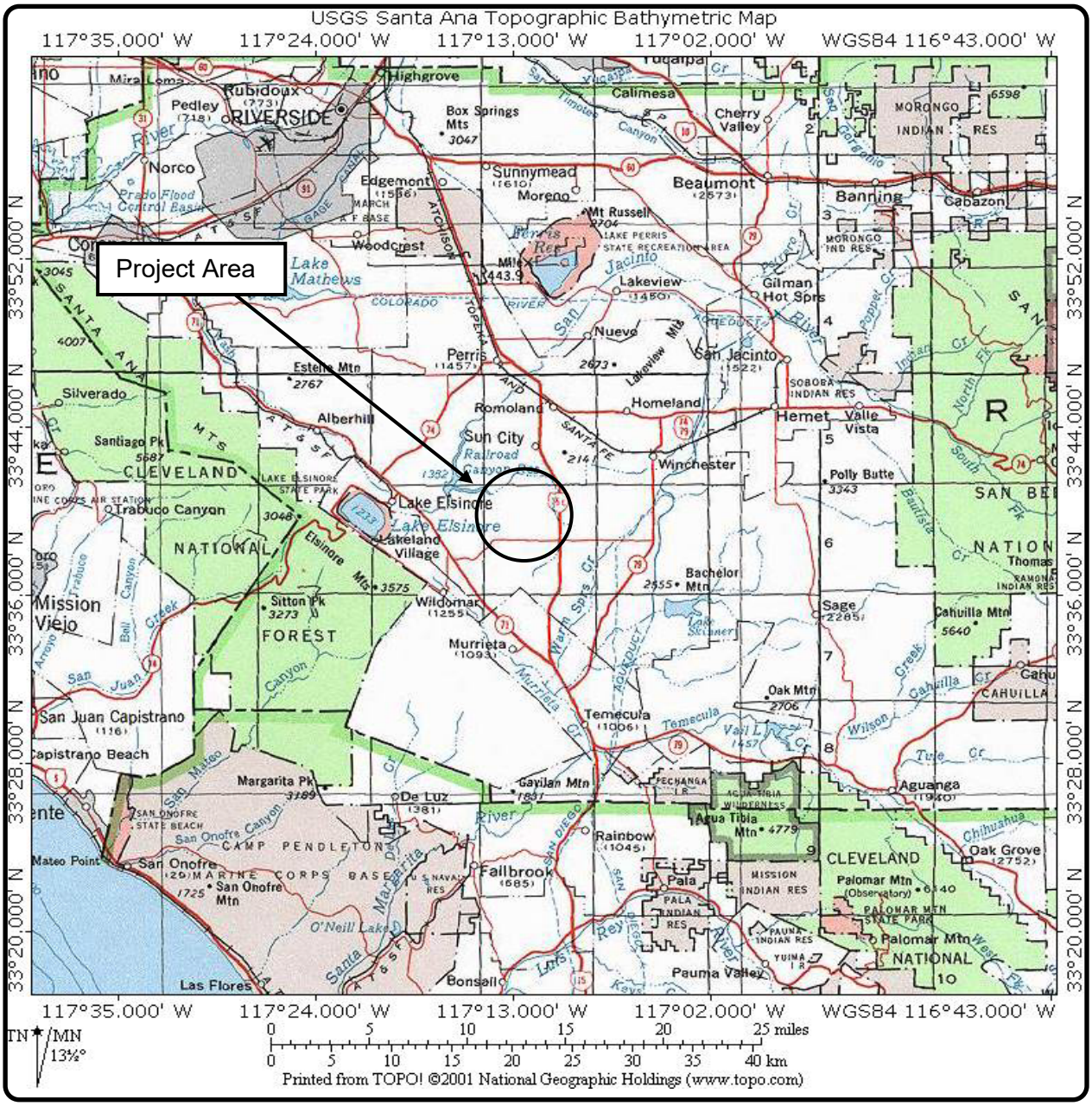
The Project is situated within Menifee Valley (historically known as the Paloma Valley) west of Interstate Highway 215 (I-215), south of Newport Road and east of Murrieta Road, between Wickerd Road to the south and Garbani Road[1] (Figure 1). Specifically, it lies within Sections 15 and 16, Township 6 south, Range 3 west, within the USGS Romoland 7.5' series quadrangle map (Figure 2).

The site is generally bounded as follows: to the west by a mixture of actively cultivated and fallow agricultural areas, Evans Road (unimproved) and rural residential units; to the east by a mixture of disturbed and relatively undisturbed open space, Ascot Way (unimproved), and a Verizon Communications complex beyond; to the north by a mixture of disturbed and relatively undisturbed lands, rural residential areas and Garbani Road (unimproved) beyond; and to the south by Wickerd Road (unimproved), rural residential areas and a mix of disturbed and relatively undisturbed lands beyond (Figure 3).

1.3) Project Area Limits and Direct Impact Area

The Golden Meadows TR 31194 Phase 4 Project area limits for cultural resources includes ±86-acres of land of which 41.3-acres is dedicated open space. Richland Communities currently proposes to construct 259 residential housing lots, a recreation center, support structures/utilities, drainage easements, water quality basins, and a park within ±44.8 acres. This development footprint includes all Phase IV improvements proposed within the limits of grading as depicted in the current Site Plan.

[1] Also known as Daniel Road where Garbani goes to the north, Daniel Road continues west.



L&L Environmental, Inc.

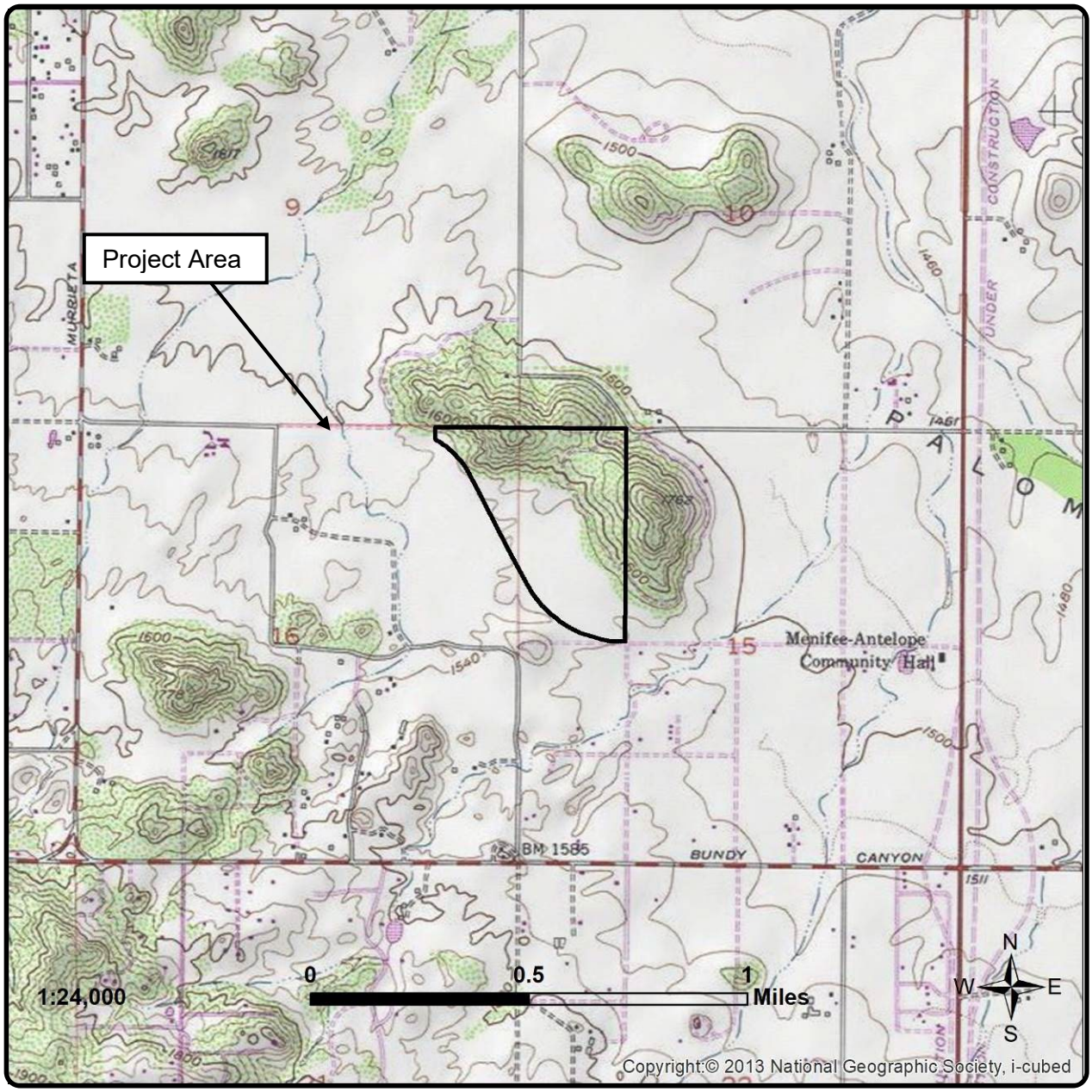
BIOLOGICAL AND CULTURAL INVESTIGATIONS AND MONITORING

RLCC-03-187
June 2022

Figure 1

Project Vicinity Map

Menifee Assemblage, TT 31194 Phase IV
City of Menifee, California



L&L Environmental, Inc.

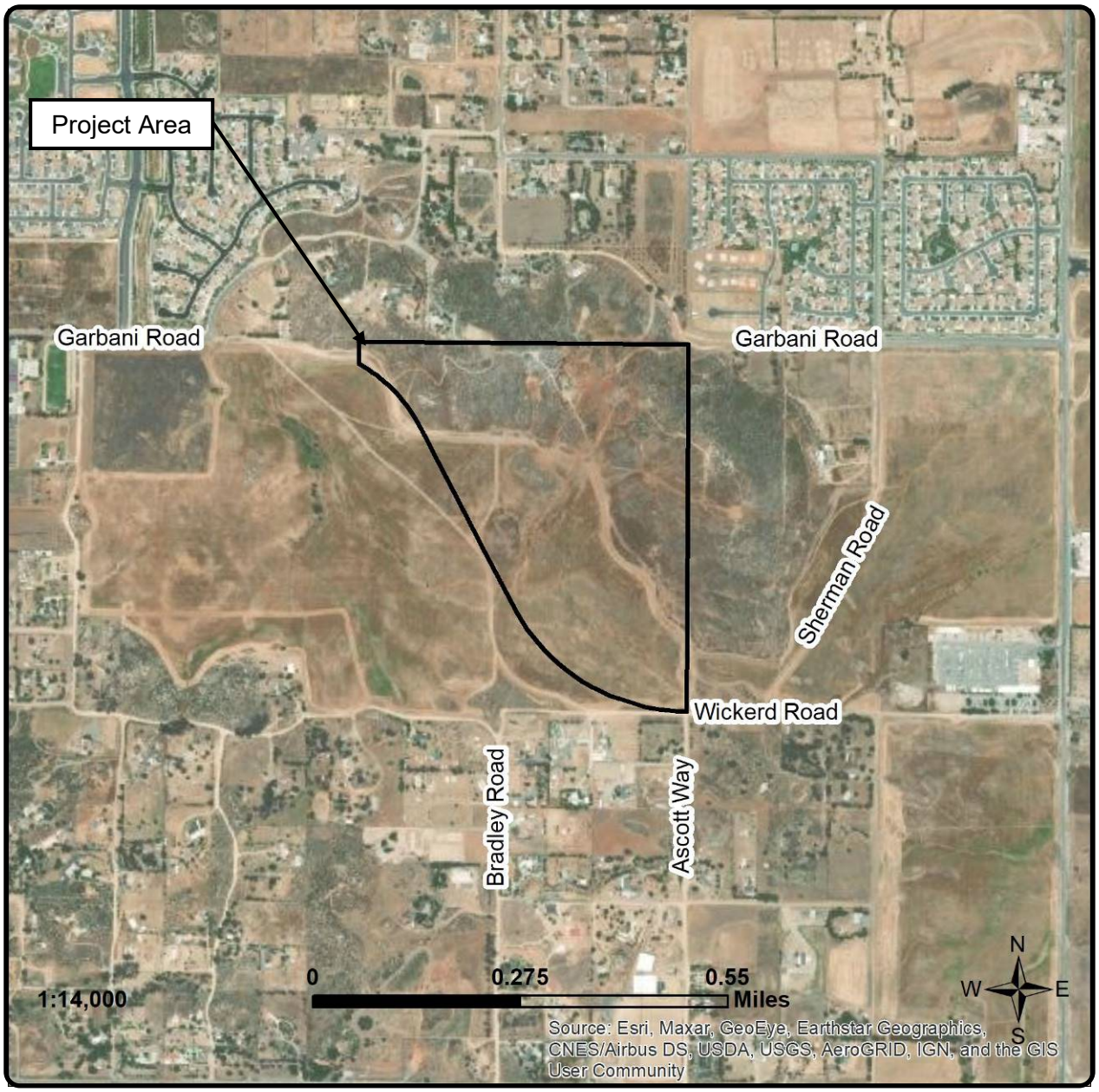
BIOLOGICAL AND CULTURAL INVESTIGATIONS AND MONITORING

RLCC-03-187
June 2022

Figure 2

Project Location Map
(USGS Romoland 1979 quadrangle)

Golden Meadows, TT 31194 Phase IV
City of Menifee, California



L&L Environmental, Inc.

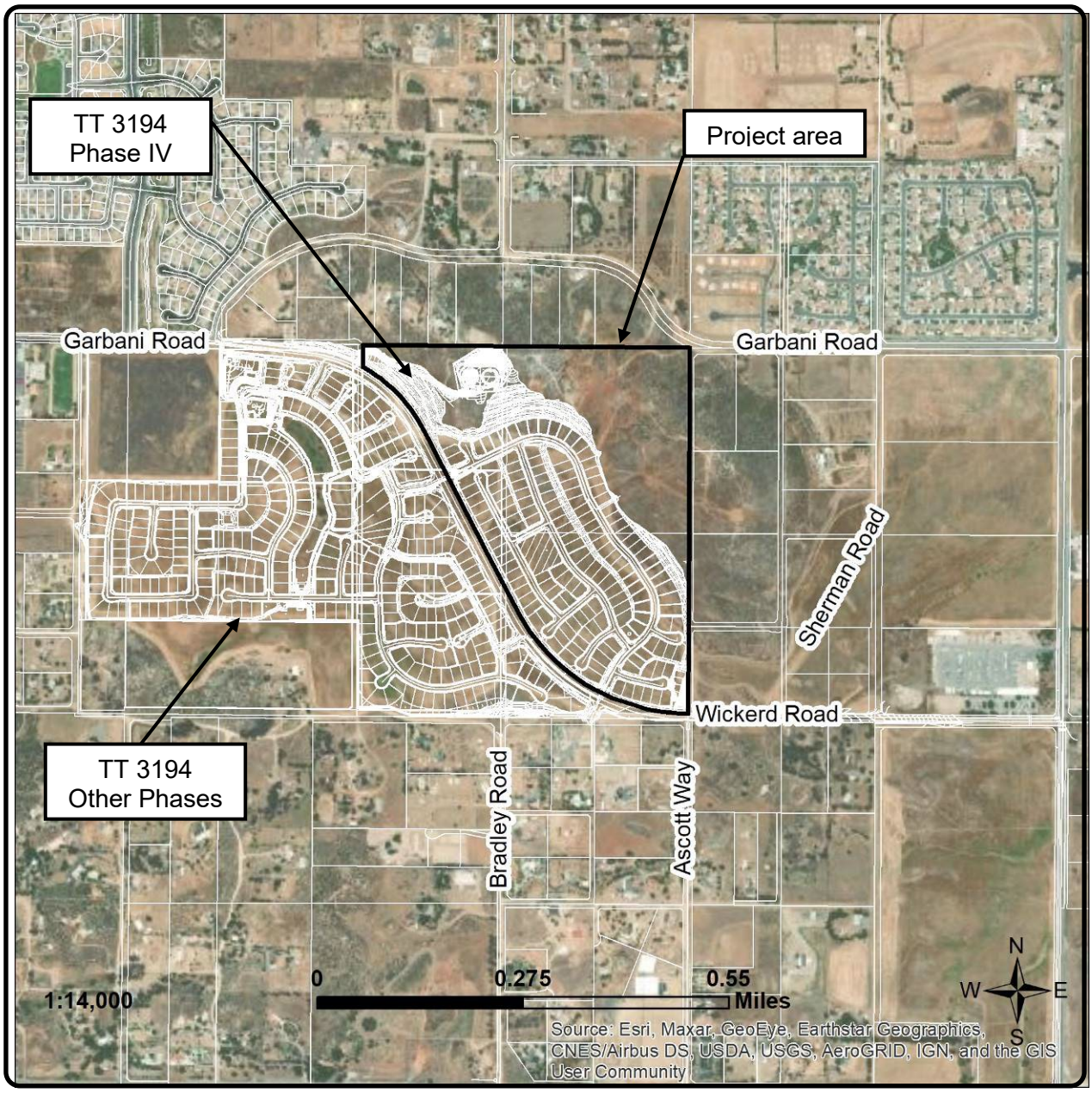
BIOLOGICAL AND CULTURAL INVESTIGATIONS AND MONITORING

RLCC-03-187
June 2022

Figure 3

Aerial Photograph

Golden Meadows, TT 31194 Phase IV
City of Menifee, California



L&L Environmental, Inc.

BIOLOGICAL AND CULTURAL INVESTIGATIONS AND MONITORING

RLCC-03-187
June 2022

Figure 4

Development Plan

(Plan obtained from Hunsaker & Assoc. Irvine, Inc., 2021)

Golden Meadows, TT 31194 Phase IV
City of Menifee, California

1.4) Environmental Setting

1.4.1) Topography and Geology

Topographically, much of the site is flat and contains open lands with low-relief rocky outcrops and shallow depressions. Gently to steeply sloping hills and ridgelines are present within the northeastern portion of the property. The site has a combined maximum vertical relief of roughly 180 feet between the highest and lowest points on the property, with elevation ranging from approximately 1,540 to 1,720 feet above mean sea level (AMSL). Surrounding topographic features in the project vicinity include gently to steeply sloping hills and ridgelines interspersed with lower-lying relatively flat areas. Although most surrounding areas of the Menifee Valley are primarily flat, significant topographic features are present northwest and southwest of the property at elevations of approximately 1,760 to 1,820 feet AMSL. Bell Mountain, a significant topographic feature located approximately 2 miles east of the subject property, lies at 1,848 feet AMSL.

The area is part of the Peninsular Ranges geologic province and within the Perris Block, between the Elsinore and San Jacinto fault zones. Old (Pleistocene) alluvial fan deposits (Qofa) make up most of the project area. Morton (1991) describes these sediments as "mostly thoroughly dissected, older alluvial fan deposits topographically above adjacent Quad deposits. Consists of well indurated brownish coarse-grained conglomeratic to sandy alluvium adjacent to basement hills. Mostly conglomeratic in vicinity of Menifee Valley and Paloma Valley where adjacent hills contain quartzite. Mostly coarse-grained sand west of Paloma Valley where the alluvium is mainly derived from granitic rocks." The deposits run diagonally from the northwest corner to the southeast corner, through the western portion of the project area.

The hills in the eastern portion of the Project area, along with two small outcrops to the west, are composed of monzogranite and granodiorite (Kdvg) described by Morton (1991) as pale gray, massive, medium-grained hypiodimorphic granular biotite monzogranite and less abundant hornblende-biotite granodiorite forming older ring dike.

Kdvg is pre-Cretaceous basement rock and part of the Cretaceous Peninsular Ranges Batholith. The Peninsular Ranges Batholiths are "…minor Jurassic and extensive Cretaceous igneous rocks associated with Nevadan plutonism and a few remnants of roof rock that establish continuity with the pre-Nevadan history of the Sierra Nevada" (Norris and Webb 1990).

1.4.2) Vegetation and Fauna

Much of the subject property is disturbed in association with (previous and active) dry-land cultivation and some grazing. As a result, these areas do not support native habitat communities. In the less disturbed area of the property Riversidean sage scrub (RSS) vegetation is present along with native low-growing herbaceous annuals. Unimproved roads are present on the property.

In prehistoric times plants of the Riversidean sage scrub community would have been of interest to people inhabiting the area. Buckwheat (*Eriogonum fasciculatum*), white sage (*Salvia apiana*), black sage (*Salvia mellifera*), California sagebrush (*Atemisia californica*), and chamise (*Adenostoma fasciculatum*) are common. Mule deer, big horn sheep, pronghorn antelope, bobcats, mountain lions, rabbits, squirrels, bears, wolves, and small rodents would have been found in the region. Raptors, quail, doves, herons, geese, ducks, and crows in addition to smaller birds like sparrows occupied the area, as well as snakes, lizards, and fish (Pardon 2010).

Land use varies adjacent to the survey area and includes anthropogenic disturbances such as rural residential, active, and fallow agricultural areas, large animal husbandry, unimproved roads, power line easements, off-road vehicle (ORV) activity, storage, and debris piles. An unimproved road begins at the eastern terminus of Daniel Road and exits at the southeastern corner of the site near the Evans Road and Ascot Way intersection. Krubsack Road (unimproved) trends north to south through previously cultivated agricultural fields within the roughly west-central portion of the property and connects with Wickerd Road to the south and Daniel Road to the north.

1.4.3) Water Resources

A shallow feature and USGS mapped blueline stream are present trending from the southwest to roughly the northwest portion of the site. Much of this area has been impacted by agricultural activities and the spread of invasive non-native annuals, but several wetland woody riparian species are present in association with this feature on the site and in areas immediately adjacent to the site.

Another blueline stream is mapped approximately one half-mile west of the project area near Murrieta Road and one more blueline stream is mapped approximately 150 meters to the southeast.

2.0) CULTURAL SETTING

2.1) Prehistoric Setting

The following section provides a brief discussion of the prehistoric setting for the Project area that borrows heavily from the general frameworks proffered by Goldberg et al. (2001) for Diamond Valley Reservoir, O'Connell et al. (1974) for Perris Valley Reservoir, Grenda (1997) for Lake Elsinore, and Warren (1984) for the greater southern California desert region. Additional information related to the prehistory of southern California can be found in ethnographic studies, mission records, and major published sources including Kroeber (1925), Strong (1929), Heizer (1978), Moratto (1984), Chartkoff and Chartkoff (1984), Warren and Crabtree (1986), Raab and Jones (2004), Jones and Klar (2007), Arnold and Walsh (2010), and Sutton (2015).

The prehistoric framework proposed by Goldberg et al. (2001) consists of seven (7) distinct periods: Paleoindian; Early, Middle, and Late Archaic; Saratoga Springs; Late Prehistoric; and Protohistoric. A reassessment of the sequence has taken into consideration the antiquity and distribution of late-period projectile point styles in cismontane southern California and neighboring desert regions (e.g., Cottonwood Triangular and Desert Side-notched), dynamic changes in regional social networks during the Medieval Warm Interval (e.g., Eddy 2013), and changes in prehistoric settlement activity during the Archaic to Late Prehistoric transition in central western Riverside County (Eddy et al. 2013). The revised cultural sequence replaces Paleoindian, a term first used by Roberts (1940) and popularized by Moratto (1984), with Paleoarchaic after Beck and Jones (1997), Jennings (1957, 1964), Willig (1988), and Davis et al. (2012). Furthermore, it identifies the Saratoga Springs Period, adopted from Warren's (1984) Mojave Desert sequence, as a potential Occupational Hiatus (ca. 1,500 to 1,200 BP) in the inland valleys and proposes an earlier date of 1,200 BP for the Late Prehistoric period. The revised sequence further differentiates the Late Prehistoric Period into Medieval Warm and Post-Medieval Warm Intervals with three (3) distinct phases (Phase I [1,200 to 750 BP]; Phase II [750 to 575 BP]; and Phase III [575 to 410 BP]).

2.1.1) Paleoarchaic Period (~12,000 to 9,500 BP)

The earliest period of human occupation in southern California dates to the late Pleistocene-Holocene transition in coastal and desert settings. This is often referred to as the Paleoindian Period (e.g., Roberts 1940; Moratto 1984) and is commonly applied to the earliest cultures across North America. This period is also referred to as Period I: Hunting (Wallace 1978), Paleocoastal (Braje et al. 2013), San Dieguito (Warren 1968, 1984, Sutton and Gardner 2010),

Lake Mojave (Campbell et al. 1937; Warren and Crabtree 1986), and the Western Pluvial Lakes Tradition (Cressman 1940a, 1940b, 1942, 1986; Bedwell 1970, 1973).

Others (e.g., Beck and Jones 1997; Davis et al. 2012) argue the existence of a Paleoarchaic tradition accounts for the stemmed and nonfluted projectile point culture(s) of the Far West and distinguish it from the Paleoindian tradition, which they equate with fluted point cultures, most notably Clovis. Davis et al. (2012:53) identify significant differences in the organization of Paleoarchaic and Paleoindian lithic technologies that challenge the idea of a clear evolution from fluted to nonfluted lithic reduction technologies, as implied within the Clovis first model.

Paleoarchaic sites may be associated with the remains of extinct megafauna. The period is also distinguished by a distinct lithic tool assemblage composed of percussion-flaked scrapers and knives and large, well-made, fluted, leaf-shaped, or stemmed projectile points (e.g., Lake Mojave, Silver Lake) as well as crescentics, heavy core/cobble tools, hammerstones, bifacial cores, choppers, and scraper planes. Both Warren (1984) and Wallace (1978:27) suggest that the absence of milling tools commonly used to process seeds and other plant materials indicates big game subsistence focus. The early occupants of southern California's deserts were most likely nomadic large-game hunters, while those occupying the coastline and islands were entrenched within a maritime economy that included large mammal, fish, and shellfish.

Pleistocene megafauna perished abruptly between 13,000 and 10,000 BP as the climate warmed and became more arid. Human populations responded to the changing environmental conditions by diversifying their subsistence base to include a variety of faunal and floral resources (Warren 1984).

2.1.2) Early Archaic Period (9,500 to 7,000 BP)

The Early Archaic Period represents the earliest accepted evidence of human occupation in the vicinity of the Project area. Archaeological remains associated with this period are often associated with and characterized by an abundance of metates and manos and a paucity of projectile points and faunal remains, suggesting a transition in subsistence focus from large game hunting to plant resource procurement. Evidence of this transition, which Wallace (1955) subsumed under "Period II: Food Collecting," was noted along southern California's coastline at approximately 8,500 BP and associated with the Encinitas Tradition (Warren 1968; Sutton and Gardner 2010), with a slightly earlier date of 9,000 BP proposed for central and northern California (Fitzgerald and Jones 1999:86). In southern California's inland valleys, the appearance of metates and manos date to as early as 9,400 BP (Horne and McDougall 2008).

The Encinitas Tradition, which Sutton and Gardner (2010) divide into inland and coastal manifestations and four (4) distinct cultural patterns (Topanga and La Jolla along the coast; Pauma and Greven Knoll for inland areas) is characterized by a rather generic and flexible subsistence strategy (e.g., Hale 2001:165) employed by small groups of highly mobile hunter-gatherers with a heavy reliance upon plant resources (Sutton and Gardner 2010:5). Material culture attributes of the Encinitas Tradition, as originally defined by Warren (1968), include abundant metates and manos, crude core and flake tools, shell ornaments, bone tools, and a paucity of projectile points.

Few archaeological sites date to the Early Archaic in Riverside County. The majority of these contain scant evidence of Early Archaic, mostly dated off obsidian hydration rind measurements, suggesting ephemeral site use by small, highly mobile groups. This seems to support the idea that ephemeral use of the inland valleys during the Paleoindian period continued into the Early Archaic. However, at least two (2) sites (CA-RIV-5786 and -6069) contain evidence of semi-sedentary residential occupations where site reuse was anticipated, suggesting a predictable availability of water and other critical resources (Goldberg et al. 2001). These sites are found invariably near large, drought-resistant, inland water sources, and may have been destination points on a scheduled, seasonal round.

2.1.3) Middle Archaic Period (7,000 to 4,000 BP)

Settlement activities intensified in the inland areas of cismontane southern California during the Middle Archaic Period as conditions in the interior deserts deteriorated (Goldberg et al. 2001). Paleoecological and paleohydrological evidence suggests maximum aridity in the desert regions between approximately 7,000 and 5,000 B.P., with amelioration returning at approximately 5,500 B.P. and continuing through 4,000 B.P. (Spaulding 1991, 1995). The Pinto Period (ca. 7,000 to 4,000 or 3,500 B.P), which succeeded the Lake Mojave Period in the Mojave Desert, represents an adaptive response to changing climatic conditions evident in prehistoric subsistence practices, placing higher emphasis on the exploitation of plants and small animals than the preceding period, although hunting of large game animals continued with similar intensity (Warren 1984).

Sutton and Gardner's (2011) Greven Knoll I complex for the San Bernardino Mountains and inland valleys, while problematic for its lack of consistency, does identify Pinto material traits among Greven Knoll sites. These traits led Kowta (1969:39) and later Sutton and Gardner (2010:26) to suggest the San Bernardino Mountains and inland valleys were influenced by Pinto groups occupying the Mojave Desert to the north.

Archaeological investigations in Diamond Valley identified at least 19 archaeological components associated with the Middle Archaic Period. Several intensively used residential bases and/or temporary camps containing abundant cultural debris, including temporally diagnostic artifacts (Pinto and Silver Lake projectile points, crescents), at least nine (9) complex lithic scatters likely representing resource extraction and processing sites, and one (1) human burial covered with large rocks and ground stone artifacts, were recorded. In addition, evidence of ephemeral Middle Archaic use is present at several sites in the form of isolated radiocarbon-dated features and/or sparse scatters of obsidian debitage dated by obsidian hydration methods. More intensively used residential components occur along alluvial fan margins, while less intensively used areas are situated on arroyo bottoms or upland benches (Goldberg et al. 2001).

CA-RIV-5045, also known as the Diamond Valley Pinto Site, evinces purely Pinto and Lake Mojave materials in well-stratified, radiometrically defined cultural deposits. In addition to the numerous Pinto-style projectile points recovered, deposits contained abundant and diverse faunal assemblages, an extensive array of flaked stone tools and ground stone implements, and intact cultural features assignable to specific periods of occupation. Radiometric data, feature types, and artifact/ecofact assemblage characteristics indicate that CA-RIV-5045 was occupied most intensively between 6,200 and 5,600 B.P., when it is believed to have functioned as a wintertime residential base (McDougall 2001).

The density of Middle Archaic Period sites in Diamond Valley compared to the previous period suggests land-use and settlement activities intensified (Goldberg et al. 2001). Similar evidence of intensification was observed by Grenda (1997) at the Lake Elsinore site (CA-RIV-2798/H) sometime after 4,800 B.P. The distribution and variety of sites (i.e., residential bases, temporary camps, and a variety of ephemeral resource extraction and processing sites) suggest that Middle Archaic inhabitants of the inland valleys likely conformed to a rest-rotation collecting strategy that included warm-season residential movements through a series of resource procurement camps (otherwise known as the seasonal round), followed by longer-term residential settlements during the midwinter ebb (Goldberg and Horne 2001). A key feature of rest-rotation collecting is reliance on stored foods during the interval of winter sedentary occupation. Logistic mobility, or the collection and transport of critical resources to the home residential base, also played an important role in resource procurement, especially during the winter when stored foods were likely consumed.

2.1.4) Late Archaic Period (4,000 to 1,500 BP)

Analysis of Late Archaic sites in nearby Diamond Valley suggests groups shifted to a semisedentary land-use and collection strategy. The profusion of features especially refuse deposits in Late Archaic components suggests that seasonal encampments saw longer use and more frequent reuse than during the latter part of the Middle Archaic Period, with increasing moisture improving the conditions of southern California after ca. 3,100 B.P. (Horne 2001a). Drying and warming after ca. 2,100 B.P. likely exacted a toll on expanding populations, influencing changes in resource procurement strategies, promoting economic diversification and resource intensification, and perhaps resulting in a permanent shift toward greater sedentism (Goldberg 2001).

The Late Archaic artifact assemblage shared many technological similarities with the assemblages of the preceding Middle Archaic. New tools were added either as innovations or as "borrowed" cultural items. Influence from the Colorado Desert was apparent in the appearance of Obsidian Butte obsidian at Late Archaic assemblages in Diamond Valley (Robinson 2001a:413). The influence of desert culture that was apparent during the Middle and early part of the Late Archaic period, as evinced by the presence of Pinto and Elko-style dart points, waned toward the end of the Late Archaic, and later, Phase I of the Late Prehistoric Period. For instance, the Rose Spring projectile point style, prevalent in the Mojave Desert north and west of the Mojave River, was not found in association with Late Archaic or Phase I Late Prehistoric Period sites in Diamond Valley (Horne 2001b:144; Robinson 2001b:55). In fact, Rose Spring-style points are rare throughout the inland valleys. Further, the Late Archaic/Late Prehistoric transition was also marked by a decrease in use of Coso Obsidian (Horne 2001b:132; Robinson 2001a:422), suggesting access to Mojave Desert resources was restricted, perhaps resulting from the growth of competing social networks (e.g., the stone bead interdependence network [Eddy 2013]).

2.1.5) Late Archaic/Late Prehistoric Transition (1,500 to 1,200 BP)

Chronometric data from archaeological sites in Diamond Valley include a 450-year gap in the human occupation record. Similar gaps were noted at Perris Reservoir (O'Connell et al. 1974) and Lake Elsinore (Grenda 1997), suggesting a potential occupational hiatus of the inland valleys between the end of the Late Archaic (1,500 B.P.) and advent of the Medieval Warm Interval (1,200 B.P.) A similar occupational hiatus between 1,350 and 1,150 BP is noted in chronometric data from residential sites in Coachella Valley. The evidence suggests the inland

valleys and lower desert witnessed a period of sporadic non-intensive use as these once viable areas were abandoned for other locations with greater availability and predictability of natural resources and water.

Late Archaic populations occupying canyons and desert oases of the northwestern Colorado Desert, as well as the Diamond, San Jacinto, and Moreno valleys, could have migrated into the Peninsular Ranges (e.g., Santa Rosa and San Jacinto mountains; Wilke 1978) or north into the Transverse Ranges and Mojave Desert. Movement southeast into the lower Colorado River is not likely due to the absence of Patayan I ceramics, produced as early as 1,250 BP in the lower Colorado River area (Schroeder 1952; Waters 1982:281), from Coachella Valley deposits radiocarbon dated as early as 1,100 BP. Patayan ceramics (i.e., evidence of interaction with the lower Colorado River), did not arrive in the Coachella Valley or the Peninsular Ranges until 950 BP (Dahdul et al. 2011:98; May 1978:4; Pallette and Schafer 1994:7; Schaefer 1994a:5).

While inland valley and lower desert areas were apparently vacated, populations were aggregating near predictable and reliable sources of water in other areas of southern California. In the Mojave Desert and southwestern Great Basin, population aggregation coincides with the early part of the Saratoga Springs Period (Wallace and Taylor 1959; Wallace 1977, Warren 1984; Warren and Crabtree 1986) associated with Rosegate-series and Eastgate-series projectile point styles, as well as morphologically distinct large triangular projectile points, later classified as Saratoga Springs points (Wallace 1988). These points may represent the advent of the bow and arrow weapons system, which was used alongside the former atlatl weapons system for some time. Others working in the Mojave Desert (e.g., Gardner 2002, 2006; Sutton 1996; Sutton et al. 2007; Sutton and Jackson 1993) refer to this period as Rose Spring and place the start date as far back as 1,800 B.P.

A shift toward sedentism during the Saratoga Springs/Rose Springs Period led to the development of extensive residential occupations established near springs, creeks, and lakeshores (Sutton 1996). In some instances, these occupations were equipped with permanent living structures (Sutton 1990, 1991). Between 1,500 and 1,100 B.P., large village sites with well-developed midden deposits appeared in the Antelope Valley (Sutton 1981), at the Bickel Site north of Antelope Valley (McGuire et al. 1981), Rustler Rockshelter in the Mojave national preserve (Davis 1962; Sutton 2005), and possibly at the Saratoga Springs site in Death Valley (Wallace and Taylor 1959). In the northwestern Colorado Desert, a Late Archaic Period occupation near Seven Palms (CA-RIV-2642; Dahdul et al. 2011) and another below the high shoreline of Lake Cahuilla (CA-RIV-6797; Brock 2002) persisted until approximately 1,350 B.P., when the area was apparently abandoned.

Adaptive responses to changing environmental conditions associated with the Medieval Warm Interval and the diversion of the Colorado River back into the Salton Trough led to repopulation and intensive occupation of the northwestern Colorado Desert. Coinciding with this settlement shift in the desert, populations reoccupied the inland valleys around 1,200 B.P.

2.1.6) Late Prehistoric Period (1,200 to 410 BP)

The initial date of the Late Prehistoric Period in southern California is a topic of some debate. It is commonly associated with the appearance of a unique suite of artifacts that include Cottonwood Triangular and Desert Side-notched (DSN) projectile points and ceramics dated to approximately 800 BP (Warren 1984:424; Goldberg et al. 2001). Others (Dahdul et al. 2011; Wallace 1955; Warren 1968) push the advent of the Late Prehistoric Period as far back as 1,500 B.P., coeval with the Saratoga Springs/Rose Springs Period in the Mojave Desert. We suggest a more satisfactory date of 1,200 BP, coinciding with the re-intensification of land-use in inland valleys following a potential 300-year occupational hiatus.

The Late Prehistoric Period may be divided into three (3) distinct phases spanning the time before and during the Medieval Warm Interval – Phase I: 1,200 to 750 BP, Phase II: 750 to 550 BP, and Phase III: 550 to 410 BP.

Phase I of the Late Prehistoric Period (1,200 B.P. to 1,050 B.P.) is associated with the reoccupation of the inland valleys and northwestern Colorado Desert prior to the onset of the Medieval Warm Interval and the aggregation of populations near reliable water sources during the climatic interval, a pattern that peaked during Phase II (750 and 550 BP). Phase III follows the end of the Medieval Warm Interval and is characterized by the transition toward fewer more permanent residential sites (see Horne 2001a) that continued into and after the arrival of Europeans, which marks the beginning of the Protohistoric Period (i.e., 410 BP).

Characteristic artifacts of the Late Prehistoric Period, in general, include large triangular projectile points, sometimes referred to as Saratoga Springs points or perhaps more appropriately ancestral Cottonwoods, that transition into standard Cottonwood points, higher frequencies of ground stone (e.g., unshaped handstones, mortars, and pestles), incised stones, and shell beads. Brownware ceramics, Lower Colorado Buffware ceramics, and Desert Side-notched points do not typically occur until the Protohistoric. During this time, access to Coso obsidian was restricted to the northern Mojave Desert, possibly associated with the Numic Spread (Bettinger and Baumhoff 1982; Lamb 1958; Sutton 1994) resulting in increased use of cryptocrystalline silicates to the south and east. In the inland valleys, locally available lithic

materials (e.g., quartz, Bedford Canyon metavolcanics) were supplemented by obsidian obtained from the Obsidian Butte source in Imperial County near the southern end of Salton Sea.

2.1.7) Protohistoric Period (410 to 150 BP)

The Protohistoric Period marks the arrival of the Spanish in Alta California and the impact of European influence on native populations. Although the Spanish did not formally enter the Project area until centuries later, Native Americans in the area were aware of Europeans and even acquired some European goods through trade networks well before European colonization began. Such influences may be found when European and Mexican-made materials are encountered in Protohistoric archaeological deposits. Such discoveries may contribute to analyses of trade networks, political relationships between groups, and shifts in emphasis on subsistence resources.

The Protohistoric Period witnessed an increase in usage of obsidian from the Obsidian Butte source near the southern end of Salton Sea, which was exposed between high stand intervals of Lake Cahuilla sometime between 350 and 300 B.P. and again between 250 to 150 B.P. Furthermore, Desert Side-notched points spread further inland where they are often found in Protohistoric archaeological deposits along with the more common Cottonwood Triangular points. Late in the period, European trade goods (i.e., glass trade beads) were added to the cultural assemblages (Meighan 1954).

Climatic conditions of the Little Ice Age, beginning in Phase III of the Late Prehistoric Period, continued into the Protohistoric Period and supported development of various productive plant communities and ecotones to sustain local populations almost year-round. The use of plant food increased, as did the intensity of the processing effort. Faunal data from this period demonstrates a decrease in faunal diversity, signifying both a reduction in diet breadth and greater dependency on specific animals, namely lagomorphs (McKim 2001).

Lower temperatures during the Little Ice Age coupled with inadequate sources of fuel wood suggest procurement of fuel may have become an increasingly important element of logistical provisioning. Toolstone distribution patterns indicate that local materials, such as Bedford Canyon metavolcanics and quartz vein deposits, were supplemented by desert materials (obsidian and chert), which gained prominence during this period while other relatively closer sources of exotic raw materials from the west (basalt, andesite, rhyolite, metavolcanic rock, and

Piedra de Lumbre "chert") were little used, suggesting that territorial boundaries, at least to the west, had become established.

Hunting efficiency increased through use of bow and arrow and widespread exploitation of hard nuts and berries, as well as the re-intensification of acorn use (indicated by the abundance of mortars and pestles in Diamond Valley assemblages), provided reliable and storable food resources. Village sites dating to the Protohistoric Period in Diamond Valley contained deeper refuse-laden midden deposits, suggesting permanent habitation. Settlement became almost completely sedentary, with many small residential sites within larger village territories that included resource gathering and processing areas. These would have been the villages and rancherias noted by early non-native explorers of the region (True 1966, 1970).

Land-use intensification strategies during the Protohistoric Period mirror changes at the end of the Late Archaic Period, when climatic degradation inducing resource stress on local populations may have triggered a shift from rest-rotation collecting to a semisedentary settlement strategy. If the environment during the Protohistoric Period was just as productive as Phase III of the Late Prehistoric Period, what other factors would account for the development of more intensive land-use strategies during the Protohistoric? It has been suggested that the shift to a fully sedentary settlement strategy during the Protohistoric was not a response to environmental degradation, but rather, resource stress resulting from a population increase that started in Phase III of the Late Prehistoric Period (Goldberg 2001).

Increased population in the inland valleys may have led to competition for food, water, and other natural resources (fuel). Resource stress could not be alleviated through territorial expansion and/or resource niche-width expansion as it was during the Late Archaic and Phase I and II of the Late Prehistoric. Increasing territorial circumscription would require longer occupation of residential bases, reducing logistical movements between seasonal bases. Rather, occupation of permanent villages and increasing population likely led to territoriality over critical resources, precluding opportunities for territorial expansion and/or leading to confrontations and all-out inter-village conflict. An increase in the frequency of projectile points and the strategic placement of residential sites on elevated bedrock surfaces overlooking the floor of Diamond Valley lends some support to this theory (Goldberg et al. 2001). Alternatively, trade and ceremonial gatherings with other groups may have helped maintain social relationships, ensured food resources during stressful times, and sustained populations.

The Hakataya influence in coastal and inland Southern California regions appears to have diminished during the late Protohistoric Period, when extensive trade networks along the

Mojave River and in Antelope Valley apparently broke down and large village sites were abandoned (Warren 1984:427). Warren (1984:428) suggests that disruption in trade networks may have resulted from the movement of the Colorado River basin Chemehuevi populations southward across the trade routes.

2.2) Ethnographic Setting

Western academics have associated Menifee with Luiseño (Drucker 1937; Heizer and Whipple 1971; Kroeber 1925; Pechanga 2011; Smith and Freers 1994) and Cahuilla (Bean 1978) traditional use areas. Both tribes spoke a Cupan language in the Takic family and shared some cultural similarities. Territorial boundaries among these groups may have been fluid and likely changed overtime (e.g., according to Strong 1929, the Cahuilla occupied area north of San Jacinto River during the Mexican Period).

The depth and breadth of ethnohistoric and ethnographic data available varies among the tribes with some tribe's history more thoroughly documented then others. In some cases, information may not have been shared with outsiders but was retained among the group through oral history, ceremonies, ritual, and song. With respect to the traditional Native American knowledge retained and recovered by local tribes, we present the following ethnographic summary based on data collected and documented by western academics. It includes sections for the Cahuilla, and Luiseño, presented in alphabetical order, and focuses on general ethnographic data, including settlement structure, subsistence, and material culture that inform on the type of Native American cultural resources that may be encountered within the Project area.

2.2.1) Cahuilla

The ethnohistory of the Cahuilla Indians is documented in academic studies, mission records, and major published sources including Kroeber (1908, 1925), Hooper (1920), Strong (1929), Bean (1972, 1978), Heizer (1978) and Bean et al. (1991). The San Gorgonio Pass, Coachella Valley, and Santa Rosa and San Jacinto Mountains were occupied by the Cahuilla people at the time of Spanish arrival in 1769. By the early 1800s, the Cahuilla had expanded into northern Riverside County (Strong 1929). The Cahuilla were organized into at least 12 differed patrilineal clans, which owned large spans of territory that included multiple ecological zones at high and low elevations. This allowed the Cahuilla people to exploit a wide range of plant and animal resources in different seasons (Bean 1972). Cahuilla groups are often distinguished by the topographic region (i.e., desert, mountain, and pass) in which they established permanent settlements (Bean 1972).

Desert Cahuilla settlements congregated around the shoreline of ancient Lake Cahuilla as well as near the mouth of canyons and valleys in areas that could supply many of their food resources within a 5-mile area (Bean 1972:73-74). As the lake receded, the Cahuilla moved their villages and adapted their subsistence practices (Wilke 1976). Pass Cahuilla also established settlements in or near the mouth of canyons and valleys in areas. Mountain Cahuilla occupied settlements between 3,000 and 5,000 feet in the San Jacinto and Santa Rosa Mountains.

Cahuilla clans operated within a hierarchical politico-religious structure, each with one or more ceremonial units that served as a "symbolic representation of the sociopolitical reality of the group" (Bean et al. 1991:5). These groups were part of a ritual congregation connecting autonomous groups to the broader socio-political, religious, and economic networks.

The Cahuilla were hunter-gatherers for the most part and may have incorporated agriculture into their subsistence foci prior to European contact. Among the animals the Cahuilla hunted were Pronghorn sheep, mule deer, rabbits, squirrels, chipmunks, desert tortoise, rats and mice. The Cahuilla often organized communal rabbit hunts prior to ceremonial gatherings to provide food for guests and participants. When available, the Cahuilla also hunted fish and birds along the shoreline of ancient Lake Cahuilla.

Cahuilla material culture included an array of utilitarian and ceremonial objects. Cahuilla were well known for their woven baskets. They were also expert potters and used ceramics to craft many different items for storage, cooking, and other uses. Stone and wood implements were integral to daily Cahuilla life. Wooden mortars and pestles were used to process mesquite beans and other seeds and plant materials as were stone manos and pestles used with stone mortars, metates and bedrock slicks. Cryptocrystalline and microcrystalline silicates, metavolcanics, and obsidian, among other stone materials, were worked into knives, blades, scrappers, and projectile points to tip wood arrows. Wood was utilized for bow construction, pestles and mortars, arrow shafts, throwing sticks, digging sticks, and flutes. The Cahuilla also utilized various parts of animals (e.g., bone and tendons) and plants (e.g., mescal fiber sandals) in everyday life. Ceremonial objects included shell beads, feathers, gourd rattles, crystals, wands, and various items that made up the ceremonial bundle.

2.2.2) Luiseno

The term Luiseño originated as a description of the native peoples associated with Mission San Luis Rey near Oceanside who shared a similar language, culture, and religious worldview. The

Luiseño refer to themselves as *Payómkawichum*, meaning people of the west (R. Basquez, personal communication April 1, 2014) derived from the word *Payómkawic* (i.e., westerner after Harrington 1933:103). They were distinguished by name from their neighbors west of the Santa Ana Mountains who were brought under the influence of Mission San Juan Capistrano (i.e., Juaneños or Acjachemen; cf. Harrington's [1933:113] *'Axátcmeyam*) but shared closely related dialects, culture, and religious customs (Harrington 1933), leading others (e.g., White 1963:91; Bean and Shipek 1978:550) to argue that the *Payómkawichum* and *'Axátcmeyam* represented one ethnic nationality. As succinctly stated in recent ethnographic work among the Luiseño, the "anthropological characterization of Luiseño history and geography…differs considerably from the Luiseño's own understanding of their origins as explained by the Luiseño Origin Story, or story of creation" (Curti 2013:19).

The Luiseño were a patrilineal society, meaning property, rights, and leadership positions were inherited through the father. The Luiseño also practiced a form of patrilocality, in which related males lived in clusters within a village, while females were either married in or married out of the family. The Luiseño did not maintain moieties, at least not the Coyote and Wildcat moieties common among neighboring groups like the Cahuilla and Serrano, although White (1963) suggested that a type of ceremonial moiety system was in place prior to Spanish arrival.

Luiseño territory was divided into a system of village complexes, village territories, and villages. The village complex, which was like a city, contained multiple villages or neighborhoods, each with their own village territory. The Pechanga Tribe has identified several large village complexes in neighboring areas, including *$óovamay* centered in Diamond and Domenigoni valleys, *Qaxáalku* southeast of Lake Matthews, *Paxávxa* in Temescal Canyon, *Páayaxchi* at Lake Elsinore, and *Téemeku* in Temecula (Pechanga 2008).

Areas within a village territory were connected by trails and pathways, all of which communicated information, both public and private, to the Luiseño. A similar system of trails connected village territories and village complexes to one another and emphasized important concepts of community and commonwealth. Oxendine (1983:45, 177), White (1963:116, 134), and others (e.g., Bean and Vane 2001; Sparkman 1908a; and True et al. 1974) recognized the existence of Luiseño settlement land-use patterns within historic village territories; future archaeological research in the Project region may determine just how far back these patterns can be traced into prehistory.

The Luiseño, were, for the most part, hunters, collectors, and harvesters who utilized available resources within their village territories while also maintaining usufruct rights to gather from

other village territories. Most food resources were gathered within proximity to the village, but during certain seasons the family group would move to the coast for marine resources or into the mountains for acorns and deer. This allowed the Luiseño to obtain resources from a variety of ecological zones, which supplied food in all seasons. Environmental niches of particular importance within the Project area would have included Riversidian sage scrub and riparian plant communities.

The Luiseño hunted small and large game, including various hare and rabbit, woodrat, mice, ground squirrels, quail, doves, ducks, and other birds, and both antelope and deer. Tree squirrels, most reptiles, and predators such as coyotes, mountain lions, and bobcats, were avoided as food resources, except possibly during lean times. Insects were also available as food resources. Luiseño hunting technology employed for small and large game included throwing sticks; the bow and arrow, typically with a wood or bone point (White 1963:127); snares; traps; slings; decoys; disguises; and hunting blinds. Fire also assisted in communal rabbit drives. Many villages also had access to creeks and rivers, and nets, traps, spears, hooks and lines, and poisons were used to catch fish.

As in most of California, acorns were a major staple, but the roots, leaves, seeds, and fruit of many other plants also were used. Roots and shoots of various types were gathered from marshes and wetlands. Seeds from various grasses and scrub plants such as buckwheat also played an important role in the aboriginal diet and were available for harvest from summer through fall. Certain mushrooms and tree fungi supplemented the diet and were considered delicacies. Teas were made from a variety of floral resources and were used for medicinal cures as well as for beverages. Tobacco and datura were sacred plants used for rituals and medicine.

Plant and animal processing activities required portable and/or stationary ground stone tools. BRMs were fixed locations on the landscape utilized in communal, family, and private resource processing settings. They were most populated with slicks, but also contained basin metates and mortars that were worked into the outcrop surface or placed within natural depressions. BRMs were used in tandem with manos and pestles. Portable ground stone tools are sometimes found in association with BRMs, but are more commonly associated with village sites, other habitation sites, and resource processing locations that did not contain bedrock outcrops (i.e., complex lithic scatters).

Most Luiseño houses were conical and partially subterranean; however, during the nineteenth century some had rectangular houses. The dwellings were made of locally available material,

such as reeds, brush, or bark. Occupants entered using a door at the side of the shelter, which was sometimes accessed through a short tunnel. Smoke from a central fireplace rose through a hole in the center of the roof. Domestic chores, such as cooking, eating, and social interaction, often occurred under a brush-covered ramada that stood near the house. Earth-covered sweat houses for purification and curing rituals, ceremonial houses with fenced areas, and granaries for food storage were found in most villages (Bean and Shipek 1978:553; Bean and Vane 2001:VI.D-5).

2.3) Historic Setting

2.3.1) Historic Aspects of the Menifee Valley

By 1850 the Spaniard and Mexican presence displaced the economies of the local Indian populations; tribal members were confined to smaller and smaller "territories" and finally decimated by alien diseases. Chartkoff and Chartkoff (1984) also state that by the end of the Hispanic Stage (1769-1822) the hardships of "missionization" almost destroyed the traditional cultures of coastal Indians in Southern California. Similarly, missionization also devastated the traditional culture of inland Indians. The cultural distortion of tribal groups from their pre-contact condition, even during the early Mission Period, was severe.

Initial contacts with Southern California tribes took place in the mid-1700s, but the timing of group-to-group contact varied by more than 300 years (Chartkoff and Chartkoff 1984). The year 1769 marks the beginning of permanent European settlement in California. As a result of the contact with and the exploitation of conquering governments, aboriginal groups of Southern California suffered a 95% reduction in population from 1769 to 1900. This process, however purposeful, allowed for easy access to resources by immigrant populations from Spain, Mexico, and eastern North America.

The Spanish Mission Period ended around 1821 with the formation of Mexico. The period that followed was one of large land grants to soldiers and Mexican citizens. In the San Jacinto Valley, prior to American control of California, a wealthy Mexican landowner, Don Jose Antonio Estudillo, held most of the area around Hemet. In 1842 Estudillo was granted the Rancho San Jacinto Viejo, a 35,000-acre parcel, by Mexican Governor Juan B. Alvarado. The tract included an area encompassing the towns of Hemet, San Jacinto, Valle Vista (Florida), and Winchester (Pleasant Valley) and was used to graze cattle (Whitney 1982). After a son of Estudillo inherited the rancho the division and sale of the rancho to immigrant American pioneers began.

According to Love et al. (2000), the Menifee Valley was sparsely colonized or affected by the Spaniards and Mexican governments prior to the annexation of California by the United States in 1846. The region was under nominal control of the Mission San Luis Rey after 1798, but was considered under-productive land, possibly due to distance and the lack of permanent streams. After secularization in 1830 the Mexican government issued several large land grants in the area, including the Rancho San Jacinto Viejo and the Rancho San Jacinto Nuevo y Potrero. The Menifee Valley was not included in any of these grants. Therefore, the study area was considered public land when California became a state.

In 1880, Luther Menifee Wilson located gold roughly eight miles south of the community of Perris, in Sections 4 and 5, T6S, R3W (Pardon 2010), known as the Menifee Quartz Lode. Many claims and mines were established in the region and lasted until 1917. The Menifee mining district was organized. When the area became part of Riverside County in 1893 the Menifee School District was organized. According to Gunther (1984), the Menifee School may have been the fine schoolhouse located at the intersection of Newport and Bradley Roads.

In 1876 the Southern Pacific railroad provided the area a connection to bigger cities. The railroad helped make the area attractive to farmers. Farms in California are generally owned and managed by commercial enterprises due to the costs of land, irrigation, and reclamation (Pardon 2010). Farms are generally large operations rather than family owned and operated. This holds true for the Menifee valley. William Newport started farming in the region in 1885 with 2,000 acres. In 1906 he was farming 15,000 acres and employed many of the men in the area.

Other early names in the Valley were Andrew Kittilson, coming to the area in 1882, William Brown from Illinois, Robert Kirkpatrick and sons, William Holland, Henry Evans, Joseph Drake, Samuel and Alice Wickerd Walker, Alden Drake, Richard Harrison, and Benjamin Kohlmier. Many of these names are commemorated in street names and descendants still live in the area (Pardon 2010).

2.3.2) The City of Menifee

Initially this area was part of San Diego County, up until 1893 when Riverside County was formed from parts of San Diego and San Bernardino Counties. According to the 1893-1894 *History and Directory of Riverside County* by A. A. Byson and Son, in 1893 Menifee was a . . .

…post office in the center of a very large hay and grain growing community. The residents trade chiefly at Perris. There is a fine large school here, and the farm of Mr. Newport deserves

mention as one of the largest and best managed in the state. Honey and fruit are raised here also. The Southern Methodists have a church and organization, Reverend A. Adkisson, pastor.

According to the *Directory* there was one (1) machinist, one (1) pastor, 27 farmers, three (3) beekeepers, one (1) laborer, Mr. Newport's foreman and farm hands, and one (1) postmistress. These are all listed by name in Part II of the directory. Only two (2) of the listed persons are women.

Menifee did not become a city until October of 2008. Prior to that the area was primarily farmland, but with the housing developments everything changed.

3.0) REGULATORY SETTING AND METHODS

3.1) Regulatory Setting

Government agencies, including federal, state, and local agencies, have developed laws and regulations designed to protect significant cultural resources that may be affected by projects regulated, funded, or undertaken by an agency. Under CEQA, public agencies must consider the effects of their actions on both historical resources and unique archaeological resources. Pursuant to Public Resources Code (PRC) Section 21084.1, a project that may cause a substantial adverse change in the significance of an historical resource is a project that may have a significant effect on the environment. Section 21083.2 requires agencies to determine whether proposed projects would have effects on unique archaeological resources.

Historical resource is a term with a defined statutory meaning (see PRC, Section 21084.1 and CEQA Guidelines, Section 15064.5(a) and (b)). The term embraces any resource listed in or determined to be eligible for the California Register of Historical Resources (CRHR). The CRHR includes resources listed in or formally determined eligible for listing in the National Register of Historic Places (NRHP), as well as some California Historical Landmarks (CHLs) and California Points of Historical Interest (CPHIs).

Properties of local significance that have been designated under a local preservation ordinance (local landmarks or landmark districts) or that have been identified in a local historical resources inventory may be eligible for listing in the CRHR and are presumed to be historical resources for purposes of CEQA unless a preponderance of evidence indicates otherwise (PRC, Section 5024.1 and California Code of Regulations, Title 14, Section 4850). Unless a resource listed in a survey has been demolished, lost substantial integrity, or there is a preponderance of evidence indicating that it is otherwise not eligible for listing, a Lead Agency should consider the resource to be potentially eligible for the CRHR.

In addition to assessing whether historical resources potentially impacted by a proposed project are listed or have been identified in a survey process, Lead Agencies have a responsibility to evaluate them against the CRHR criteria prior to making a finding as to a proposed project's impacts to historical resources (PRC, Section 21084.1 and CEQA Guidelines, Section 15064(a)(3)). The following criteria were used to evaluate the significance of potential impacts to cultural resources for the proposed Project. An impact would be considered significant if the proposed Project affects the qualities that render a resource eligible for listing in the NRHP or the CRHR.

3.1.1) State Significance Criteria

Given that the CRHR was modeled after the NRHP, it has very similar eligibility criteria. Generally, to be considered significant under CEQA, a resource must possess integrity and demonstrate eligibility under at least one (1) of the following criteria (California Code of Regulations 15064.5):

Is associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage;

Is associated with the lives of persons important in our past;

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; or

Has yielded, or has the potential to yield, information important to the prehistory or history of the local area, California, or the nation.

In addition to meeting one (1) of the significance criteria listed above, a resource must also demonstrate a sufficient degree of integrity so that it is capable of conveying such significance (Hardesty and Little 2000). The seven (7) elements of integrity, identified by the NRHP and commonly applied to CRHR evaluations, include location, design, setting, materials, workmanship, feeling, and association (NPS 1991).

As noted above, CEQA also requires Lead Agencies to consider whether projects will impact unique archaeological resources. PRC Section 21083.2(g) states that a unique archaeological resource is an archaeological artifact, object, or site about which it can be clearly demonstrated that, without merely adding to the current body of knowledge, there is a high probability that it meets any of the following criteria:

Contains information needed to answer important scientific research questions and that there is a demonstrable public interest in that information;

Has a special and particular quality such as being the oldest of its type or the best available example of its type; or

Is directly associated with a scientifically recognized important prehistoric or historic event or person.

Treatment options under Section 21083.2 include activities that preserve such resources in place and in an undisturbed state. Other acceptable methods of mitigation under Section 21083.2 include excavation and curation, or study in place without excavation and curation (if the study finds that the artifacts would not meet one [1] or more of the criteria for defining a unique archaeological resource).

3.1.2) Local Regulations

The City of Menifee's general plan (2013) includes goals and policies related to cultural resources.

Goal OSC-5: Archaeological, historical, and cultural resources are protected and integrated into the city's built environment.

Policies

OCS-5.1: Preserve and protect archaeological and historic resources and cultural sites, places, districts, structures, landforms, objects and native burial sites, traditional cultural landscapes and other features, consistent with state law and any laws, regulations or policies which may be adopted by the city to implement this goal and associated policies.

OCS-5.2: Work with local schools, organizations, appropriate Native American tribes with ancestral territories located within the city and other agencies to educate the public about the rich archaeological, historic, and cultural resources found in the city.

OCS-5.3: Preserve sacred sites identified in consultation with the appropriate Native American tribes whose ancestral territories are within the city, such as Native American burial locations, by avoiding activities that would negatively impact the sites, while maintaining the confidentiality of the location and nature of the sacred site.

OCS-5.4: Establish clear and responsible policies and best practices to identify, evaluate, and protect previously unknown archaeological, historic, and cultural resources, following applicable CEQA and NEPA procedures and in consultation with the appropriate Native American tribes who have ancestral lands within the city.

OCS-5.5: Develop clear policies regarding the preservation and avoidance of cultural resources located within the city, in consultation with the appropriate Native American tribes who have ancestral lands within the city

OCS-5.6: Develop strong government-to-government relationships and consultation protocols with the appropriate Native American tribes with ancestral territories within the city in order to ensure better identification, protection and preservation of cultural resources, while also developing appropriate educational programs, with tribal participation, for Menifee residents.

3.2) Methods

The purpose of this technical report is to provide the City of Menifee with information necessary to determine whether the Project would cause an adverse change to a historical resource, as defined in PRC §5020.1(j) and therefore result in a significant impact to the environment under CEQA. To accomplish this objective, L&L completed a historical resources records search, historical and geoarchaeological background research, coordinated with the Native American Heritage Commission (NAHC) and local Native American tribes, organizations, and individuals, and a completed a systematic survey of the entire Project area.

This investigation included the following tasks:

- Review of regional history and previous cultural resource sites and studies within the Project area and the vicinity.
- Examine archival topographic maps and aerial photographs for the Project area and the general vicinity.
- Request of an NAHC SLS for the Project area and contact with Tribal groups and individuals as named by the NAHC.
- Complete a non-collection Phase I pedestrian survey of the Project area.
- Prepare DPR 523 Forms for all new sites and isolates encountered during the survey, as well as DPR 523 Update Forms for all previously recorded resources.
- Submit all DPR 523 Forms to the EIC for their files and to obtain Primary Numbers/Trinomials for all new sites and isolates.
- Evaluate cultural resources against CRHR criteria, when feasible.
- Evaluate the potential for the proposed project to result in significant impacts to cultural resources, including the potential to impact buried cultural resources with no surface expression.
- Develop recommendations associated with impacts to cultural resources following the guidelines as outlined in the Regulatory Setting.

3.2.1) Cultural Resources Records Search

Record searches at the Eastern Information Center (EIC), located on the campus of the University of California, Riverside (UCR), were previously completed by L&L staff in 2003 and 2013 for the Project area limits and one-mile radius. A supplemental cultural resources records

search request was submitted to the EIC on October 18, 2021. In compliance with the UC System COVID pandemic policy the records search was restricted to a member of UCR, EIC staff. A partial records search without maps was received on January 28, 2022, after publication of the report. This revised report includes the records search results.

The records searches include a review of EIC maps, previously documented cultural resource records, and historical resource studies on or within a one-mile radius of the Project area. In addition, the records search included a review of the National Register of Historic Places, Archaeological Determinations of Eligibility (ADOE), and the Built Environment Resources Directory (BERD).

3.2.2) Historic Records Review

A historic records search was completed using maps available at the Bureau of Land Management General Land Office (BLM 2021), the Eastern Information Center, and L&L offices for any evidence of historic resources located within the project boundaries. The Riverside County Planning Department information website was checked for any additional legal and individual parcel information regarding ownership of the property. In addition, historic topographic maps and aerial photographs containing the Project area were reviewed (NETR 2021).

3.2.3) Native American Coordination

L&L notified the Native American Heritage Commission (NAHC) of the Project and requested a record search of the Sacred Lands File (SLS) on October 14, 2021. The NAHC responded in writing on November 18, 2021, stating the results of the records search was positive and requested the Pechanga Band of Luiseno Indians be contacted for information. The NAHC also provided a list of local Native American tribes, organizations, and individuals to contact regarding the Project. L&L contacted all the tribes, organizations, and individuals included in the NAHC list in a letter dated November 21, 2021. The letter included a description of the Project, identified its location, and requested information regarding Native American resources within or near the Project area. As of the date of this report, L&L received three (3) responses, from the Agua Caliente Band of Cahuilla Indians (ACBCI), the Augustine Band of Cahuilla Indians, and the Quechan Tribe of the Fort Yuma Reservation. All correspondence completed to date is presented in Table 3 of this report and is included in Appendix D.

3.2.4) Pedestrian Survey

The primary purpose of a cultural resource pedestrian survey is to identify, document, and assess the condition of cultural resources (e.g., archaeological sites and built environment resources). Information gathered from the field is used to assess the integrity and potential historical significance of cultural resources and assist the Lead Agency in determining which resources qualify as "historical resources" under CEQA.

The Project area was surveyed December 10-13 by L&L archaeologist William Gillean utilizing the block-transect method with north-south or east-west trending transects spaced at 15-meter intervals (see Appendix A for Qualifications). Project survey maps generated in ArcGIS were uploaded to ESRI's Collector application, which was operated in the field via smartphone platforms and used to establish property and survey boundaries. In this way, the entire Project area was surveyed for cultural resources. Digital photographs were taken to document current field conditions and a Daily Work Record was completed that documented survey personnel, hours worked, weather, ground surface visibility, vegetation, soils, exposure/slope, topography, natural depositional environments, and identified cultural resources.

During the pedestrian survey, systematic efforts were made to document the horizontal extent of cultural resources. For the purposes of this Project, an isolate was defined as an archaeological resource containing three (3) or less artifacts of a single type (e.g., three [3] tin cans or three [3] pieces of flaked stone debitage). Archaeological sites were defined as resources that: contain more than three (3) artifacts of the same type; contain two (2) or more artifact types (e.g., a piece of flaked stone debitage and a mano); or contain one or more features. Site limits were delineated by the distribution of cultural material and features within a 30-meter radius.

When encountered in the Survey area, new archaeological resources 45 years in age or older were assigned a temporary number and basic information was collected including GPS coordinates in NAD83, photos, and a brief description of each resource. Cultural resource locations were plotted on the appropriate 1:24,000 scale USGS 7.5' quadrangle using ESRI's Survey123 application on smartphone platforms using GPS satellite-based systems with sub-10-meter accuracy.

Following completion of the pedestrian survey, archaeological resources identified in the Project area were revisited and formally recorded onto California DPR 523 forms. Site recordation fieldwork was completed between December 17 and 18, 2021, by Mr. Gillean. At that time, efforts were made to measure, inventory, describe, and document all cultural resources in the field. Smartphones operating ESRI Collector with site location and survey maps were used to locate cultural resources and the ESRI Survey123 GPS application was used to document the

locations and UTM coordinates of activity loci, cultural features, and artifacts. Site maps of each archaeological resource were drawn to scale, indicating the location of activity loci, features, and temporally or functionally diagnostic artifacts. Digital site overview photographs were also taken; in addition, digital overview photographs were taken of activity loci, cultural features, and temporally or functionally diagnostic artifacts. When feasible, cultural features were documented fully, inventoried, and mapped by UTM coordinates. No artifacts were collected during the field survey.

All digital photographs and Daily Work Records, as well as handwritten DPR 523 Forms and GPS/ArcGIS data are archived on L&L's main servers. Copies of the photographs taken during the field survey are also included in Appendix B and site photographs are provided in in DPR 523 records included in Confidential Appendix D.

4.0) RESULTS

4.1) Cultural Resources Records Search

The results of the supplemental EIC records search were received on January 28, 2022 and are listed after the 2003 and 2013 summary of records searches completed by L&L. Record search results indicate 62 previous archaeological studies were completed within a one-mile radius of the Project area, including one (1) within the property boundaries covering approximately the eastern half of the property. The archaeological studies were performed over the past 35 years, 47 of which occurred between 1977 and 2003. In addition, the Project area was previously surveyed in its entirety by L&L in 2003 (Irish et al. 2003) and again in 2013 (Hoover and Blevins 2013). These studies are listed in Table 1.

Table 1. Cultural Resource Surveys within a One-Mile Radius

Report #	Date	Recorder (Date)	Author
RI-0229	1977	Archaeological Assessment of the NW ¼ of Section 10, T6S, R3W, Romoland Quadrangle, Riverside County, California.	Kenneth Daly
RI-0307	1978A	Environmental Impact Evaluation: An Archaeological Assessment of Tentative Parcel Map 11994, South of Scott Road, Menifee Area of Riverside County, California	Donna Belligio
RI-0344	1978	An Archaeological Survey of Tract 11072 Near Sun City in Riverside County	Paul G. Chace
RI-0359	1978	An Archaeological Survey of Tract 11088 Near Sun City in Riverside County	Paul G. Chace
RI-0393	1978	Environmental Impact Evaluation: Archaeological Assessment of a Portion of Land Near Temecula, Riverside County, California (Tentative Parcel 15454)	Thomas Holcomb
RI-0440	1978	Environmental Impact Evaluation: Archaeological Assessment of Tentative Parcel 11785, Riverside County, California	Daniel F. McCarthy
RI-0529	1979	Environmental Impact Evaluation: An Archaeological Assessment of Tentative Parcel 11137, Sedco Hills Area of Riverside County California, (UCRAC)	James Barker Matthew C. Hall
RI-0542	1980	Archaeological Assessment for Tentative Parcel.	Larry Bowles Jean A. Salpas
RI-557	1979	Archaeological Assessment for Tentative Parcel 12802.	Larry Bowles Jean A. Salpas
RI-0569	1979	Archaeological Assessment for Tentative Parcel 14411, Near Sun City Riverside County.	Larry Bowles Jean A. Salpas

Report #	Date	Recorder (Date)	Author
RI-0636	1979	Environmental Impact Report. An Archaeological Assessment for Tentative Parcel 15363. Sedco Hills Area of Riverside County of California	Matthew Hall James Barker
RI-0637	1979	Environmental Impact Report. An Archaeological Assessment for Tentative Parcel 13570. Sedco Hills Area of Riverside County of California	Matthew Hall James Barker
RI-0670	1987	Archaeological Test Excavations at CA-RIV-634 South of Sun City in Riverside County	Stephen Bouscarens
RI-0671	1979	Report of an Archaeological Survey of CZ 2900, S10, T6S, R3W Romoland Quadrangle	Joan Oxendine
RI-0683	1999	A Phase I Cultural Resources Assessment of APN-358-230-001	Jean A. Keller
RI-0684	1979	Archaeological Survey of a 14 Acre Parcel in the Menifee and Paloma Valleys Region	Susan L. Frommer
RI-0771	1980	Archaeological Assessment for Tentative Parcel 15837.	Larry Bowles Jean A. Salpas
RI-0772	1980	Archaeological Assessment for Tentative Parcel 15454	Larry Bowles Jean A. Salpas
RI-0791	1980	Archaeological Assessment for Tentative Parcel 16119.	Larry Bowles Jean A. Salpas
RI-0794	1980	Archaeological Assessment for Tentative Parcel 16334.	Larry Bowles Jean A. Salpas
RI-0797	1980	Archaeological Assessment for Tentative Parcel 16407.	Larry Bowles Jean A. Salpas
RI-0800	1980	Archaeological Assessment for Tentative Parcel 16181.	Larry Bowles Jean A. Salpas
RI-0894	1980	Environmental Impact Evaluation: an Archaeological Assessment of Tentative Tract 15133, South of Sun City, Riverside, County California	Deborah Moore
RI-0895	2001	A Phase I Cultural Resources Investigation of the Millennium Project Area in the Murrieta Area of Riverside County, California	Jeanette McKenna
RI-0903	1980	Archaeological Assessment of Parcel 16120.	Jean A. Salpas
RI-0976	1980	Archaeological Assessment Form.	Jean Oxendine
RI-1503	1982	Archaeological Assessment for Tentative Parcel 17674 Near Sun City, Riverside County, California.	Kathleen Del Chario Marie G. Cottrell

Report #	Date	Recorder (Date)	Author
RI-1569	1979	Archaeological Assessment for Tentative Parcel 13839.	Larry Bowles Jean A. Salpas
RI-1570	1979	Archaeological Assessment for Tentative Parcel 13840.	Larry Bowles Jean A. Salpas
RI-1571	1979	Archaeological Assessment for Tentative Parcel 13873.	Larry Bowles Jean A. Salpas
RI-1572	1979	Archaeological Assessment for Tentative Parcel 14613.	Larry Bowles Jean A. Salpas
RI-1978b	1978b	Environmental Impact Evaluation: An Archaeological Assessment of Tentative Parcel Map 12179, South of Scott Road, Menifee Area of Riverside County, California	Donna Belligio
RI-1978c	1978c	Environmental Impact Evaluation: An Archaeological Assessment of Tentative Parcel Map 12076, South of Scott Road, Menifee Area of Riverside County, California	Donna Belligio
RI-2150	1987	Environmental Impact Evaluation: Archaeological Assessment of 19.56 Acres of Land along Haun Road, South of Sun City, Riverside County, California	Daniel F. McCarthy
RI-2152	1993	Letter Report Tract 22739/Pegg Property.	Bruce Love
RI-2525	1989	Archaeological Assessment for Tentative Parcel 24538, Riverside, County.	Jean A. Keller
RI-2622	1989	A Cultural Resource Inventory An Archaeological Survey of the Paloma Channel and Transition South of Sun City, California.	Christopher E. Drover
	1989	Environmental Impact Evaluation: An Archaeological Assessment of Tentative Tract 23551 Located West of Hemet in Western Riverside County, California	R.E. Parr
RI-2623	1997	A Phase I Cultural Resources Investigation for the Pebley Property, Menifee, Riverside County, California	Jeanette McKenna Richard Shepard
RI-3189	1990	Addendum to Cultural Resources Cultural Resources Assessment of AT&Ts Proposed San Bernardino to San Diego Fiber Optic Cable, San Bernardino, Riverside and San Diego Counties	Peak and Associates, Inc.
RI-3190	1990	Cultural Resources Assessment of AT&Ts Proposed San Bernardino to San Diego Fiber Optic Cable, San Bernardino, Riverside and San Diego Counties	Peak and Associates, Inc.
RI-3739	1993	A Cultural Resources Survey for the Gas Pipeline No 6900 Project, Riverside County, California	Daniel Landis
RI-3823	1994	An Archaeological Assessment of a 10-Acre Parcel as shown on TPM 27932, Located at 31755 Bradley Road, Menifee, Riverside County	Robert S. White
RI-3846	1994	A Phase I Cultural Resources Assessment of Tentative Tract Map 26798. 59 Acres of Land near Menifee, Riverside County, California, USGS Romoland, California Quadrangle 7.5 Series,	Jean A. Keller

Report #	Date	Recorder (Date)	Author
RI-4376	1979	An Archaeological Survey of a Portion of Menifee and Paloma Valleys	Diana Pinto
RI-4404	2000	Final Cultural Resources Inventory Report for the Williams Communication Company, Inc., Fiber Optic Cable System Installation Project, Riverside to San Diego, California	Larry Bowles Jean A. Salpas
	2000	Historical/Archaeological Resources survey Report Tentative Tract No 29837, near the of Menifee, Riverside County, California.	Bruce Love M. Hogan M. Dahdul D. Ballester A. Sanchez-Moreno
RI-4905	**2003**	**A Phase I Archaeological and Paleontological Survey Report for Menifee Assemblages, TT# 31194, APNS 360-300-002 to -006, -009, and 360-350-001, Menifee, County of Riverside, California (L&L Environmental, Inc)**	**Anna Hoover** **Kristi Blevins**
RI-4906	**2003**	**A Historical Assessment Amendment to an Archaeological and Paleontological Assessment Report Entitled A Phase I Archaeological and Paleontological Survey Report for Menifee Assemblages, TT# 31194, APNS 360-300-002 to -006, -009, and 360-350-001, Menifee, County of Riverside, California (L&L Environmental, Inc)**	**Anna Hoover** **Kristi Blevins**
RI-5405	2004	A Phase I Cultural Resources Assessment of Tentative Tract Map 31831 ±30 Acres of Land Near Sun City, Riverside County, California	Jean A. Keller
RI-5407	2005	A Phase I Cultural Resources Assessment of Tentative Tract Map 33060 ±9.2 Acres of Land Near Menifee, Riverside County, California	Jean A Keller
Ri-5630	2004	Cultural Resource Assessment of a 7.93 Acre Parcel Shown of TPM 3200 Located at 26560 Meadow Road, Menifee, Riverside County, California (Archaeological Associates)	Robert S. White Laura S. White
RI-6050	2004	Cultural Resources Reconnaissance for the Menifee School Project, Riverside County, California (SWCA)	Joan C. Brown
RI-6158	2005	Cultural Resources Records Search and Site Visit Results for Cingular Telecommunications Facility Candidate SC-232-03 (Rockland Garbani Ranch) 26675 Garbani Road, Menifee, Riverside County, California (Michael Brandiman Associates)	Marnie-Aislin-Kay
RI-6561	2005	Historical/Archaeological Resources Survey Report Signal Light and Road Improvements at the Intersection of Scott and Antelope Roads, City of Menifee Riverside, California (CRM Tech)	Josh Smallwood
RI-7286	2007	Historical /Archaeological Resources Survey Report Assessor's Parcel No. 360-340-004, Near the Community of Menifee, Riverside County, California (CRM Tech)	Mariam Dahdul Daniel Ballester Laura H. Shaker
RI -7510	2007	Phase I Archaeological Cultural Resources Investigation of the Proposed Wal-Mart Site in the Community of Menifee, Riverside County, California (McKenna et al.)	Jeanette McKenna
RI-7626	2008	Phase I Archaeological Assessment for the Shops at Scott Project, APNS 384-180-001, 384-180-006, and 384-180-010 (Brian F. Smith and Associates)	Sara Clowery-Moreno Brian F. Smith
RI-7632	2006	A Phase I Archaeological Assessment for the Galvez Menifee Project (Brian F. Smith and Associates)	Nora Collins Brian F. Smith

Report #	Date	Recorder (Date)	Author
RI-7852	2007	Built-Environment Historic Resources Technical Memorandum for Bundy Canyon-Scott Road Improvement Project	Francesca G. Smith Caprice D. Harper
RI-8195	2009	A Phase I Cultural Resources Assessment of Tentative Parcel Map 34901, 5.04 Acres of Land in the City of Menifee, Riverside County, California	Jean A. Keller
RI-8785	2012	Archaeological Letter Report: 77-TD5699291, WO 6088-4800,0-4826, 0-4804, E-4830: Equinox 12 kV, Roadrunner as kV, Menifee 12 kV, and Flats 12 kV Deteriorated Pole Replacement Projects, Riverside County, California (Compass Rose Archaeological Inc.)	James J. Schmidt
N/A	2013	Phase I Cultural Resources Assessment Update: Golden Meadows, City of Menifee, CA & Phase II Testing (L&L Environmental, Inc.)	Leslie Irish and Barbara Loren-Webb

The January 28, 2022, records search results included eleven (11) additional studies and are listed below:

Report #	Date	Recorder (Date)	Author
RI-00118	1965	Excavations at the Christensen-Webb Site, Menifee Valley, 1963-64	M. Kowta, R.A. Appelton, Jr., D.J. Harris, D.A. M. Lane, and C.A. Singer
RI-00119	1974	Anaylsis of Materials Collected at the Haun Road Site (4-Riv-333)	Howard Atkinson
RI-00123	1988	Archaeological Survey Report for the Proposed Improvement of Haun Road Between Garboni Road and Holland Road, Riverside County, California	Stephen R. Hammond
RI-00228	1977	Archaeological Assessment of the NW 1/4 of Section 10, T6S, R3W, Romoland Quadrangle, Riverside County, California	Ken Daly
RI-9815	2015	Cultural Resource Records Search Results for Verizon Wireless Candidate '879861 S Jan Co', 31300 Haun Road, Menifee, Riverside County, California	Carrie D. Wills and Sarah A. Williams
RI-9872	2016	Historical/ Archaeological Resources Survey Report Millcreek Promenade Project City of Menifee Riverside County, California	Bai "Tom" Tang, Michael Hogan, Ben Kerridge, Nina Gallardo, and Salvadore Boites
RI-9930	2005	Cultural Resource Records Search and Site Visit Results for Cingular Telecommunications Facility Candidate RS0116-01 (Monk), 25205 Bundy Canyon Road, Menifee, Riverside County, California	Wayne H. Bonner and Marnie Aislin-Kay
RI-10377	2018	Results of Archaeological Monitoring at the Commerce Pointe II Project (Project No. GP16-026P), City of Menifee, California (Negative Archaeological Monitoring Report)	Brian F. Smith
RI-10380	2017	Phase IV Cultural Resources Monitoring Report for the Menifee Estates Project City of Menifee, Riverside County, California	Jennifer M. Sanka, William R. Gillean, and Leslie Nay Irish

Report #	Date	Recorder (Date)	Author
RI-10600	2006	Historic Consultation for Nextel of California (Nextel) Wireless Telecommunications Service (WTS) Facility Project Lynx / CA8596D, 33300 Antelope Road, Murrieta, Riverside County, California	Sean M. Thal
RI-10757	2019	Cultural Resource Constraints Analysis for Assessor's Parcel Number 388-010-040, City of Murrieta. Riverside County, California	Kholood Abdo Hintzman

At least thirty-two (32) cultural resources were previously recorded within a one-mile radius of the Project area (Table 2). These include twenty-five (25) prehistoric archaeological sites, three (3) built-environment resources, two (2) historic archaeological sites, one (1) isolated historic artifact, and one (1) mixed component site with both historic and prehistoric components. The mixed component site lies within the ±207-acre Golden Meadows property (Tract 31194) but is outside the Phase IV development Project area limits. One prehistoric site (P-33-011203), consisting of three bedrock milling features, was recorded less than a quarter mile south. Approximately three quarters of a mile to the northeast, several additional prehistoric archaeological sites (CA-RIV-332, -333, and -634), which appear to be habitation sites associated with a larger village complex, were recorded.

The habitation sites are situated in a north to south trending line that extends approximately one half-mile in length. The northernmost site (CA-RIV-332), also known as the Christensen-Webb site (see Kowta et al. 1965), encompasses two to three acres of land and contains elements that distinguish it from the other nearby sites, including artifacts such as pottery, beads, and paint stones (McCarthy 1987). The site also contains bedrock mortars and slicks but is devoid of rock art, which McCarthy (1987) suggests may differentiate specialized activity sites from habitation areas.

The largest of the three sites (CA-RIV-333) encompasses approximately 7-acres and contains numerous bedrock milling features, cupule boulders, pottery, lithic tools and a pictograph panel. Archaeological excavations recovered over 1,500 artifacts, including diagnostic flaked stone, ground stone, ceramics, and unmodified bone (Pinto 1987). Prehistoric site CA-RIV-634 encompasses approximately two acres and contains midden deposits, bedrock milling features, and a surface lithic scatter. Site excavations recovered ceramic, ground stone, flaked stone, bone, seeds, quartz crystals, and clay beads at depths extending to 40 centimeters below ground surface (Bouscaren 1987). Other sites likely associated with the Christensen-Webb village complex include potential ceremonial sites (CA-RIV-339 and 340) and numerous food processing and short-term habitation sites. The village sites are significant representations of the Late Prehistoric Northern Figurine Tradition (Brown and Freeman 2006).

Table 2. Cultural Resources within a One-Mile Radius.

Site #	Historic/ Prehistoric	Recorder (Date)	Site Description
CA-RIV-332	Prehistoric	Bowles 1979	Habitation site (Christensen-Webb site)
CA-RIV-333	Prehistoric	McCarthy 1987	Habitation site
CA-RIV-337	Prehistoric	MK 1964	House remnants
CA-RIV-339	Prehistoric	McCarthy 1987	Described as boulder with 49 cupules
CA-RIV-340	Prehistoric	McCarthy 1987	Petroglyphs, cupules, rock wall, bedrock milling sites
CA-RIV-341	Prehistoric	M. Kowta 1964	Wall features in a circle
CA-RIV-631	Prehistoric	Humbert and Hammond 1973	Habitation site with bedrock milling slicks and pictographs
CA-RIV-632	Prehistoric	Humbert 1973	Bedrock milling site
CA-RIV-633	Prehistoric	Humbert and Hammond 1973	Bedrock milling site
CA-RIV-634	Prehistoric	Bouscaren 1987	Habitation site with midden deposit, bedrock slicks, subsurface artifacts
CA-RIV-635	Prehistoric	Humbert and Hammond 1973	Three bedrock milling slicks
CA-RIV-636	Prehistoric	Krosen 1981	Bedrock milling site
CA-RIV-1027	Prehistoric	Eastvold 1976	Prehistoric cupules
CA-RIV-1072	Prehistoric	Eastvold 1976	Prehistoric midden, pictographs, and bedrock milling slick
CA-RIV-1309	Prehistoric	Holcomb 1978	Prehistoric-5 bedrock mortars, 2 slicks, and flake scatter
CA-RIV-1358	Prehistoric	Waldron 1976	Prehistoric-one bedrock milling slick
CA-RIV-1415	Prehistoric	Chace 1978	Prehistoric-lithic scatter and bedrock milling features
CA-RIV-1417	Prehistoric	Chace 1978	Prehistoric-camp site with a midden deposit
CA-RIV-1633	Prehistoric	Hall and. Barker 1979	Prehistoric lithic processing site
CA-RIV-1724	Prehistoric	Oxendine 1979	Prehistoric bedrock milling features and lithic scatter
CA-RIV-1826	Prehistoric	Salpas and Bowles 1980	Prehistoric bedrock grinding slicks
CA-RIV-2543	Prehistoric	Salpas and Bowles 1979	Prehistoric-food processing site
CA-RIV-3348	Prehistoric	Barker and Hall 1979	Prehistoric-one bedrock milling slick
CA-RIV-3349	Prehistoric	Hall and Barker 1979	Prehistoric one bedrock milling slick
33-007698	Historic	Hedges 1982	Historic-1902 vernacular wood frame house
33-007714	Historic	Jim Warner	Historic-1927 vernacular wood frame house

Site #	Historic/ Prehistoric	Recorder (Date)	Site Description
		1983	
33-007716	Historic	Jim Warner 1983	Historic-1927 vernacular wood frame house
33-011189	Historic	McKenna 2001	Historic trash scatter
CA-RIV-9111	Prehistoric	Keller 2009	Bedrock milling site
33-015668	Historic	Applied Earthworks 2006	Isolate. Abandoned well
33-021009	Historic	Schmidt 2012	20th century foundation
33-012435 / CA-RIV-7057	Prehistoric	Barbara Loren-Webb 2013	Mixed component site with historic refuse scatter, abandoned farm equipment and one prehistoric bedrock milling feature.

The January 28, 2022 records search results included thirty-seven (37) additional archaeological resources consisting of bedrock milling features, some with associated lithic scatters, two (2) isolated manos, one (1) isolated quartz tool, multiple historic structures, and refuse scatters. Results of the records search are listed below:

Site #	Historic/ Prehistoric	Recorder (Date)	Site Description
33-001987/CA-RIV-1987	Prehistoric	Fromer 1979	Prehistoric bedrock milling features and lithic scatter
33-002005/CA-RIV-2005	Prehistoric	Oxendine 1979	Prehistoric bedrock milling features and lithic scatter
33-002151/CA-RIV-2151	Prehistoric	R. Jenkins 1981	Prehistoric bedrock milling features
33-002152/CA-RIV-2152	Prehistoric	R. Jenkins 1981	Prehistoric bedrock milling feature
33-007706	Historic	F. Smith, and C. Harper Parsons 2007	Historic two-story stone building
33-007708	Historic	T. Borchard 1982	Historic-1924 cabin and associated structures
33-007717	Historic	J. Warner 1983	Historic-1890s farm house and associated outbuildings
33-008851/CA-RIV-6282	Prehistoric	S. Bholat 2008	Prehistoric bedrock milling features with groundstone and lithic scatter
33-011203	Prehistoric	J. McKenna 2001	Prehistoric bedrock milling features
33-011242	Historic	W. Sawyer 2001	Historic foundations and refuse scatter
33-012888/CA-RIV-7186	Historic	K. Bouscaren, R. Dilthey, and	Historic refuse scatters in three (3) concentrations

Site #	Historic/ Prehistoric	Recorder (Date)	Site Description
		M. Dice 2003	
33-012889/CA-RIV-7187	Historic	K. Bouscaren, R. Dilthey, and M. Dice 2003	Historic refuse scatter
33-014399/CA-RIV-7830	Prehistoric	D. Eliseuson 2003	Prehistoric bedrock milling feature
33-014400/CA-RIV-7831	Prehistoric	D. Eliseuson 2003	Prehistoric bedrock milling feature
33-014990/CA-RIV-7964	Prehistoric	Michael Brandmen Associates 2006	Prehistoric bedrock milling features
33-014991/CA-RIV-7965	Prehistoric	Michael Brandmen Associates 2006	Prehistoric bedrock milling features
33-015667/CA-RIV-8165	Historic	M. Linder, T. Kennedy, and K. Jernigan 2006	Historic refuse scatter
33-016712	Historic	F. Smith, and C. Harper Parsons 2007	Historic-1905 single-family residence and associated structures.
33-017046/CA-RIV-8867	Prehistoric	S. Bholat 2008	Prehistoric bedrock milling feature
33-017108	Historic	F. Smith, and C. Harper Parsons 2007	Historic-1950 single-family residence
33-017109	Historic	F. Smith, and C. Harper Parsons 2007	Historic-1935 single-family residence
33-017182	Historic	F. Smith, and C. Harper Parsons 2007	Historic-1946 single-family cottage
33-017575/CA-RIV-9111	Prehistoric	J. Keller 2009	Prehistoric bedrock milling features
33-019927/CA-RIV-10124	Prehistoric	C. Cotterman and D. Ballester 2009	Prehistoric bedrock milling feature
33-023814/CA-RIV-11706	Mixed-component	B. Webb 2013	Mixed-component-historic refuse, farm equipment, and prehistoric bedrock milling feature
33-024208/CA-RIV-11905	Prehistoric	C. Morgan and J. Hall 2015	Prehistoric bedrock milling features
33-024209/CA-RIV-11906	Historic	C. Morgan and J. Hall 2015	Historic foundation and rock wall lined driveway
33-026645	Prehistoric	W.R. Gillean and J.M. Sanka 2016	Prehistoric mano fragment and crystal quartz lithic tool

Site #	Historic/ Prehistoric	Recorder (Date)	Site Description
33-026646	Prehistoric	W.R. Gillean and J.M. Sanka 2016	Prehistoric mano
33-026647/CA-RIV-12548	Historic	W.R. Gillean and J.M. Sanka 2016	Historic refuse deposit
33-026648/CA-RIV-12549	Historic	W.R. Gillean and J.M. Sanka 2016	Historic refuse deposit
33-028615	Prehistoric	J.Keller 2018	Prehistoric bedrock milling features
33-028743/CA-RIV-12916	Prehistoric	J. Hahnlen 2019	Prehistoric bedrock milling features and lithic scatter
33-028744/CA-RIV-12917	Prehistoric	J. Hahnlen 2019	Prehistoric bedrock milling features and lithic scatter
33-028745/CA-RIV-12918	Prehistoric	J. Hahnlen 2019	Prehistoric bedrock milling features
33-028746/CA-RIV-12919	Prehistoric	J. Hahnlen 2019	Prehistoric bedrock milling feature
33-028747/CA-RIV-12920	Prehistoric	J. Hahnlen 2019	Prehistoric bedrock milling features

4.2) Historic Records Search

Historic documents available at the Bureau of Land Management, Desert District Office, the Eastern Information Center, and L&L offices were consulted for any evidence of historic resources located within the project boundaries, including township plat maps (1860 and 1896) and one historic map (USGS Elsinore 15' 1901). No historic structures, buildings, or features were noted on the GLO plat map within the project area. Also, no buildings, structures, or features are noted on the 1901 topographic map (Special Collections, Meriam Library).

Historic Aerial Photographs Web Site (NETR-online) dating from 1938, 1954, 1967, 1978, and 2005, as well topographic maps (100') available on the same website were reviewed. Fifteen (15) maps in all were available, dating from 1901 to 1985. The aerial photograph from 1938 shows fences and structures, as well as trees and possibly a small orchard at the intersection of Evans Road and what is identified as "Private Road" on topographic maps. The 1954 photograph shows no fencing at the intersection of Evans Road and Private Road but shows a house at Wickerd and a "Private Road" outside of the project boundaries. It also shows a dirt road extending to the northern property boundary. The 2005 aerial shows the Wickerd Road structures, but not the Evans Road structures. The topo maps offered at this site are somewhat

problematic. The Evans Road structures are seen in the 1943 map, the 1954 map as well as 1966, 1962, 1968, 1975, 1979, 1985, but are absent from the 1948 map.

Google Earth historical photographs 1996 and 2002 show the Evans Road structures, but in the 2005, 2009, 2011, and present photographs do not show the structures.

According to aerial photographs and 100' topographic maps, the structures on Evans Road existed as early as 1943 and were gone by 2002.

L&L also completed a historic assessment in 2003 exploring ethnographic stories claiming the area was part of the Butterfield Stage Road and part of a dairy. There was also rumored to have been a 1910 structure located on the property, for which no surficial evidence has been found physically or in records.

> According to the Chain of Entitlement, provided by T&B Planning, Newton Bradley purchased the property in 1896 via purchase from a taxes lien sale. The property was then sold to Wilson Boardman in 1916. Boardman deeded the property to Julia Mary Boardman, presumably his wife, in 1930 who, in turn sold the land to Ralph and Mollie Fawcett in 1939. For $10.00 (ten dollars) Erdman and Leona Krubsack purchased the property from Ralph and Mollie Fawcett in 1941. Joint tenancy was granted for Erdman and Leona Krubsack and Louis and Kathryn Krubsack in 1949. Finally, in 1991, Mr. and Mrs. David Wu purchased the property from Louis and Kathryn Krubsack who then sold the property to Woodside Homes of California (Irish et al. 2003).
>
> The results of the previous research strongly indicate that there was no stagecoach stop, either wooden or adobe, located on the current study property. There is a possibility that where Evans road is now, a stagecoach line or old trail could have run through but it was likely never mapped and was a small, local route intended for the accessibility of local inhabitants to reach the larger and more active cities and towns. Also, it has been determined that the buildings located on the current study property were not constructed around 1910 nor are the present buildings considered to be historic. We concluded that from our review the 1910 structure was previously destroyed, most likely before 1952. It is possible that the property was/is known as Peppertree Ranch, although it has not been formally documented in County resources. In addition, if the property had served as a dairy, that fact could also not be verified either by aerial photos or other records (Irish et al. 2003).

4.3) Native American Coordination

As part of the scoping process, L&L notified the Native American Heritage Commission (NAHC) of the Project and requested a record search of the Sacred Lands File (SLS) on October 14, 2021. The NAHC responded in writing on November 18, 2021, with positive results and requested contacting the Pechanga Band of Luiseño Indians for information. The NAHC also provided a list of local Native American tribes, organizations, and individuals to contact regarding the Project. L&L contacted all the tribes, organizations, and individuals included in the NAHC list in a letter dated November 21, 2021, to gather background information on Native American cultural resources in the Project area.

As a result of the information scoping process, three (3) tribes responded by email and in letters including the ACBCI, the Augustine Band of Cahuilla Indians, the Quechan Tribe of the Fort Yuma Reservation. No response was received from the Pechanga Band of Luiseno Indians regarding the sacred land site identified by the NAHC[2]. A sample of the scoping letter, response letters, and copies of all additional correspondence are included in Appendix C and a summary of the detail is provided below in Table 3.

Table 3. Summary of Native American Coordination

Contact Name and Title	Contact Affiliation	Method of Contact and Date	Response	Action(s) Required?
Jeff Grubbe, Chairperson	Agua Caliente Band of Cahuilla Indians	Scoping letter sent via USPS on November 21, 2021	Arysa Gonzalez Romero responded in an email stating that the project is not located within the Tribe's Traditional Use Area and that the ACBCI defers to other tribes in the area. This letter concluded their consultation efforts.	None
Patricia Garcia-Plotkin, Director	Agua Caliente Band of Cahuilla Indians	Scoping letter sent via email on November 21, 2021	Arysa Gonzalez Romero responded in an email stating that the project is not located within the Tribe's Traditional Use Area and that the ACBCI defers to other tribes in the area. This letter concluded their consultation efforts.	None
Doug Welmas, Chairperson	Cabazon Band of Mission Indians	Scoping letter sent via email on November 21, 2021	No response received.	Government-to-government consultation
Daniel Salgado, Chairperson	Cahuilla Band of Indians	Scoping letter sent via email on November 21, 2021	No response received.	Government-to-government consultation

[2] Please note, the coordination effort does not satisfy the CEQA requirements for government-to-government consultation under SB18 and/or AB52

Contact Name and Title	Contact Affiliation	Method of Contact and Date	Response	Action(s) Required?
Ray Chapparosa, Chairperson	Los Coyotes Band of Cahuilla and Cupeño Indians	Scoping letter sent via USPS on November 21, 2021	No response received.	Government-to-government consultation
Robert Martin, Chairperson	Morongo Band of Mission Indians	Scoping letter sent via USPS on June 1, 2021	No response received.	Government-to-government consultation
Ann Brierty, Tribal Historic Preservation Officer	Morongo Band of Mission Indians	Scoping letter sent via email on November 21, 2021	No response received.	Government-to-government consultation
Shasta Gaughen, Tribal Historic Preservation Officer	Pala Band of Mission Indians	Scoping letter sent via email on November 21, 2021	No response received.	Government-to-government consultation
Mark Macarro, Chairperson	Pechanga Band of Luiseño Indians	Scoping letter sent via email on November 21, 2021	No response received.	Government-to-government consultation
Paul Macarro, Cultural Resources Coordinator	Pechanga Band of Luiseño Indians	Scoping letter sent via email on November 21, 2021	No response received.	Government-to-government consultation
Manfred Scott, Acting Chairman Kw'ts'an Cultural Committee	Quechen Tribe of the Fort Yuma Reservation	Scoping letter sent via email on November 21, 2021	Jill McCormick responded in email stating that the Quechen Tribe have no comments and that they defer to the more local Tribes and support their decisions on the project.	None
Jill McCormick, Historic Preservation Officer	Quechen Tribe of the Fort Yuma Reservation	Scoping letter sent via email on November 21, 2021	Jill McCormick responded in email and stating that the Quechen Tribe have no comments and that they defer to the more local Tribes and support their decisions on the project.	None
Joseph Hamilton, Chairperson	Ramona Band of Cauilla	Scoping letter sent via email on November 21, 2021	No response received.	Government-to-government consultation
John Gomez, Environmental Coordinator	Ramona Band of Cahuilla	Scoping letter sent via email on November 21, 2021	No response received.	Government-to-government consultation
Bo Mazzetti, Chairperson	Rincon Band of Luiseño Indians	Scoping letter sent via email on November 21, 2021	No response received.	Government-to-government consultation
Cheryl Madrigal, Tribal Historic Preservation Officer	Rincon Band of Luiseño Indians	Scoping letter sent via email on November 21, 2021	No response received.	Government-to-government consultation
Lovina Redner, Tribal Chair	Santa Rosa Band of Cahuilla Indians	Scoping letter sent via email on November 21, 2021	No response received.	Government-to-government consultation
Joseph Ontiveros, Cultural Resource Department	Soboba Band of Luiseno Indians	Scoping letter sent via email on November 21, 2021	No response received.	Government-to-government consultation
Isiah Vivanco, Chairperson	Soboba Band of Luiseno Indians	Scoping letter sent via email on November 21, 2021	No response received.	Government-to-government consultation

Contact Name and Title	Contact Affiliation	Method of Contact and Date	Response	Action(s) Required?
Michael Mirelez, Cultural Resource Coordinator	Torres-Martinez Desert Cahuilla Indians	Scoping letter sent via email on November 21, 2021	No response received.	Government-to-government consultation

4.4) Archaeological Field Survey

In 2003, the property was surveyed with the primary goal of locating cultural resources visible on the surface, utilizing 10-meter transects trending in a north/south direction. In 2013, the survey was carried out with an intuitive survey, focusing on areas most likely to be sensitive for cultural resources. L&L Archaeologist William (Bill) R. Gillean, B.S. completed a pedestrian survey of the entire Project area between December 10 and 13, 2021. He returned to the Project area to record newly identified cultural resources on December 17 and 18, 2021.

In the western portion of the Project area limits where flat valley floors dominate the local topography the field survey was completed via the block-transect method with a transect interval of no more than 15 meters; east/west transects were utilized. This area was mechanically ripped along the toe of the slope to a former wheat field where sparse bedrock outcrops were noted. Ground surface visibility was generally poor (0 to 10 percent) within the former wheat field and improved significantly (90 to 100 percent) within the mechanically ripped area.

For the hillside slopes and ridgelines in the eastern portion of the Project area limits, survey methods were intuitive, and efforts were made to examine all bedrock outcrops for evidence of cultural modification. This area is replete with bedrock outcrops and dense vegetation. Ground surface visibility was generally poor (10 to 20 percent) within the heavily vegetated areas, and excellent (90 to 100 percent) in areas cleared to mineral soil, including OHV trails.

During the survey, six (6) cultural resources were identified. These include one (1) prehistoric isolate (RLCC-01-ISO), three (3) prehistoric bedrock milling sites (RLCC-02, -04, and -05), one historic concrete water trough (RLCC-06H), and a hand-hewn wood post and barbed wire fence line (RLCC-07H). Descriptions of each cultural resource encountered in the Project area limits is provided below and additional details may be found in the DPR 523 forms in Confidential Appendix D.

Several additional resources were encountered during the survey. A steel capped well engraved “8 5/8, Seal-A-Well/Palmdale California” was found along the ridgeline of the hill near the northern section line of T6S R3W, Section 16. A pile of concrete rubble, each embedded

with a single 6-inch by 6-inch fragment of milled lumber, was noted nearby. No well record was found in the California Well Record Completion database, through materials and design suggest modern construction. A survey benchmark with an aluminum disc engraved "44-89" atop a galvanized steel hub was found near the crest of a small hill near the eastern section line of T6S R3W, Section 15. No benchmark record was found in the Riverside County Transportation Document online database, and it is not possible to determine the age or purpose of the benchmark at this time. A single hand-hewn fence post measuring approximately 5 feet in length by 7 inches wide by 3 inches thick with associated barbed wire was found near the benchmark and appears to be the same style and age of the fence line recorded along the northern boundary of the Project area.

4.4.1) Isolated Native American Artifact (RLCC-01-ISO)

This isolated artifact consists of a piece of jasper flaked stone debitage observed in a mechanically ripped and highly disturbed dirt road at the toe of a northwest to southeast trending hill in relatively level terrain (elevation 1,560 feet amsl) and vegetation typical of the Riversidian Coastal Scrub community. The flake was fractured into two fragments during post-depositional disturbances (e.g., trampling, discing, etc.). It measures 20 mm (L) x 20 mm (W) with a thickness of 3 mm.

4.4.2) Bedrock Milling Site (RLCC-02)

This site contains a single bedrock milling feature with two (2) slicks situated on a northerly trending, heavily vegetated slope (elevation 1,595 feet amsl) amid vegetation typical of the Riversidian Coastal Scrub community. The boulder measures approximately 3 meters long by 2 meters wide by 2 meters tall on its south facing side. The slicks are on the west side of the boulder. Slick 1 is near the center and measures 44 cm (N/S) by 50 cm (E/W). Slick 2 is near the southwest corner and measures 40 cm (N/S) by 50 cm (E/W). Both slicks are irregular in shape, highly exfoliated, with high points ground smooth and evidence of possible pecking, or resharpening.

4.4.3) Bedrock Milling Site (RLCC-04)

This site contains two (2) bedrock milling features approximately 15 meters apart and situated on a northerly trending, heavily vegetated slope amid vegetation typical of the Riversidian Coastal Scrub community. It is immediately adjacent, and upslope, of an unauthorized, and highly disturbed dirt Off Highway Vehicle trail at an elevation of 1,674 feet AMSL. Feature 1 measures approximately 1.4 meters long by 0.88 meters wide by 1 meter tall on its south facing

side. It exhibits two (2) slicks. Slick 1 measures 10 cm (N/S) by 5 cm (E/W) and is on the west central portion of the outcrop. It is elongated-oval shaped and utilized a natural crag as a grinding surface. It is lightly polished, with high points ground smooth, and shows evidence of some resharpening. Slick 2 measures 7 cm (N/S) by 7 cm (E/W) and is near the northwest extent of the outcrop. It is circular in shape, lightly polished, with ground high points, and some resharpening noted. Feature 2 measures 0.57 meters long by 0.51 meters wide by 0.51 meters in height and exhibits a single slick. Slick 3 measures 10 cm x 10 cm and is near the east-central corner of the boulder. The ground surface is faint and lightly polished.

4.4.4) Bedrock Milling Site (RLCC-05)

This site consists of a single bedrock milling feature with two (2) slicks. The site is approximately 100 meters south of bedrock milling site RLCC-02 and 25 meters north, and upslope, of a recently mechanically ripped, and highly disturbed dirt road. The site is situated on a northerly trending, heavily vegetated slope amid vegetation typical of the Riversidian Coastal Scrub community at an elevation of 1,593 feet AMSL. The Feature measures approximately 3.3 meters long by 1.5 meters wide by 1.45 meters tall on its south facing side. The slicks are located on the west side of the boulder. Slick 1 measures 40 cm (N/S) by 30 cm (E/W), and Slick 2 measures 12 cm (N/S) by 12 cm (E/W). Both slicks are irregular in shape, highly exfoliated around their margins, with high points ground smooth and exhibit a high level of polish.

4.4.5) Poured Concrete Water Guzzler (RLCC-06H)

The resource consists of the remains of a poured concrete (aggregate) apron and gallinaceous guzzler constructed sometime between 1942 and 1967. It is immediately east and adjacent to a recent mechanically ripped and highly disturbed dirt road at the toe of a northwest to southeast trending hill (elevation of 1,560 feet AMSL) surrounded by vegetation typical of the Riversidian Coastal Scrub community. Two main parts of the guzzler were observed: the apron, which is a shallow half-circle shaped catchment basin; and a rectangular cistern where water was stored. At one time, rainwater was captured on the apron and funneled into the covered cistern. The apron extends approximately 15 feet to the east and upslope from the cistern; an exposed “curb” or “lip” along its southern end is the only visible element of the apron, which is buried and covered in dense vegetation. The cistern measures 14 feet long by 6 feet wide by 2 feet deep (168 cubic feet) and could have once held over 1,000 gallons of water. A removable concrete lid that once covered the cistern has partially collapsed and the cistern is filled with concrete

fragments and vegetation. There is a small opening in the lid (now collapsed) that allowed small mammals, quail, and other birds to access water in the cistern.

The gallinaceous guzzler is a "tank-trough" self-filling watering device designed by the California Division of Fish and Game and first constructed at the Bitterwater Experimental Area in southern San Benito County, California, in 1942 (Glading 1943:158). Three additional guzzlers were installed in 1943, one at Kettleman Hills in Bitterwater and two at quail refuges in Riverside County, in southern California (Glading 1943:158). One guzzler was constructed in an area referred to as "Gavilan", which is likely a reference to the Gavilan Hills west of Menifee. These hills and much of the surrounding land were part of the Quail Valley Land Company's game reserve, which operated in the 1910s and 1920s before most of the land was sold to investors for the Lake Elsinore Lodge development. The other guzzler constructed in southern California in 1942 was placed in the Box Springs area of Riverside County, near the campus of the University of California, Riverside.

The purpose of the gallinaceous guzzler is to provide supplementary water to valley quail inhabiting arid lands (Emlen and Glading 1945). Rainfall is collected in the apron where it flows downslope into a gallinaceous guzzler storage tank or cistern for summer use. Emlen and Glading (1945:38) describe the gallinaceous guzzler as:

> …a subsurface concrete tank permanently covered to prevent evaporation or access by animals and connected at the bottom to a drinking trough sloping up from the bottom of the tank to the ground level. As water is gradually used, its level lowers in both tank and trough, and the quail follow the receding water down the slope.

The first gallinaceous guzzlers were square and measured 5 feet by 5 feet by 26 inches deep with a capacity of 400 gallons. Experiments with circular guzzlers at Bittersweet proved more difficult to construct but favorable under specific circumstances. The rectangular guzzler, first constructed in 1943, was developed in anticipation of desert use and measured 7 feet by 5 feet by 30 inches deep with a capacity of 600 gallons. They included a solid concrete cover for the storage tank and an 18-inch covered manhole allowing access to the tank for cleaning (Glading 1943:161).

The guzzlers were successful in collecting and storing water and attracted so many quail that a change in design was necessary to accommodate the hundreds of quail that might flock to the guzzler to drink on a hot, arid day (Glading 1947:288-289). The result was the "gallinaceouos

guzzler M-2-A." The device was enlarged to enable more surface water to be accessed by quail and construction methods were improved to allow all cement pouring to be completed in a single continuous run.

> It is a subsurface, rectangular, concrete tank, 30 inches deep, 5 feet wide, 5 feet long, opening at one end to a sloping drinking trough or ramp which is as wide as the tank and approximately 5 feet long, sloping from the bottom of the tank up to ground level. The total capacity is about 700 gallons. A concrete partition, 3 inches thick and 30 inches high, runs the length of tank and trough; this partition supports the roof. A baffle made of concrete slaps is placed on a plane parallel to the bottom of the ramp and about 7 inches above it; this separates the drinking ramp from the storage compartment and cuts down evaporation. Concrete roof, baffle, and shade slabs, 28 inches by 32 inches by 3 inches are poured in forms placed on nearby leveled ground immediately after the tank is poured, and, after setting are removed from forms and mortared in place over the tank and drinking ramp. The tank is then covered with earth, leaving only the entrance to the drinking trough and the concrete shade slabs exposed (Glading 1947:289).

The rain collecting apron, originally made by clearing and smoothing an area uphill from the tank and covering with light road oil, was also improved. A California road mix (oiled earth mix) was added to the surface of the apron, but this was damaged by plants and rodents requiring annual repairs (Glading 1947:289). Concrete, approximately 3 inches thick, would replace California road mix as the preferred medium for apron construction. Aprons were channeled to run downslope into converging shallow troughs that were approximately two feet wide and expansion cracks were smoothed into ridges to prevent cracks from impeding drainage to the tank (Glading 1947:289).

By 1946, the California Division of Fish and Game had constructed 14 experimental watering devices in cooperation with Federal Aid Projects 6-R and 16-R (Glading 1947:288). In 1947, The California Division of Fish and Wildlife budgeted two full-time crews for water development projects in southern California, mostly in the Mojave Desert. The projects consisted almost exclusively of guzzler construction because it was considered the best method of developing upland game in the arid southwest deserts. By 1952, the Division of Fish and Game had completed installation of 1,921 guzzlers in California, with most in the southern portion of the state (Leopold 1977:42). Between 1952 and 1972, 229 additional gallinaceous guzzlers were installed by the Division, along with those constructed by private entities (Leopold 1977:42; Bleich et al. 2009:633).

4.4.6) Hand-Hewn Wood Post and Barbed Wire Fence (RLCC-07H)

This linear resource consists of a hand-hewn wood post and barbed wire fence line. Production of the barbed wire and hardware (i.e., nails and staples) used in fence construction and/or maintenance continues to this day. The exact date of its construction is unknown, but the use of hand-hewn wood posts suggests historic age (i.e., 45 years or older).

The fence line extends east to west along the section line separating Section 16 and 9 and Section 15 and 10, and north to south along the section line separating Section 15 and 16. The western end of the resource is approximately 1,985 feet east of the corner of Evans Road and Garbani Road. The eastern end is approximately 870 feet west of the corner of Kurt Street and Garbani Road. The northern end of the north to south extension is approximately 660 feet due south of the corner of Bradley Street and Garbani Road. From that point the resource extends approximately 480 feet due south. It is in steep terrain and vegetation typical of the Riversidian Coastal Scrub community.

5.0) CRHR Significance Evaluations

As a result of the current study, six (6) cultural resources were identified within the Project area. These include one (1) prehistoric isolate (RLCC-01-ISO), three (3) prehistoric bedrock milling sites (RLCC-02, -04, and -05), one historic concrete water trough (RLCC-06H), and a hand-hewn wood post and barbed wire fence line (RLCC-07H). These resources are evaluated, where possible, against CRHR criteria to determine whether any of the identified resources qualify as historical resources under CEQA.

5.1) Isolated Native American Artifact (RLCC-01-ISO)

Isolated artifacts are not typically considered "historical resources" under CEQA because they lack association with important persons and events (Criteria 1 and 2), do not possess any distinctive characteristics of a type, period, region, or method of construction, represent the work of an important creative individual, or possess high artistic value (Criterion 3), and do not, on their own, possess the quantity or quality of data to address important research questions (Criterion 4). As such, RLCC-01-ISO does not appear eligible for the CRHR and does not qualify as "historical resources" under CEQA, however, it may have cultural significance to consulting Native American tribes and the artifact should be collected prior to the start of construction and either reburied on site in an area not subject to future disturbance or curated to a local tribe or museum.

5.2) Bedrock Milling Sites (RLCC-02, 04, and 05)

Three prehistoric bedrock milling sites were identified within the Project area (RLCC-02, -04, and 05). The three bedrock milling sites contain no associated artifact scatters and appear to lack cultural midden deposits or other types of features (e.g., fire hearths or rock art). Often, when considered in isolation, these types of special use sites are dismissed as lacking the quantity and quality of data required to generate important information regarding prehistory or history under Criterion 4 of the CRHR. The significance of these resources is rarely considered under Criteria 1-3 (e.g., Hogan et al. 2004:45; McKenna and Brunzell 2003:21; Peter et al. 1986:51; Pierson et al. 2002:7.0-1; Smith and Clifford 2004:7.0-1).

More recently, the spatial association of features, sites, and prominent geographic and ethnographic/ethnohistoric resources has been employed in the analysis of bedrock milling sites in western Riverside County (Eddy et al. 2013; Eddy et al. 2014; Eddy 2015; Green and Leckman 2011). From this perspective, bedrock milling sites are considered, collectively, within

the complex settlement and subsistence system associated with increasingly sedentary populations of Native Americans over the last 1,500 years.

In a pilot study during the Clinton Keith Road Extension Project, viewshed and auditory analysis of bedrock milling sites revealed that data collected from bedrock milling features, in the absence of other archaeological materials and features, could address important research questions related to the intensity of site use, logistical organization of resource gathering and processing activities, settlement and land-use strategies, social interaction and landscape connectivity, and the cultural use of space (Eddy 2015). Ultimately, "the research has shown a great deal of diversity within these sites that caution against blanket assumptions and interpretations…" (Eddy 2015:193).

None of the three bedrock milling sites, individually, demonstrate significance of association with events that have made a significant contribution to broad patterns of our history (Criterion 1) or are associated with a significant person (Criterion 2). Nor do they embody the distinctive characteristics of a type, period, or method of construction, represent the work of a master, or possess high artistic values (Criterion 3). Their data potential, when considered in isolation, is also lacking (Criterion 4). Thus, the three bedrock milling sites identified within the Project area are not considered *historical resources* eligible for individual listing on the CRHR.

Collectively, the bedrock milling sites are physical evidence associated with Native American settlement and subsistence activities that occurred in the Menifee area, and as such, collectively contribute to the historical significance of a potential Christensen-Webb Native American village complex (Criterion 1). Furthermore, viewshed and auditory analysis, coupled with limited subsurface exploration and documentation of these sites has the potential to generate important information relating to prehistory and therefore these sites, collectively, also contribute to the significance of the potential village complex under Criterion 4. Thus, the three bedrock milling sites within the Project area are considered *historical resources* for the purposes of CEQA.

5.3) Poured Concrete Water Guzzler (RLCC-06H)

The gallinaceous guzzler recorded in the Project area was constructed sometime between 1942 and 1967 when it appears on a historic aerial image of the area. Its dimensions do not conform to the earliest designs installed in the Bitterwater Experimental Area (Glading 1943) or the refined M-2-A guzzlers (Glading 1947). The M-2-A design was most likely used by Division of Fish and Game to construct more than 1,500 guzzlers in California between 1947 and 1952.

RLCC-06H is double the size of the M-2-A design, which may indicate its construction occurred sometime after 1952 by either a private party or as part of the Division's guzzler program.

The resource is likely not associated with the California Division of Fish and Game's early 1940s experimental self-watering program but could be associated with the Departments guzzler construction boom between 1947 and 1952, both of which are historically significant events in the history of California's wildlife management efforts. Its size, which does not conform to the M-2-A design, may indicate a post-1952 construction date but this can't be determined with any degree of certainty. The Department constructed 229 guzzlers in California between 1952 and 1972, and many others were constructed by private landowners and other non-government parties. Regardless, the resource lacks clear historical association with the Departments guzzler program between 1942 and 1952 and is not associated with any significant events and/or persons (CRHR Criteria 1 and 2).

As previously mentioned, the guzzler does not conform to the specifications of the M-2-A device, but does share many attributes in common. Its increased size may have been intended to improve the efficiency and viability of the guzzler for sustaining larger populations of quail. Unfortunately, there is not enough information to ascertain whether the design is common to the period, emblematic of a transition from standard to larger sized M-2-A devices, or the result of an ambitious privately funded or volunteer venture. The resource retains its historically distinguishable material (concrete) and at least two of its major elements (i.e., the apron and tank); the condition of the apron is unknown, and tank is in a state of disrepair. In its current state, RLCC-06H does not appear to have sufficient integrity to convey historical significance related to its distinctive character of type, period, and method of construction, nor does it embody the work of an important creative individual or possess high artistic values (Criterion 3).

Finally, the gallinaceous guzzler has not yielded important information to the history of the local area or California. Additionally, the resource has no potential to yield any additional information beyond what can be gleaned from archival and historical research (Criterion 4).

As such, RLCC-06H does not appear to qualify for the CRHR and is not a historical resource under CEQA. However, a reassessment of its integrity and significance may be warranted during Project construction if its apron and other characteristic components are found intact.

5.4) Hand-Hewn Wood Post and Barbed Wire Fence (RLCC-07H)

The fence lacks clear historical association with any event or person of local, state, or national significance (Criteria 1 and 2). Furthermore, as a common minor resource type it does not

embody 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 (Criteria 3). Finally, the fence has not yielded, nor does it have the potential to yield, any information important to the history of the local area (Criterion 4). As such, RLCC-07H does not appear to qualify for the CRHR, and is not a historical resource for the purpose of CEQA. No further consideration of this resource is required during Project planning.

6.0) SUMMARY AND RECOMMENDATIONS

6.1) Summary

L&L performed a Phase I cultural resources assessment to identify, evaluate, and assess the impacts of the proposed development on historical resources in compliance with CEQA. During this investigation, L&L reviewed record searches at the EIC, researched historical records on the subject property, coordinated with the NAHC and local Native American groups regarding sacred lands and other Native American resources, and completed a pedestrian survey of the Project area.

As a result of these efforts, six (6) new cultural resources were identified in the Project area. These include one (1) isolated prehistoric artifact (RLCC-01-ISO), three (3) bedrock milling sites (RLCC-02, -04, and -05), a concrete gallinaceous guzzler (RLCC-06H), and a hand-hewn wood post and barbed wire fence line (RLCC-07H). Isolate RLCC-01-ISO and fence line RLCC-07H are recommended not eligible for the CRHR. No further consideration of RLCC-07H is required during Project planning. Conversely, prehistoric isolated finds like RLCC-01-ISO that do not qualify as historical resources under CEQA may have cultural significance to local Native American tribes and therefore efforts should be made to avoid direct impacts that may result in damage to, or destruction of, these isolated resources.

The three (3) bedrock milling sites (RLCC-02, -04, and -05) are recommended not eligible for individual listing on the CRHR, but collectively, their association with Native American settlement and subsistence activities contributes to the historical significance of the potential Christensen Webb village complex under Criterion 1. Furthermore, viewshed and auditory analysis, coupled with limited subsurface exploration and documentation of these sites has the potential to generate important information relating to prehistory and therefore these sites, collectively, also contribute to the significance of the potential district area under Criterion 4. Thus, RLCC-02, -04, and -05 are considered historical resources for the purposes of CEQA

In its current state, gallinaceous guzzler RLCC-06H does not appear to have sufficient integrity to convey historical significance related to its distinctive character of type, period, and method of construction. As such, RLCC-06H does not appear to qualify for the CRHR and is not considered a historical resource under CEQA. However, a reassessment of its integrity and potential significance may be warranted during Project construction should its apron and other character defining features be found intact.

6.2) Management Recommendations

The results of L&L's investigation indicates that the proposed Project has the potential to cause a substantial adverse change in the significance of historical resources as defined in CEQA Guidelines Section 15064.5. Impacts to historical resources may include physical disturbance or destruction of known resources, disturbance or destruction of unknown buried and potentially significant archaeological deposits, diminishing historical integrity and the ability of a historical resource to convey its potential significance through visual, atmospheric, vibration, or other indirect impacts, and diminishment of historical integrity and the ability of a historical resource to convey its potential significance through cumulative impacts.

Avoidance is the preferred treatment for any significant resource. If avoidance is not feasible, then efforts to minimize impacts through Project design, additional technical studies including but not limited to data recovery, establishing Environmentally Sensitive Areas and archaeological monitoring, and other forms of mitigation are recommended prior to and during Project implementation. L&L recommends the following conditions/measures to avoid, minimize, and/or mitigate potentially significant impacts to historical resources within the Project area. Numbering is consistent with the numbering in the CEQA document.

Archaeological Resources

4.4-1 Prior to any clearing, grubbing and/or earth moving activities, a qualified archaeologist shall be retained by the developer. The potential for discovery of archaeological resources on the site has been indicated as medium to high; therefore, consultation with the culturally affiliated Luiseño Tribe(s) is required. A pre-grading meeting between the archaeologist, a Native American observer, and the excavation and grading contractor shall take place to ensure an understanding of the mitigation measures required during construction.

4.4-2 Prior to issuance of a grading permit, the archaeologist shall develop a mitigation plan and a discovery clause/treatment plan, which shall include mitigation monitoring to be implemented during earthmoving on the project site. The treatment plan shall be developed in consultation with the culturally affiliated Luiseño Tribe(s) and shall account for treatment of any archaeological remains and associated data uncovered by brushing, grubbing, or earthmoving.

> *The mitigation and discovery/treatment plan should include a discussion of key personnel and their specific roles and responsibilities, archaeological monitoring methods, controlled excavation and/or destruction methods, environmentally sensitive areas procedures, pre- construction field surveys to*

identify known and unknown cultural resources, a discussion of archaeological resource classes that may be encountered during construction, and protocols for identifying, evaluating, treating, and curating archaeological resources that may be encountered. The plan should also include the following attachments: an Environmentally Sensitive Area (ESA) Action Plan to preserve known bedrock milling features in place; cultural resource sensitivity training for construction personnel (i.e., Worker Environmental Awareness Program [WEAP]); methods for documenting bedrock milling features through close range photogrammetric documentation and viewshed analysis (i.e., direct line of sight and 180-degree viewsheds), and methods of relocating bedrock milling features to the nearest dedicated open space where they will be preserved in perpetuity. The plan will be prepared in consultation with culturally affiliated Luiseño Tribe(s).

4.4-2(B) The project applicant shall enter into a pre-excavation agreement with the culturally affiliated Luiseño Tribe(s). The agreement shall document archaeological monitoring requirements and specific the disposition of any significant resources discovered during monitoring.

4.4-3 The landowner shall relinquish ownership of all cultural resources, including all Luiseno cultural sacred items, burial goods and all archaeological artifacts that are found on the project site, to the culturally affiliated Luiseño Tribe(s) for proper treatment and disposition.

The Project proponent will hire a qualified archaeologist that meets Secretary of Interior Standards to oversee the surface collection of isolated prehistoric artifact RLCC-01-ISO. The field work shall be completed by an archaeologist and Native American monitor(s) on behalf of the culturally affiliated Luiseño Tribe(s).

4.4-4 Archaeological and tribal monitoring shall be conducted on a full-time basis for all grading and ground disturbing activities, including archaeological testing, until the project archaeologist in consultation with the culturally affiliated Luiseño Tribe(s) and the County of Riverside determines that resources are not likely to be encountered.

4.4-5 If archaeological remains are found by the archaeological monitor, earthmoving shall be diverted temporarily around the deposits until they have been evaluated, recorded, excavate, and/or recovered as necessary.

Earthmoving shall be allowed to proceed through the site when the archaeological supervisor, in consultation with the culturally affiliated Luiseño Tribe(s) and the County of Riverside, determines the artifacts are recovered and/or the site is mitigated to the extent necessary.

4.4-6 If possible human remains are encountered during any earthmoving activities, all work shall stop in the area in which the find(s) are present, and the Riverside County Coroner must be notified. State law dictates that the Native American Heritage Commission (NAHC) shall be notified in the event that remains are determined to be human and of Native American decent, in accordance with California Public Resources Code Section 5097.98.

4.4-7 If a previously unknown site is encountered and it requires additional mitigation, a plan or proposal shall be prepared by the archaeologist, in consultation with the culturally affiliated Luiseño Tribe(s) and County of Riverside, outlining the plan of action that needs to be implemented to mitigate the new site.

4.4-8 Any recovered archaeological resources shall be identified, recorded, mapped and artifact catalogued as required by standard archaeological practices. Examination by an archaeological specialist shall be included where necessary, dependent upon the artifacts, features or sites that are encountered. Specialists shall identify, date, and/or determine significance potential.

4.4-9 A final report of findings shall be prepared by the archaeologist for submission to the Eastern Information Center and the County of Riverside. The report shall describe parcel history, summarize field and laboratory methods used, if applicable, and include any testing or special analysis information conducted to support the findings.*The draft archaeological monitoring report will, at a minimum, present the results of monitoring field work including enforcement of Environmentally Sensitive Areas, the WEAP program, efforts to relocate bedrock milling features, include copies daily monitoring logs, and append photogrammetric documentation and viewshed analysis of bedrock milling features. If archaeological resources are discovered while implementing the monitoring program, the final monitoring report may also report on the results of lab analysis, special studies, and document the final treatment and disposition of the artifacts. The archaeological monitoring report will be completed in consultation the*

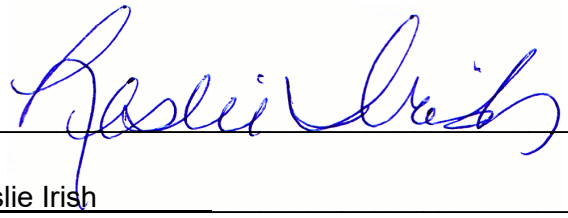
culturally affiliated Luiseño Tribe(s). The Project proponent is responsible for completing a final monitoring report that addresses comments from the Lead Agency, proponent, and/or consulting tribes. Final reports must be submitted to the Lead Agency, Project Proponent, consulting tribes, and the Eastern Information Center located on the campus of the University of California, Riverside.

7.0) CERTIFICATION

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: December 31, 2021 SIGNED: 

PRINTED NAME: John J. Eddy, M.A., RPA

DATE: December 31, 2021 SIGNED: 

PRINTED NAME: Leslie Irish

COUNTY REGISTRATION # 170

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APPENDIX A

Personnel Qualifications

Leslie Nay Irish
Principal Project Manager
Cal Trans (CT) 022889

Leslie Irish is the qualifying principal for WBE certification with CALTRANS and the PUC, with both a State and Federal designation as a Disadvantaged and Small Business Enterprise. Ms. Irish has multi-disciplinary experience in environmental, engineering, land development and construction management and administration.

Ms. Irish has more than 25 years experience as a project manager on public and private NEPA / CEQA projects overseeing the areas of biology, archaeology, paleontology, regulatory services and state and federal level permit processing.

Ms. Irish is a certified to perform wetland / jurisdictional delineations and holds a responsible party permit for performing archaeological and paleontological investigations on (BLM) public lands. She remains an active participant in the oversight of installation and monitoring of revegetation programs and the development of mitigation plans. Her principal office duties include review of all environmental documents authored by the firm; oversight of regulatory permits, agency consultation and negotiations; impact mitigation review; and long-term permit compliance. Her field duties are more limited but include delineations / compliance monitoring and reporting (coordination), constrains analysis, plan for corrective measures and resolution of "problem projects",

Ms. Irish's responsibilities include direct contact with clients/project proponents, scientists and agencies and involve her in all aspects of the project from request for proposal to project completion. Ms. Irish has a complex understanding of the industry from various perspectives. As a result, she uses her personal understanding of team member positions and responsibilities in her role as the principal management and quality control lead.

CREDENTIALS

- ***ACOE, Advanced Wetlands Delineation and Management, 2001***
- ***ACOE, Wetlands Delineation and Management, 1999, Certificate No. 1257***
- ***U.S. Government, Permit for Archaeology on Federal Lands,, Responsible Party***
- ***MOU, County of Riverside, Archaeology, Biology, Paleontology and Wetlands ID/Delineation***

EDUCATION

Update, Storm Water Management BMPs, University of California, Riverside Extension, 2005
Certificate, Wetland Delineation & Management, ACOE, 2000 and Advanced Certificate: 2002
Certificate Program, Field Natural Environment, University of California, Riverside, 1993
Certificate Program, Light Construction, Developmental Management, University of California, Riverside, 1987
Certificate Program, Construction Technologies, Administrative Management, Riverside City College, 1987
License B-General and C-Specialties (Concrete/Masonry) and General Law sections, 1986
Core Teaching and Administrative Management, Primary (K-3) and Early Childhood, Cal State, San Bernardino, Lifelong Learning Program, 1973-2005
Behavioral Sciences and Anthropology, Chaffey and Valley Jr./Community Colleges, 1973 - 1976

Leslie Nay Irish
Continued

PROFESSIONAL HISTORY

L&L Environmental, Inc. - Principal, Project Manager / Principal in Charge: 1993 - present: Site assessments, surveys, jurisdictional delineations, permit processing, agency consultation/negotiation, impact mitigation, project management, coordination, report writing, technical editing, and quality control.
Marketing Consultant - Principal: 1990 - 1993: Engineering / architectural, environmental, and water resource management consultant.
Warmington Homes - Jr. Project Manager: 1989 - 1990: Residential development, Riverside and Los Angeles Counties.
The Buie Corporation - Processor / Coordinator: 1987 - 1990: The Corona Ranch, Master Planned Community.
Psomas & Associates - Processor / Coordinator- 1986 - 1987: Multiple civil engineering and land surveying projects.
Irish Construction Company- Partner: (concurrently with above) 1979 - 1990: General construction, residential building (spec. housing), and concrete and masonry product construction.

PROFESSIONAL AFFILIATIONS

Member, Southern California Botanists
Member, Archaeological Institute of America
Member, California Society of Archaeology and of Preservation
Member, California Chamber of Commerce
Member, CalFlora
Member, San Bernardino County Museum Associates
Member, Orange County Natural History Museum Associates
Life Member, Society of Wetland Scientists
1994-97 President, Business Development Association, Inland Empire
1993-94 Executive Vice President, Building Industry Association, Riverside County

SYMPOSIA, SEMINARS AND WORKSHOPS

Bedrock Food Processing Centers in Riverside County, TLMA, 2009

Nexus Geology-Archaeology, Riverside County, TLMA, 2009
Desert Tortoise Handling Class, (DT Consortium / Joint Agencies USFWS/CDFG) 2008

Ecological Islands and Processes (vernal pools, alkali wetlands, etc), Southern California Botanists, 2004

Low Impact Development, State Water Board Academy, 2004

Inland Empire Transportation Symposium, 2004
Western Riverside County MSHCP Review and Implementation Seminar, 2004
Field Botany and Taxonomy, Riverside City College, 2002

Construction Stormwater Compliance Workshop, BIA, 2002

Identifying Human Bone: Conducted by L&L Environmental, County Coroner and Page Museum, 2002

CEQA/NEPA Issues in Historic Preservation, UCLA, 2000

CEQA and Biological Resources, University of California, Riverside, 2000

CEQA Law Update 2000, UCLA
Land Use Law/Planning Conference, University of California, Riverside
CALNAT “95”, University of California, Riverside
Desert Fauna, University of California, Riverside
Habitat Restoration/Ecology, University of California, Riverside
Geology of Yosemite and Death Valley, University of California, Riverside
San Andreas Fault: San Bernardino to Palmdale, University of California, Riverside
Historic Designations and CEQA Law, UCLA

John Eddy, M.A., RPA
Principal Investigator
Archaeologist

John Eddy is the Cultural Resources Program Manager for L&L Environmental, Inc., is a Registered Professional Archaeologist (RPA), and meets the Secretary of Interior Standards for Principal Investigator.

Mr. Eddy has practiced cultural resource management for more than fifteen years including more than 10 years managing cultural resource projects and staff in the preparation of bids and proposals, contract negotiation and management, project development and design, budgeting, personnel management, as well as tasks related to the execution of archaeological technical studies (e.g., field survey, monitoring, testing and data recovery excavation, technical writing and editing, consultation, etc.) in compliance with Section 106 of the NHPA, NEPA, CEQA and other federal, state and local regulations. He has directed and administered professional on-call contracts with state and federal agencies including environmental on-call contracts service contracts with the California Department of Transportation (CALTRANS) District 8 and District 5 and the Riverside County Transportation Department. As a CALTRANS archaeologist, Mr. Eddy negotiated avoidance, minimization, and mitigation measures with multiple agencies and tribes. He is skilled in the development and implantation of National Register evaluations, data recovery plans, mitigation and monitoring plans, treatment plans, historic property preservation documentation reports, site protection plans, site impact reports, cultural landscape assessments, and buried site testing plans and reports.

Mr. Eddy's responsibilities include direct contact with clients/project proponents, scientists and agencies and involve him in all aspects of the project from a request for proposal to project completion. Mr. Eddy directs the cultural resources program, oversees all cultural and paleontological resource related projects and tasks, and provides QA/QC of cultural resource deliverables

PROFESSIONAL HISTORY

2020-present – Cultural resources Program Manager/Principal Investigator L&L Environmental, Inc. Redlands, CA.
2019 – Project Archaeologist, CRM TECH, Inc., Colton, CA.
2017-2018 – Lecturer, California State University, San Bernardino, Department of Anthropology.
2013-2017 – Senior Archaeologist, Applied Earthworks, Hemet, CA.
2010-2013 – Associate Archaeologist, Applied Earthworks, Hemet, CA.
2009-2010 – Associate Environmental Planner (Archaeologist), CALTRANS District 8, San Bernardino, CA.
2008-2009 – Environmental Planner (Archaeologist), CALTRANS District 8, San Bernardino, CA.
2007-2008 – Project Archaeologist/Native American Liaison, CRM TECH, Colton, CA.
2007 – Archaeologist (GS-09-01), Inyo National Forest, Bishop, CA.
2003-2007 – Project Archaeologist/Native American Liaison, CRM TECH, Riverside, CA.

CREDENTIALS AND PERMITS

- RPA Certified (990008)
- U.S. Government, ARPA Permit, Responsible Party
- Riverside County Certified Archaeologist
- CALTRANS PQS Principal Investigator (Prehistoric Archaeology)

John J. Eddy, M.A., RPA
Continued

HONORS AND AWARDS

Thesis of the Year Award: *The Early Middle Period Stone Bead Interdependence Network*. California State University, Northridge, Department of Anthropology, 2013.
Begole Archaeological Research Grant for Geochemcial Analysis of Soapstone from San Diego and Los Angeles Counties, 2008.
Phi Kappa Phi Student Scholarship Award, 2007.
Visiting Researcher, National Science Foundation Funded Program for Solid Samples Research in the Archaeological Sciences, IRMES, California State University, Long Beach, 2006-2012.
Book Prize for Academic Excellence, California State University, Northridge, Department of Anthropology, 2005 and 2006.

EDUCATION

M.A., Anthropology (Public Archaeology), California State University, Northridge, 2013.
B.A., Anthropology, California State University, San Bernardino, 2003.
B.A., History, California State University, San Bernardino, 2003.

PROFESSIONAL AFFILIATIONS

Society for California Archaeology
Coachella Valley Archaeological Society
Society for American Archaeology

PROFESSIONAL DEVELOPMENT

2014 – *Landscape Preservation: Advanced Tools for Managing Change*, National Preservation Institute. San Francisco..
2012 –Section 4(f) Compliance for Historic Properties, National Preservation Institute. San Francisco.
2010 – *Riverside County Cultural Sensitivity Training*. Riverside, CA.
2010 – *CALTRANS Environmental Academy*, CALTRANS Environmental Staff Development. Irvine, CA.
2010 – *ESRI ArcGIS II*, Caltrans District 8. San Bernardino, CA.
2009 – *Categorical Exclusions (NEPA) and Categorical Exemptions (CEQA*. CALTRANS Environmental Staff Development Los Angeles, CA.
2008 – *CALTRANS Cultural Resource Procedures and Use of the Programmatic Agreement.* Caltrans Cultural Studies Office (CSO). Sacramento, CA.
2008 – *Advanced GIS Applications*. California State University, Northridge.

PUBLICATIONS

2009 Source Characterization of Santa Cruz Island Schist and Its Role in Stone Bead Exchange Networks. In Proceedings of the 7th Channel Islands Symposium, February 4-7, 2008, Oxnard, California.
2008 The Cahuilla Indians: An Ethnological and Archaeological Literature Review. Coachella Valley Archaeological Society Occasional Papers No. 4.

William R. Gillean, B.S.
Archaeologist

Mr. Gillean has gained more than 10 years of archaeological survey, testing, and excavation experience in Arizona, California, and Nevada. His duties at L&L include archaeological mitigation monitoring, Phase I surveys, California Historical Resources Information System (CHRIS) research, Native American Heritage Commission (NAHC) Sacred Lands Search (SLS) requests, Native American information scoping, completion of site records, and assisting senior staff with technical reports. He has experience with a wide range of GPS data collectors, photographic equipment, and software programs. He holds a Bachelor of Science in Anthropology with an emphasis in Cultural Resource Management from Cal Poly, Pomona.

PROFESSIONAL HISTORY

2015-present – Archaeologist, L&L Environmental, Inc. Redlands, CA. Performs field surveys, research, and completes site recordation for projects in southern California. Contributes to technical reports.

2013-present – Archaeologist, First Carbon Solutions. Irvine, CA. Performs archaeological mitigation monitoring in San Bernardino and Riverside Counties, California.

2010-2015 – Archaeologist, Atkins. San Bernardino, CA. Performed field surveys, research, completed site records, contributed to technical reports, assisted with Native American information scoping letters, and coordinated with the NAHC for SLS requests. Performed archaeological mitigation monitoring in San Bernardino and Riverside Counties, California.

2006-2010 – Archaeologist, U.S. Department of Agriculture (USDA) Forest Service, Skyforest, CA. Performed field surveys, subsurface testing programs, and data recovery projects throughout the San Bernardino and Angeles National Forests in southern California. Completed site records, authored and contributed to technical reports, conducted archaeological reconnaissance and inventory of fire suppression activities in support of the Butler II, Grass Valley, Slide, and Station fires. Made recommendations for minimizing impacts to archeological sites and performed mitigation monitoring in archaeologically sensitive areas during project implementation.

2004-2007 – Archaeologist, L&L Environmental, Inc. Corona, CA. Performed field surveys, research, subsurface testing programs, and data recovery projects in Riverside, San Bernardino, and Inyo Counties, California. Contributed to technical reports and performed archaeological mitigation monitoring.

2003-2004 – Field Technician, Center for Archaeological Research, California State University, Bakersfield. Bakersfield, CA. Provided technical support for the archaeological reconnaissance and inventory of over 40 miles of the Southern California Edison power line corridor located within the San Bernardino National Forest.

PROFESSIONAL DEVELOPMENT

2010 – Applied NEPA. USDA Forest Service. San Bernardino, CA.

2008 – The Section 106 Essentials. USDA Forest Service. Sacramento, CA.

EDUCATION

B.S., Anthropology (Cultural Resource Management Emphasis) – 2002, Cal Poly, Pomona, CA

APPENDIX B

Photographs

State of California - The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
PHOTOGRAPH RECORD

Primary #
HRI #
Trinomial

Page ____ of ____ **Project Name:** RLCC-03-187.ARS3 **Year** 2021

Temporary Number/Resource Name: _____

Image Type: ☐ (**bw**) 35mm B&W film ☐ (**cp**) 35mm Color Print film ☐ (**cs**) 35mm Color Slide film
☐ (**di**) Digital-Internal Memory ☐ (**dm**) Digital-Memory flash card

Camera Type and Model: moto z4 **Lens Size:** N/A

Film Type and Speed: ~~not~~ N/A

Negatives Kept at: N/A **Roll Number:** RLCC-02 - DM

Mo.	Day	Time	Frame/ File Name	(Survey) Subject/Description	View Toward
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"	"	9:33	007	" " " " " SoF NW corner (PP3)	N
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"	"	12:42	012	OV benchmark	N
"	"	12:44	013	Oblique BM	—
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DPR 523i (9/2013)



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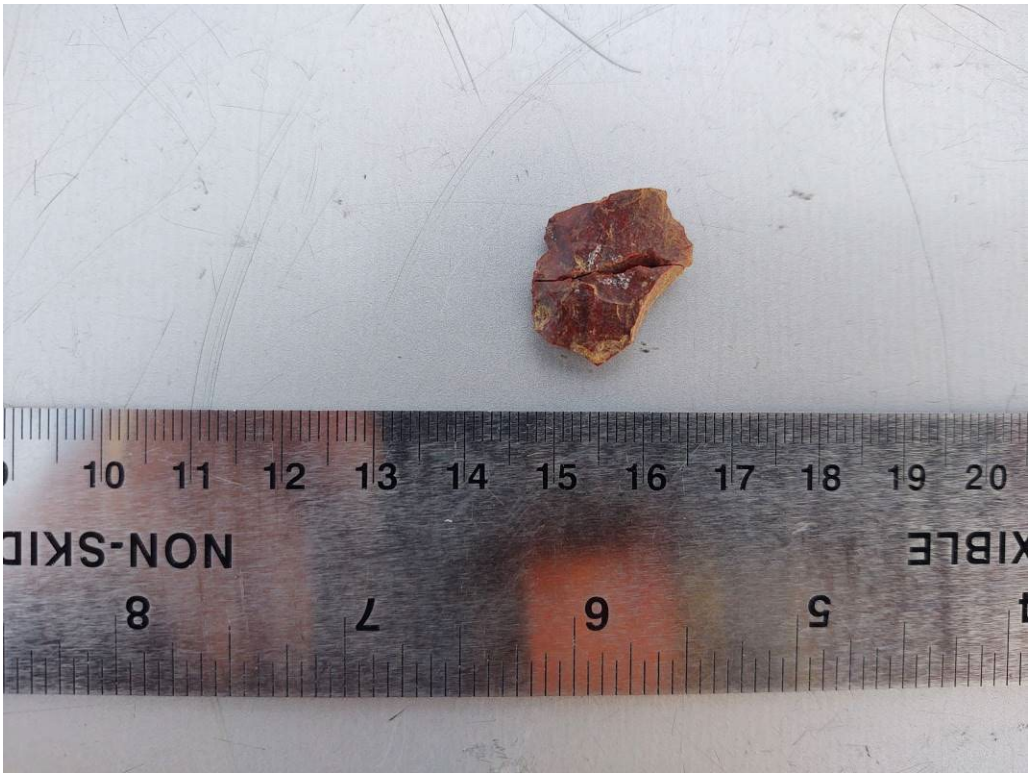


RLCC-01-DM-021

State of California - The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
PHOTOGRAPH RECORD

Primary #
HRI #
Trinomial

Page ____ of ____ **Project Name:** RLCC-03-187.ARS3 **Year** 2021

Temporary Number/Resource Name: _____

Image Type: ☐ (**bw**) 35mm B&W film ☐ (**cp**) 35mm Color Print film ☐ (**cs**) 35mm Color Slide film
☐ (**di**) Digital-Internal Memory ☐ (**dm**) Digital-Memory flash card

Camera Type and Model: Moto Z 4 **Lens Size:** N/A

Film Type and Speed: N/A

Negatives Kept at: N/A **Roll Number:** RLCC-02-DM

Mo.	Day	Time	Frame/ File Name	Subject/Description	View Toward
12	11	9:50	001	Survey area OV From NE corner	S
"	"	9:50	002	" " " " " "	SW
"	"	9:50	003	" " " " " "	W
"	"	10:12	004	OV fence post along N boundary	W
"	"	12:06	005	Disturbances E portion of Survey area	E
"	"	12:06	006	" " " " " "	N
"	"	12:06	007	" " " " " "	W
"	"	12:06	008	" " " " " "	S
"	"	12:22	009	Disturbances NE portion of survey area	N
"	"	12:22	010	" " " " " "	W
"	"	12:22	011	" " " " " "	S
"	"	12:23	012	" " " " " "	E
"	"	1:20	013	OV of capped wells	S
"	"	1:21	014	OV of modern refuse	S
"	"	1:47	015	OV H_2O feature	182°
"	"	1:48	016	Exposed east apron	83°
"	"	1:54	017	OV H_2O feature	115°
"	"	2:05	018	aggregate apron E portion arcing W	192°

DPR 523i (9/2013)



RLCC-02-DM-001



RLCC-02-DM-002



RLCC-02-DM-003



RLCC-02-DM-004



RLCC-02-DM-005



RLCC-02-DM-006



RLCC-02-DM-007



RLCC-02-DM-008



RLCC-02-DM-009



RLCC-02-DM-010



RLCC-02-DM-011



RLCC-02-DM-012



RLCC-02-DM-013



RLCC-02-DM-014



RLCC-02-DM-015



RLCC-02-DM-016



RLCC-02-DM-017



RLCC-02-DM-018

State of California - The Resources Agency **Primary #**
DEPARTMENT OF PARKS AND RECREATION **HRI #**
PHOTOGRAPH RECORD **Trinomial**

Page ___ **of** ___ **Project Name:** RLCC-03-187.ARS3 **Year** 2021

Temporary Number/Resource Name: _____

Image Type: ☐ (**bw**) 35mm B&W film ☐ (**cp**) 35mm Color Print film ☐ (**cs**) 35mm Color Slide film
☐ (**di**) Digital-Internal Memory ☐ (**dm**) Digital-Memory flash card

Camera Type and Model: moto Z 4 **Lens Size:** N/A

Film Type and Speed: N/A

Negatives Kept at: N/A **Roll Number:** RLCC-03-Dm

Mo.	Day	Time	Frame/ File Name	Subject/Description	View Toward
12	13	8:54	001	OV fence line along N boundary	E
"	"	11:09	002	OV Temp RLCC-1	4°
"	"	11:15	003	" " " " worked surface	275°
"	"	11:23	004	" " " " " " w/arrow	Oblique
"	"	11:43	005	" " " 2	220°
"	"	11:46	006	Temp RLCC-2 worked surface w/arrow	Oblique
"	"	11:57	007	OV of Temp RLCC-2 & 3 (3 is in foreground)	50°
"	"	11:57	008	OV of Temp RLCC-3	50°
"	"	11:57	009	OV Temp RLCC-3 worked surface w/arrow	Oblique
"	"	12:15	010	" Temp RLCC-1	300°
"	"	12:39	011	White sage	oblique
"	"	1:04	012	RLCC Temp-4 Overview	216°
"	"	1:08	013	" " " "	216°
"	"	1:09	014	Overview of Temp RLCC-4 (from below)	4°
"	"	1:56	015	OV of location of RLCC Temp-4 from near NW corner	164°
"	"	1:56	016	" " " of RLCC Temp-1 from near NW corner (temp 4 is upslope)	74°

DPR 523i (9/2013)



RLCC-03-DM-001



RLCC-03-DM-002



RLCC-03-DM-003



RLCC-03-DM-004



RLCC-03-DM-005



RLCC-03-DM-006



RLCC-03-DM-007



RLCC-03-DM-008



RLCC-03-DM-009



RLCC-03-DM-001



RLCC-03-DM-011



RLCC-03-DM-013



RLCC-03-DM-014



RLCC-03-DM-015



RLCC-03-DM-016

State of California - The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
PHOTOGRAPH RECORD

Primary #
HRI #
Trinomial

Page ___ of ___ **Project Name:** RLCC-03-187.ARS3 **Year** 2021

Temporary Number/Resource Name: _____

Image Type: ☐ (**bw**) 35mm B&W film ☐ (**cp**) 35mm Color Print film ☐ (**cs**) 35mm Color Slide film
☐ (**di**) Digital-Internal Memory ☐ (**dm**) Digital-Memory flash card

Camera Type and Model: moto Z4 **Lens Size:** N/A

Film Type and Speed: N/A

Negatives Kept at: N/A **Roll Number:** RLCC-04-DM

Mo.	Day	Time	Frame/ File Name	Subject/Description	View Toward
12	17	8:05	001	RLCC-1	150°
12	17	8:10	002	" "	265°
12	17	9:42	003	" " Slick (milling surface) 1	Plan
12	17	9:54	004	" " milling surface 2	Plan
12	17	11:44	005	RLCC-4 milling surface 1	Plan
12	17	11:49	006	" " " " 2	Plan
12	17	12:24	007	OV of RLCC-4	290°

DPR 523i (9/2013)



RLCC-04-DM-001



RLCC-04-DM-002



RLCC-04-DM-003



RLCC-04-DM-004



RLCC-04-DM-005



RLCC-04-DM-006



RLCC-04-DM-007

State of California - The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
PHOTOGRAPH RECORD

Primary #
HRI #
Trinomial

Page ___ of ___ **Project Name:** RLCC-03-187.ARS3 **Year** 2021

Temporary Number/Resource Name: _____

Image Type: ☐ (**bw**) 35mm B&W film ☐ (**cp**) 35mm Color Print film ☐ (**cs**) 35mm Color Slide film
☐ (**di**) Digital-Internal Memory ☐ (**dm**) Digital-Memory flash card

Camera Type and Model: MotoZ4 **Lens Size:** N/A

Film Type and Speed: N/A

Negatives Kept at: N/A **Roll Number:** RLCC-05-DM

Mo.	Day	Time	Frame/ File Name	Subject/Description	View Toward
12	18	8:30	001	Oblique ms 1+2 Boulder 1 (RLCC-Temp 2)	—
"	"	8:31	002	Oblique Boulder 1 (RLCC-Temp 2)	—
"	"	9:44	003	" " 2 ms 1 (RLCC-Temp 2)	—
"	"	9:56	004	Ov fence posts/North central survey area trending/s	180°

DPR 523i (9/2013)



RLCC-05-DM-001



RLCC-05-DM-002



RLCC-05-DM-003



RLCC-05-DM-004

CONFIDENTIAL APPENDIX C

Record Search Results (not provided by EIC)

APPENDIX D

Native American Coordination

Sacred Lands File & Native American Contacts List Request

NATIVE AMERICAN HERITAGE COMMISSION
1550 Harbor Blvd., Suite 100
West Sacramento, CA 95691-3830
(916) 373-3710
(916) 373-5471 – FAX
nahc@nahc.ca.gov

Information Below is Required for a Sacred Lands File Search

Project: RLCC-03-187 - Golden Meadows

County: Riverside

USGS Quadrangle Name: Romoland

Township: 6 South Range: 3 West Section(s): 15 & 16

Company/Firm/Agency: L&L Environmental, Inc.

Contact Person: Bill Gillean

Street Address: 700 East Redlands Blvd, Suite U, PMB 351

City: Redlands, CA Zip: 92373

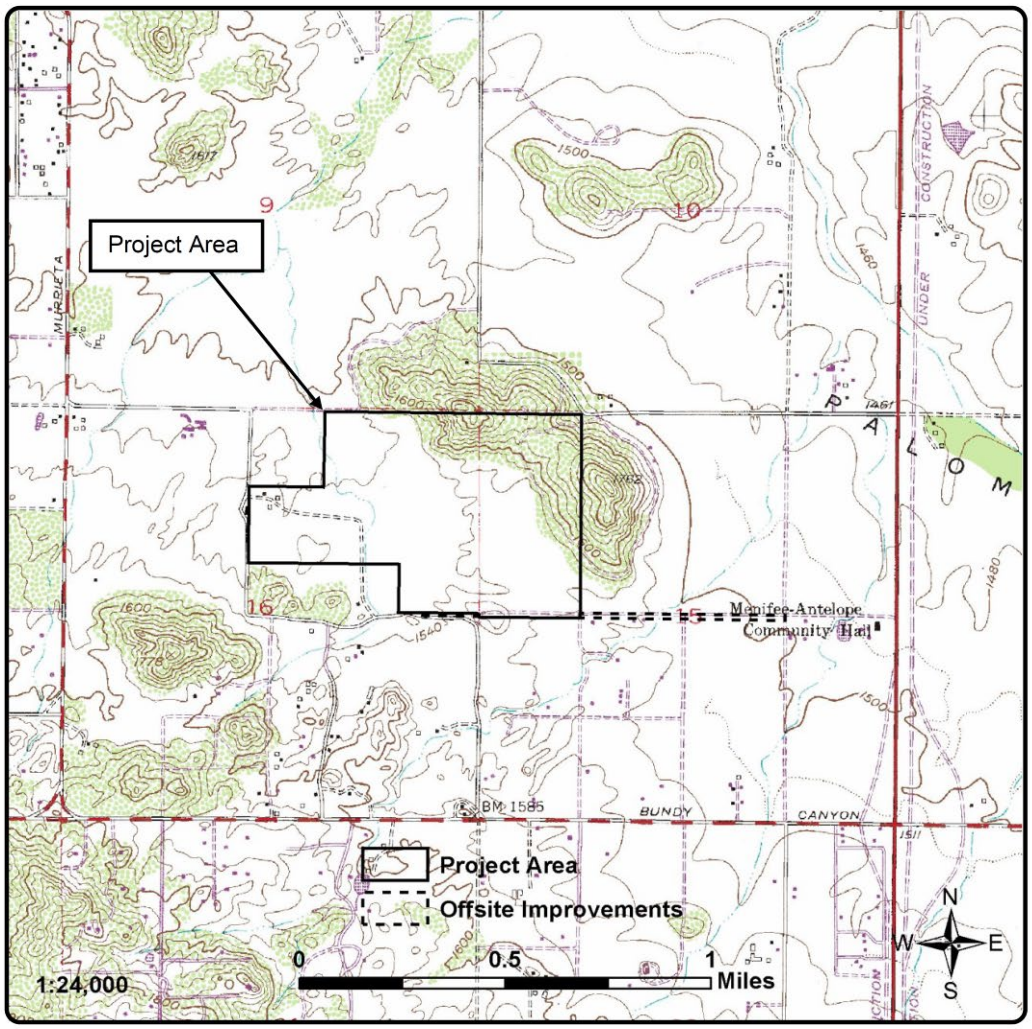
Phone: 909-335-9897

Fax: 909-335-9893

Email: WGillean@LLenviroinc.com

Project Description:

The study area is a planned ±500 dwelling housing development covering ±103 acres within the City of Menifee, California.



L&L Environmental, Inc.

BIOLOGICAL AND CULTURAL INVESTIGATIONS AND MONITORING

RLCC-03-187
October 2021

Figure 2

Project Location Map
(USGS Romoland 1979 quadrangle,
Sections 15 & 16, Township 6 South, Range 3 West)

Golden Meadows, TT 31194
City of Menifee, California

STATE OF CALIFORNIA **Gavin Newsom, *Governor***

NATIVE AMERICAN HERITAGE COMMISSION

November 18, 2021

Bill Gillean
L&L Environmental, Inc.

Via Email to: WGillean@LLenviroinc.com

Re: RLCC-03-187 – Golden Meadows Project, Riverside County

Dear Mr. Gillean:

A record search of the Native American Heritage Commission (NAHC) Sacred Lands File (SLF) was completed for the information submitted for the above referenced project. The results were positive. Please contact the Pechanga Band of Luiseno Indians on the attached list for information. Please note that tribes do not always record their sacred sites in the SLF, nor are they required to do so. A SLF search is not a substitute for consultation with tribes that are traditionally and culturally affiliated with a project's geographic area. Other sources of cultural resources should also be contacted for information regarding known and recorded sites, such as the appropriate regional California Historical Research Information System (CHRIS) archaeological Information Center for the presence of recorded archaeological sites.

Attached is a list of Native American tribes who may also have knowledge of cultural resources in the project area. This list should provide a starting place in locating areas of potential adverse impact within the proposed project area. Please contact all of those listed; if they cannot supply information, they may recommend others with specific knowledge. By contacting all those listed, your organization will be better able to respond to claims of failure to consult with the appropriate tribe. If a response has not been received within two weeks of notification, the Commission requests that you follow-up with a telephone call or email to ensure that the project information has been received.

If you receive notification of change of addresses and phone numbers from tribes, please notify the NAHC. With your assistance, we can assure that our lists contain current information.

If you have any questions or need additional information, please contact me at my email address: Andrew.Green@nahc.ca.gov.

Sincerely,

Andrew Green

Andrew Green
Cultural Resources Analyst

Attachment

CHAIRPERSON
Laura Miranda
Luiseño

VICE CHAIRPERSON
Reginald Pagaling
Chumash

PARLIAMENTARIAN
Russell Attebery
Karuk

COMMISSIONER
William Mungary
Paiute/White Mountain Apache

COMMISSIONER
Isaac Bojorquez
Ohlone-Costanoan

COMMISSIONER
Sara Dutschke
Miwok

COMMISSIONER
Buffy McQuillen
Yokayo Pomo, Yuki, Nomlaki

COMMISSIONER
Wayne Nelson
Luiseño

COMMISSIONER
Stanley Rodriguez
Kumeyaay

EXECUTIVE SECRETARY
Christina Snider
Pomo

NAHC HEADQUARTERS
1550 Harbor Boulevard
Suite 100
West Sacramento,
California 95691
(916) 373-3710
nahc@nahc.ca.gov
NAHC.ca.gov

Native American Heritage Commission
Native American Contact List
Riverside County
11/18/2021

Agua Caliente Band of Cahuilla Indians
Jeff Grubbe, Chairperson
5401 Dinah Shore Drive — Cahuilla
Palm Springs, CA, 92264
Phone: (760) 699 - 6800
Fax: (760) 699-6919

Agua Caliente Band of Cahuilla Indians
Patricia Garcia-Plotkin, Director
5401 Dinah Shore Drive — Cahuilla
Palm Springs, CA, 92264
Phone: (760) 699 - 6907
Fax: (760) 699-6924
ACBCI-THPO@aguacaliente.net

Augustine Band of Cahuilla Mission Indians
Amanda Vance, Chairperson
P.O. Box 846 — Cahuilla
Coachella, CA, 92236
Phone: (760) 398 - 4722
Fax: (760) 369-7161
hhaines@augustinetribe.com

Cabazon Band of Mission Indians
Doug Welmas, Chairperson
84-245 Indio Springs Parkway — Cahuilla
Indio, CA, 92203
Phone: (760) 342 - 2593
Fax: (760) 347-7880
jstapp@cabazonindians-nsn.gov

Cahuilla Band of Indians
Daniel Salgado, Chairperson
52701 U.S. Highway 371 — Cahuilla
Anza, CA, 92539
Phone: (951) 763 - 5549
Fax: (951) 763-2808
Chairman@cahuilla.net

Los Coyotes Band of Cahuilla and Cupeño Indians
Ray Chapparosa, Chairperson
P.O. Box 189 — Cahuilla
Warner Springs, CA, 92086-0189
Phone: (760) 782 - 0711
Fax: (760) 782-0712

Morongo Band of Mission Indians
Robert Martin, Chairperson
12700 Pumarra Road — Cahuilla, Serrano
Banning, CA, 92220
Phone: (951) 755 - 5110
Fax: (951) 755-5177
abrierty@morongo-nsn.gov

Morongo Band of Mission Indians
Ann Brierty, THPO
12700 Pumarra Road — Cahuilla, Serrano
Banning, CA, 92220
Phone: (951) 755 - 5259
Fax: (951) 572-6004
abrierty@morongo-nsn.gov

Pala Band of Mission Indians
Shasta Gaughen, Tribal Historic Preservation Officer
PMB 50, 35008 Pala Temecula Rd. — Cupeno, Luiseno
Pala, CA, 92059
Phone: (760) 891 - 3515
Fax: (760) 742-3189
sgaughen@palatribe.com

Pechanga Band of Luiseno Indians
Mark Macarro, Chairperson
P.O. Box 1477 — Luiseno
Temecula, CA, 92593
Phone: (951) 770 - 6000
Fax: (951) 695-1778
epreston@pechanga-nsn.gov

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 Resource Section 5097.98 of the Public Resources Code.

This list is only applicable for contacting local Native Americans with regard to cultural resources assessment for the proposed RLCC-03-187 – Golden Meadows Project, Riverside County.

PROJ-2021-005682 — 11/18/2021 02:29 PM — 1 of 3

Native American Heritage Commission
Native American Contact List
Riverside County
11/18/2021

Pechanga Band of Luiseno Indians
Paul Macarro, Cultural Resources Coordinator
P.O. Box 1477 Luiseno
Temecula, CA, 92593
Phone: (951) 770 - 6306
Fax: (951) 506-9491
pmacarro@pechanga-nsn.gov

Quechan Tribe of the Fort Yuma Reservation
Manfred Scott, Acting Chairman
Kw'ts'an Cultural Committee
P.O. Box 1899 Quechan
Yuma, AZ, 85366
Phone: (928) 750 - 2516
scottmanfred@yahoo.com

Quechan Tribe of the Fort Yuma Reservation
Jill McCormick, Historic Preservation Officer
P.O. Box 1899 Quechan
Yuma, AZ, 85366
Phone: (760) 572 - 2423
historicpreservation@quechantribe.com

Ramona Band of Cahuilla
Joseph Hamilton, Chairperson
P.O. Box 391670 Cahuilla
Anza, CA, 92539
Phone: (951) 763 - 4105
Fax: (951) 763-4325
admin@ramona-nsn.gov

Ramona Band of Cahuilla
John Gomez, Environmental Coordinator
P. O. Box 391670 Cahuilla
Anza, CA, 92539
Phone: (951) 763 - 4105
Fax: (951) 763-4325
jgomez@ramona-nsn.gov

Rincon Band of Luiseno Indians
Bo Mazzetti, Chairperson
One Government Center Lane Luiseno
Valley Center, CA, 92082
Phone: (760) 749 - 1051
Fax: (760) 749-5144
bomazzetti@aol.com

Rincon Band of Luiseno Indians
Cheryl Madrigal, Tribal Historic Preservation Officer
One Government Center Lane Luiseno
Valley Center, CA, 92082
Phone: (760) 297 - 2635
crd@rincon-nsn.gov

Santa Rosa Band of Cahuilla Indians
Lovina Redner, Tribal Chair
P.O. Box 391820 Cahuilla
Anza, CA, 92539
Phone: (951) 659 - 2700
Fax: (951) 659-2228
lsaul@santarosa-nsn.gov

Soboba Band of Luiseno Indians
Joseph Ontiveros, Cultural Resource Department
P.O. BOX 487 Cahuilla
San Jacinto, CA, 92581 Luiseno
Phone: (951) 663 - 5279
Fax: (951) 654-4198
jontiveros@soboba-nsn.gov

Soboba Band of Luiseno Indians
Isaiah Vivanco, Chairperson
P. O. Box 487 Cahuilla
San Jacinto, CA, 92581 Luiseno
Phone: (951) 654 - 5544
Fax: (951) 654-4198
ivivanco@soboba-nsn.gov

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 Resource Section 5097.98 of the Public Resources Code.

This list is only applicable for contacting local Native Americans with regard to cultural resources assessment for the proposed RLCC-03-187 – Golden Meadows Project, Riverside County.

PROJ-2021-005682 11/18/2021 02:29 PM 2 of 3

Native American Heritage Commission
Native American Contact List
Riverside County
11/18/2021

Torres-Martinez Desert Cahuilla Indians
Michael Mirelez, Cultural Resource Coordinator
P.O. Box 1160 Cahuilla
Thermal, CA, 92274
Phone: (760) 399 - 0022
Fax: (760) 397-8146
mmirelez@tmdci.org

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 Resource Section 5097.98 of the Public Resources Code.

This list is only applicable for contacting local Native Americans with regard to cultural resources assessment for the proposed RLCC-03-187 – Golden Meadows Project, Riverside County.

PROJ-2021-005682 11/18/2021 02:29 PM 3 of 3

L&L ENVIRONMENTAL, INC.
REGULATORY SERVICES
BIOLOGICAL & CULTURAL INVESTIGATIONS & MONITORING

November 19, 2021

Augustine Band of Cahuilla Mission Indians
Amanda Vance, Chairperson
P. O. Box 846
Coachella, CA 92236

hhaines@augustinetribe.com
(760)398-4722
(760)369-7161, fax

REGARDING: INFORMATION REQUEST LETTER ASSOCIATED WITH ONE CULTURAL RESOURCES ASSESSMENT PROJECT – APNS 360-300-002, -003, -004, -005, -006, -009, 360-350-001, AND PORTIONS OF OFFSITE APNS 360-180-009, 360-300-001, -008, 360-350-019, -022, -023, -024, 360-360-009, -010, -011, AND 360-380-004, TRACT 31194, LOCATED ON ±210 ACRES IN THE CITY OF MENIFEE, RIVERSIDE COUNTY, CALIFORNIA (USGS *ROMOLAND, CA* 7.5-MINUTE TOPOGRAPHIC QUADRANGLE) (L&L PROJECT RLCC-03-187)

Amanda Vance:

L&L Environmental, Inc. (L&L) is in the process of completing a California Environmental Quality Act (CEQA) compliant cultural resources assessment for a project area totaling ±210 acres in the City of Menifee, Riverside County, California. The proposed project includes construction of 572 single-family residences and associated infrastructure.

Environmental regulations, including CEQA, consider the impacts a project may have on cultural resources. To determine whether the proposed project may impact any cultural resources, L&L has conducted research on the project area, including the request of a Sacred Land Search (SLS) from the Native American Heritage Commission (NAHC). The NAHC indicates NAHC-recorded Native American cultural resources are located in the vicinity of the project and has directed inquiry for additional information be requested from the list of contacts provided. The NAHC has listed you as a contact and has indicated that you may have information about the potential for this project area to contain resources. This letter is not associated with a formal consultation process, but is an information request that will be included in our cultural resources assessment document.

We have enclosed maps showing the location of the project area. Generally, the project is located in Paloma Valley, west of the Interstate 215 freeway (I-215), south of Newport Road, and east of Murrieta Road (Figure 1). It is located between Wickerd Road to the south and Garbani Road to the north. The site is situated in Sections 15 and 16, Township 6 South,

Celebrating 20+ Years of Service to Southern CA and the Great Basin, WBE Certified (Caltrans, CPUC, WBENC)
Mailing Address: 700 East Redlands Blvd, Suite U, PMB#351, Redlands CA 92373
Delivery Address: 721 Nevada Street, Suite 307, Redlands, CA 92373
Webpage: llenviroinc.com | Phone: 909-335-9897 | FAX: 909-335-9893

Range 3 West, within the USGS Romoland 7.5' series quadrangle map (Figure 2). The site is generally bounded as follows: to the west by agricultural lands, Evans Road (unimproved), rural residential areas, and a school; to the east by a mixture of disturbed and relatively undisturbed vacant land, Sherman Road (unimproved), and a Frontier Communications building complex and Haun Road beyond; to the north by a mixture of disturbed and relatively undisturbed vacant lands, rural residential areas, Garbani Road (unimproved), and residential developments; and to the south by Wickerd Road (unimproved), and a mix of disturbed and relatively undisturbed vacant lands and rural residential areas (Figure 3).

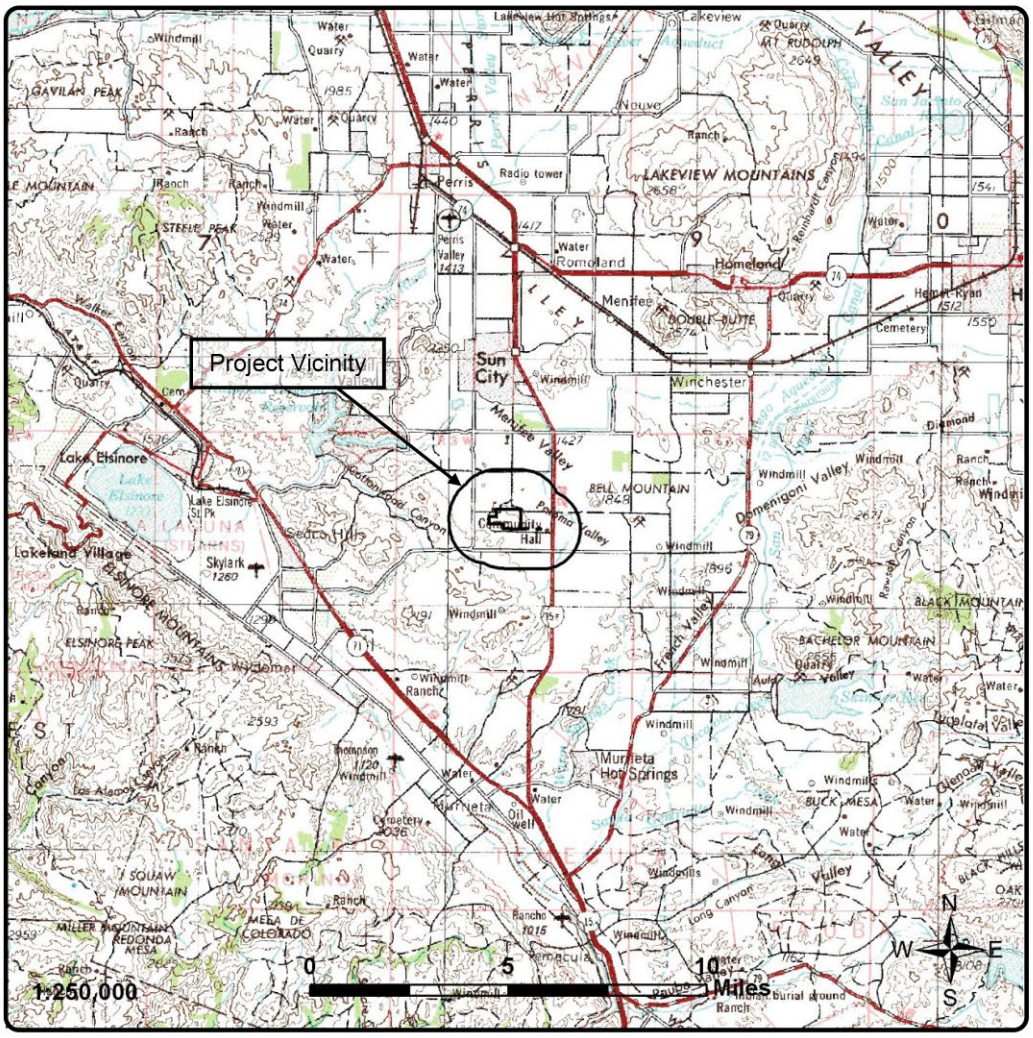
We wish to ask if you have any information or concerns about this project area and/or if the proposed project may have an impact on cultural resources that are important to you. Please feel free to contact me at **909-335-9897** or **WGillean@llenviroinc.com** if you have any questions or information or you may address and mail a response to my attention at our office.

Sincerely,
L&L Environmental, Inc.

William R. Gillean, B.S.
Archaeologist

WRG/jje

Encl: Figure 1: Project Vicinity Map
Figure 2: Project Location Map
Figure 3: Aerial Photograph



L&L Environmental, Inc.

BIOLOGICAL AND CULTURAL INVESTIGATIONS AND MONITORING

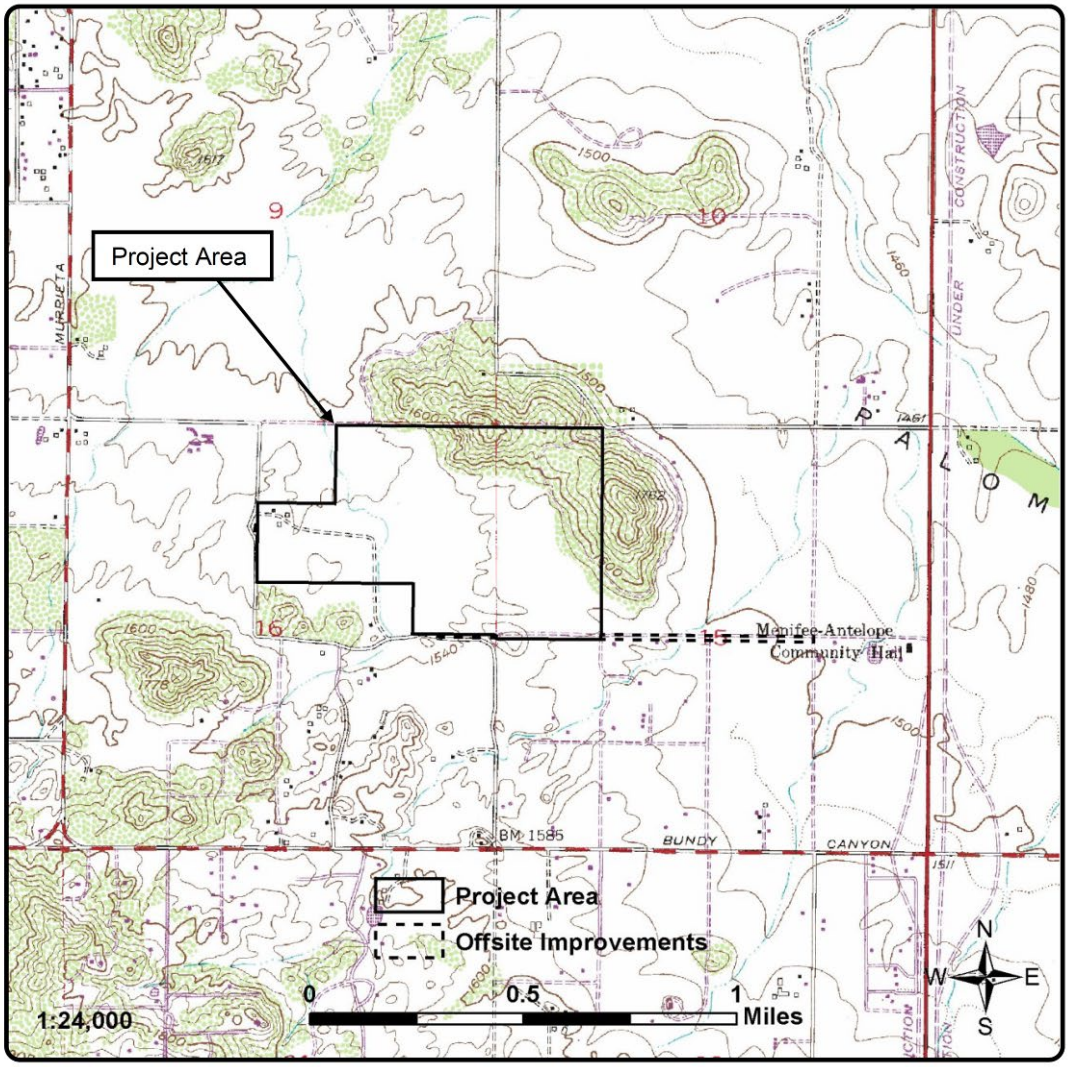
RLCC-03-187
November 2021

Figure 1

Project Vicinity Map

Golden Meadows, TT 31194
City of Menifee, California

Information Scoping Letter
Tract 31194, City of Menifee, Riverside County, California *November 2021*



L&L Environmental, Inc.

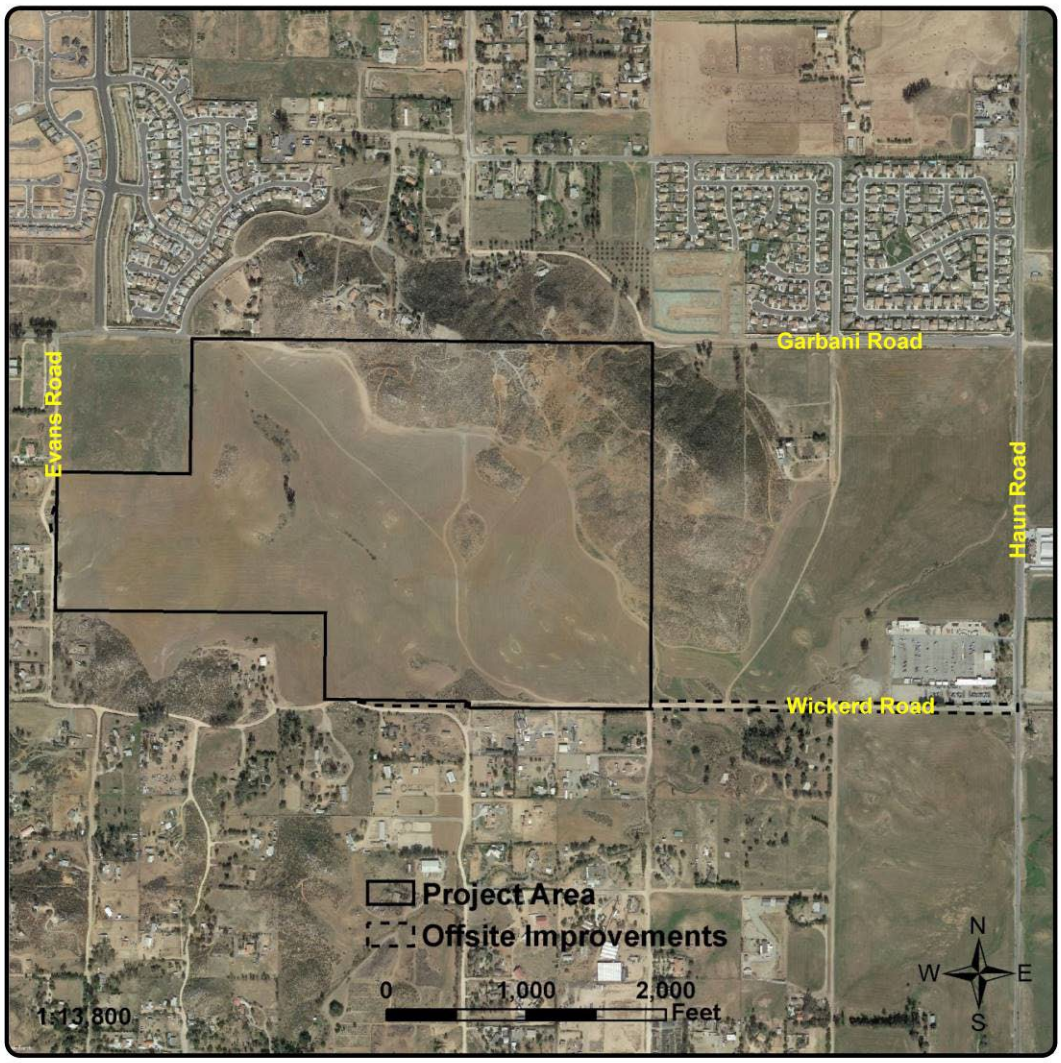
BIOLOGICAL AND CULTURAL INVESTIGATIONS AND MONITORING

RLCC-03-187
November 2021

Figure 2

Project Location Map
(USGS Romoland 1979 quadrangle,
Sections 15 & 16, Township 6 South, Range 3 West)

Golden Meadows, TT 31194
City of Menifee, California



L&L Environmental, Inc.

BIOLOGICAL AND CULTURAL INVESTIGATIONS AND MONITORING

RLCC-03-187
November 2021

Figure 3

Aerial Photograph
(Photo obtained from Google Earth, February 2018)

Golden Meadows, TT 31194
City of Menifee, California

AUGUSTINE BAND OF CAHUILLA INDIANS
PO Box 846 84-481 Avenue 54 Coachella CA 92236
Telephone: (760) 398-4722
Fax (760) 369-7161
Tribal Chairperson: Amanda Vance
Tribal Vice-Chairperson: William Vance
Tribal Secretary: Victoria Martin

Date: November 22, 2021

RE: **INFORMATION REQUEST LETTER ASSOCIATED WITH ONE CULTURAL RESOURCES ASSESSMENT PROJECT – APNS 360-300-002, -003, -004, -005, -006, -009, 360-350-001, AND PORTIONS OF OFFSITE APNS 360-180-009, 360-300-001, -008, 360-350-019, -022, -023, -024, 360-360-009, -010, -011, AND 360-380-004, TRACT 31194, LOCATED ON ±210 ACRES IN THE CITY OF MENIFEE, RIVERSIDE COUNTY, CALIFORNIA (USGS *ROMOLAND, CA* 7.5-MINUTE TOPOGRAPHIC QUADRANGLE) (L&L PROJECT RLCC-03-187)**

Dear: William R. Gillean
Archaeologist

Thank you for the opportunity to offer input concerning the development of the above-identified project. We appreciate your sensitivity to the cultural resources that may be impacted by your project and the importance of these cultural resources to the Native American peoples that have occupied the land surrounding the area of your project for thousands of years. Unfortunately, increased development and lack of sensitivity to cultural resources have resulted in many significant cultural resources being destroyed or substantially altered and impacted. Your invitation to consult on this project is greatly appreciated.

At this time, we are unaware of specific cultural resources that may be affected by the proposed project, however, in the event, you should discover any cultural resources during the development of this project please contact our office immediately for further evaluation.

Very truly yours,

Victoria Martin

Victoria Martin, Tribal Secretary
Augustine Band of Cahuilla Indians

Gonzalez Romero, Arysa (TRBL) <aromero@aguacaliente.net>
Tue 12/7/2021 8:47 AM

To: Bill Gillean
Greetings,

A records check of the Tribal Historic preservation office's cultural registry revealed that this project is not located within the Tribe's Traditional Use Area. Therefore, we defer to the other tribes in the area. This letter shall conclude our consultation efforts.

Thank you,

Arysa Gonzalez Romero, M.S., RPA.
Historic Preservation Technician
Agua Caliente Band of Cahuilla Indians
Tribal Historic Preservation Office
Main (760)-883-1327 | Cell (760)-831-2484

From: Quechan Historic Preservation Officer <historicpreservation@quechantribe.com>
Sent: Monday, November 22, 2021 8:58 AM
To: Jeff Sonnentag
Subject: RE: H. Jill McCormick - Information Request Letter for L&L Project RLCC-03-187 (Menifee Assemblage)

This email is to inform you that we have no comments on this project. We defer to the more local Tribes and support their decisions on the projects.

CONFIDENTIAL APPENDIX E

DPR 523 Forms

APPENDIX D

Geotechnical Report, Leighton and Associates, Inc.

GEOTECHNICAL EXPLORATION
PROPOSED WATER TANK, GOLDEN MEADOWS – TRACT 31194
MENIFEE AREA, RIVERSIDE COUNTY, CALIFORNIA

Prepared for

RICHLAND COMMUNITIES, INC.

4100 Newport Place Drive
Newport Beach, California 92672

Project No. 11813.002

April 7, 2021

Leighton and Associates, Inc.
A LEIGHTON GROUP COMPANY

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Richland Communities, Inc.
4100 Newport Place Drive
Newport Beach, California 92672

Attention: Mr. Brian Hardy, Vice President – Land Entitlement

Subject: Geotechnical Exploration
Proposed Water Tank, Golden Meadows – Tract 31194
Menifee Area, Riverside County, California

In accordance with our February 11, 2021, Leighton and Associates, Inc. (Leighton) is pleased to present this geotechnical exploration report for the proposed welded steel water tank to be constructed on the north side of the proposed Golden Meadows residential development, Tract 31194, located in the Menifee Area of Riverside County, California. This report presents our findings and conclusions, and geotechnical recommendations for design and construction of this proposed water tank.

Based on the results of this geotechnical exploration, the site of the proposed tank is generally a ridge top with moderate to steep surrounding slopes underlain by Cretaceous-Aged granitic rock (Gabbro). The site is not located within a currently designated Alquist-Priolo Special Studies Zone or a Riverside County fault zone.

We appreciate the opportunity to be of additional service. If you have any questions or if we can be of further assistance, please contact us at your convenience.

Respectfully Submitted,

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1.0 INTRODUCTION

1.1 Site Location and Description

The proposed water tank is located on a ridge top along the northern portion of Tract 31194, east of the intersection of Garbani Road and Evans Road in the Menifee Area of Riverside County, California *(see Site Location Map, Figure 1)*. This site is currently a vacant/undeveloped hilltop/ridgeline that slopes moderately to steeply in southerly and westerly directions. Site access is by a steep dirt road located to the south side of the site.

1.2 Proposed Water Tank

We understand that an approximately 103-foot diameter by 40-foot high welded steel water tank is proposed to be constructed at the Site as depicted on the provided conceptual grading plan (see Figure 3) with expansion pad for a potential future tank. Based on this plan, a desired pad elevation of 1,660 feet and cut slopes of up to approximately 60 feet in height may be constructed to create the required pad (future tank). Site access is expected to extend from an extension of Grabani Road and will also require cut slopes up to approximately 20 feet in height and fill slopes of up to approximately 40 feet in height. For the purpose of bearing capacity evaluation and slope stability analyses, a static pressure of 2,500 pound-per-square-foot (PSF) is assumed to be exerted by the proposed tank.

1.3 Purpose and Scope of Work

The purpose of our geotechnical study is to explore subsurface conditions at this proposed tank site and provide geotechnical recommendations for design and construction. In accordance with our proposal, the scope of this exploration has included the following tasks:

- **Desktop Review**: We reviewed relevant geotechnical literature, reports and aerial photographs for this tank site. These documents are referenced at the end of this report.
- **Geologic Mapping**: On February 17, 2021, we performed a site reconnaissance to observe site conditions and map any pertinent geologic features (i.e. bedding, joints, foliation, etc.) in existing/exposed cut slopes or natural bedrock exposures. We also collected surface samples for the purpose of laboratory testing and evaluation.

- **Geophysical Survey**: Four (4) seismic refraction lines were performed by our sub-consultant Atlas Technical Consultants, LLC. The purpose of this survey is to obtain readings/points for both vertical and lateral velocities so "tomography models" can be provided. Tomography is an enhanced seismic refraction method that allows changes in layer velocity to be revealed as gradients rather than discrete contacts. The seismic refraction survey report is presented in whole in Appendix B. The approximate locations of the survey transects are shown on Figure 3, Geotechnical Map. Three survey lines were conducted at the tank site and one survey line was conducted along the cut area for the planned access road.
- **Geotechnical Laboratory Testing**: Geotechnical laboratory tests were performed on surficial earth material collected during our site reconnaissance. Tests performed are included in Appendix A.
- **Geotechnical Analyses**: Data obtained from our background review, field exploration and geotechnical laboratory testing was evaluated to develop geotechnical conclusions and recommendations presented in this report.
- **Report Preparation**: Results of our geotechnical exploration have been summarized in this report to address geotechnical conditions encountered at the site, including our geotechnical findings, conclusions and recommendations for tank design and construction.

Important information about limitations of geotechnical reports is presented in Appendix E, *GBA Important Information About This Geotechnical Engineering Report*.

2.0 FINDINGS

2.1 Regional Geology/Settings

The subject property is located within a prominent natural geomorphic province in southwestern California known as the Peninsular Ranges. This province is characterized by steep, elongated ranges and valleys that generally trend northwestward. Tectonic activity along the numerous faults in the region has created the geomorphology present today. Specifically, the property is situated in the southern portion of the Perris Block, a stable, eroded mass of Cretaceous and older crystalline and metamorphic rock. Thin sedimentary, metamorphic and volcanic units locally mantle the bedrock with alluvial deposits filling in the lower valley and drainage areas. The Perris Block is bounded by the San Jacinto Fault Zone to the northeast, the Elsinore Fault Zone to the southwest, the Cucamonga Fault Zone to the northwest and the poorly-defined northern boundary of the Temecula Basin to the southeast. The Temecula segment of the active Lake Elsinore Fault Zone is located approximately 6.4 miles to the southwest.

2.2 Site Geology

As regionally mapped on Figure 2, the site is underlain by gabbroic bedrock. Our field exploration indicates that this bedrock is generally covered with a relatively thin layer of surficial soils as further described below.

2.2.1 Surficial Soils

Surficial soils including topsoil and localized artificial fill should be expected within the site. These soils are expected to be relatively shallow (<3 feet), but they may be deeper in localized areas such as current access road. Expansion Index (EI) testing was performed on a representative soil sample indicate that these materials (silty sand) possess a very low expansion potential (EI=0). Test results are included in Appendix A.

2.2.2 Cretaceous-Aged Gabbroic Bedrock

Bedrock is exposed on outcrops and on steeper hillsides throughout the site. This granular granitic-type bedrock is generally dark gray in color, massive and jointed. Where exposed on the surface, the bedrock is moderately weathered and creates boulders along the hillsides up to 10 feet in diameter. The elevated portion of the site (north of future tank) has been cut into a relatively flat pad with bedrock exposed at the surface. The bedrock breaks down into granular silty to well-graded sand with gravel.

Jointing is common within this bedrock unit, limited exposures of undisturbed in-place bedrock were encountered throughout the site. Jointing typically dips to the south or southwest. Bedrock cut slopes will need to be geologically mapped as they are excavated to confirm the anticipated structural pattern and long-term stability.

2.3 Rippability and Excavation Characteristics

Review of provided conceptual site design indicates cuts (excavation below existing ground surface) up to 60 feet may be required to create the proposed pad for future tank and up to 20 feet for the proposed access road.

Based on our seismic refraction survey data performed by Atlas Technical Consultants, LLC. (Appendix B), rippable bedrock using Caterpillar D-9 dozer with a single shank should be anticipated to a depth of 10 to 20 feet BGS or may vary depending on location. However, very difficult ripping or blasting (or other rock reducing techniques) should be anticipated for deeper excavations or where measured shear wave velocities exceed 4,000 foot-per-second (fps) as shown on the “Tomograpgy Models” included in Appendix B. The relatively shallow and hard rock zones (green to red color) are likely due to buried corestones/remnant boulders, dikes, and/or less weathered rock.

A summary of the seismic refraction survey including rippability criteria based a Caterpillar D-9 dozer with a single shank is further provided in Appendix B. Trench excavation characteristics using conventional excavators may vary based on the specific equipment used. It is important that a contractor with excavation experience in similar conditions be consulted for the proper excavation methodology, equipment, and production rate based on the findings of this report.

2.4 Surface and Groundwater

Surface water was not encountered on this site during our field exploration. Groundwater is not expected to be encountered within the depth of excavation. However, localized seeps may occur at Formation contacts or in fractured zones immediately after rain events.

2.5 Faulting and Seismicity

Seismic hazards in Southern California could include strong ground shaking and fault rupture. No currently-known active surface faults cross or trend towards this project site. The subject site is not included within an Earthquake Fault Zone as created by the Alquist-

Priolo Earthquake Fault Zoning Act (Bryant and Hart, 2007). The nearest zoned active faults are the Temecula Segment of the Elsinore Fault Zone, approximately 6.4 miles southwest of the site and the Glen Ivy Segment of the Elsinore Fault Zone is located approximately 15.6 miles northwest of the site

A detailed review of vertical, sequential, stereo aerial photograph pairs was conducted to identify possible geomorphic evidence of faulting and landsliding. Various photos taken between 1949 and 1999 were reviewed (see references). Our review of aerial photographs and subsequent field observations do not provide geomorphic evidence supporting the existence of faulting or reveal any photo-lineaments that are typically associated with faulting in this region. The recent (<11,000 years) geologic history of this area reflects that this site is undergoing a regressive, erosional sequence. As observed in the aerial photographs, there are several deeply cut active, drainage channels that do not show any horizontal displacement that may be associated with active faulting.

2.6 Secondary Seismic Hazards

In general, secondary seismic hazards for sites in the region could include soil liquefaction, earthquake-induced settlement, lateral displacement and landsliding. The potential for secondary seismic hazards at the site is discussed below.

2.6.1 Seismically Induced Settlement

Seismically induced settlement consists of dry dynamic settlement (above groundwater) and liquefaction-induced settlement (below groundwater). During a strong seismic event, seismically induced settlement can occur within loose to moderately dense sandy soil due to reduction in volume during and shortly after a large, long-duration local earthquake. Settlement caused by ground shaking is often non-uniformly distributed, which can result in differential settlement. Based on the results of our exploration, seismic settlement is not considered a geotechnical constraint for this tank.

2.6.2 Seismically Induced Landslides

Based on the underlying bedrock formation and our review of aerial photographs and field observations, the site is not susceptible to seismically induced landslides.

2.7 Slope Stability

Proposed cut slopes up to 60 feet in height at 2:1 (horizontal:vertical) gradients are considered grossly stable for static and pseudo-static conditions. Compacted fill slopes up to 20 feet in height at 2:1 gradients are also considered grossly stable for static and

pseudo-static conditions. In addition, 1.5:1 cut slope in the granitic rock are also considered acceptable from a gross slope stability perspective provided no adverse geologic conditions observed during grading. As such, these cut slopes should be observed by an engineering geologist during grading to verify jointing or fracture patterns and recommend remedial measures, if needed.

3.0 CONCLUSIONS AND RECOMMENDATIONS

Based on results of this geotechnical exploration, the proposed tank site pad is underlain by granitic rock/Gabbro. The site is not located within a currently designated Alquist-Priolo Special Studies Zone or a Riverside County fault zone. However, as is the case for most of Southern California, strong ground shaking has and will occur at this site. Our geotechnical recommendations for design and construction of this proposed water tank are presented in the following sections.

3.1 Tank Foundation Location

Based on proposed pad elevations, the tank pad will be entirely cut into the granitic rock. Due to potentially weathered bedrock material along the shallow cut (daylight) areas we recommend a setback of 15 feet horizontally from daylight to ring foundation.

3.2 Earthwork

Earthwork is expected to generally consist of cut pad and access road excavation, pad surface preparation, and footing and pipeline construction. In addition, minor filling (~15 feet) may be required on the downhill side for access road. Specific earthwork recommendations are provided in the following subsections:

3.2.1 Site Preparation

Based on proposed grading concept, the tank pad is expected to expose dense gabbroic rock. If highly weathered bedrock/loose rocks or any undesirable geologic features are exposed within portions of the tank pad and/or subgrade for the access road, then such conditions should be addressed by the project geotechnical engineer or geologist prior to foundation construction.

3.2.2 Fill Placement and Compaction

Onsite very low expansive (EI<21) soils free of organics, debris, and oversized material less than (≤) 3-inches in largest dimension are suitable for use as structural fill on this site. Soils to be placed as fill, whether onsite or import material, should be reviewed by Leighton and tested if and as necessary.

To provide uniform subgrade and fill any potential voids created from removal of loose rock/materials, we recommend that a minimum of 6-inch layer consisting of granular base (Caltrans Class 2 or equivalent) be placed prior to construction of concrete floor slab. However, if removal of rock or loose material creates voids larger than 2 feet in depth, such areas should be subject to further evaluation as potentially needing additional filling procedures.

Where fill is being placed at slopes steeper-than (>) 5:1 (horizontal:vertical), proper surface preparations and benching should be implemented in accordance with latest edition of the "Greenbook", and approved by Leighton during construction. A 15-foot wide minimum fill slope keyway should be prepared to support the tank pad slope and access road fill slope (see Figure 5). As such, all areas to receive fill, including processed areas, fill slope, and benches, should be observed, mapped, and approved or tested by Leighton prior to proceeding with placement of fill.

3.2.3 Utility Trench Backfill

Utility trenches should be backfilled with compacted fill in accordance with Sections 306-1.2 and 306-1.3 of the "Greenbook". Utility trenches can be backfilled with on-site soils free of debris, organic and oversized material up to (≤) 3-inches in largest dimension. Prior to backfilling trenches, pipes should be bedded in and covered with either:

- **Sand**: A uniform, granular material that has a Sand Equivalent (SE) of (≥) 30 or greater and a maximum particle size of ¾-inches (or as specified by the pipe manufacturer), water densified in place, or
- **CLSM**: One sack cement slurry/Controlled Low Strength Material (CLSM) conforming to Section 201-6 of the "Greenbook".

Pipe bedding should extend at least 4-inches below any pipeline invert and at least 12 inches over the top of the pipeline. Native soils can be used as backfill over the pipe bedding zone, and should be placed in thin lifts, moisture conditioned above optimum, and mechanically compacted to at least 90 percent relative compaction, relative to the ASTM D 1557 laboratory maximum density.

3.3 Seismic Design Parameters

It is our understanding that the proposed water tank will be constructed of steel and the structural design of the tank will follow ANSI/AWWA D100-11. Therefore, the purpose of the seismic hazard evaluation is to identify and assess potential seismic hazards at the site in general accordance with the requirements of ANSI/AWWA D100, which generally follows the requirements of ASCE 7-16. Our seismic hazard evaluation includes development of peak ground acceleration (PGA) and design response spectra by using a seismic source model based on proximity of the site to active faults, major historical earthquakes, regional seismicity, and subsurface soil conditions at the site. Specifically, our scope includes estimation of peak horizontal ground acceleration and the response spectra at the site for the Maximum Considered Earthquake (MCE) and the Design Earthquake (DE) Site-specific ground motion parameters derived based on the

requirements of ASCE 7-16, Chapters 11 and 21. These seismic coefficients were calculated utilizing an interactive program on current United States Geological Survey (USGS) website (referred to as USGS General Procedure). Based on our site-specific seismic refraction survey, this site is classified as a Class **B** site:

Table 1. 2019 CBC Site-Specific Seismic Parameters

2013 CBC Site-Specific Seismic Design Parameters	Value
Site Longitude (decimal degrees)	-117.18905
Site Latitude (decimal degrees)	33.6555
Site Class Definition	**B**
Mapped Spectral Response Acceleration at 0.2s Period, S_s	1.41
Mapped Spectral Response Acceleration at 1s Period, S_1	0.52
Short Period Site Coefficient at 0.2s Period, F_a	*0.9*
Long Period Site Coefficient at 1s Period, F_v	*0.8*
Adjusted Spectral Response Acceleration at 0.2s Period, S_{MS}	1.26
Adjusted Spectral Response Acceleration at 1s Period, S_{M1}	0.42
Design Spectral Response Acceleration at 0.2s Period, S_{DS}	**0.84**
Design Spectral Response Acceleration at 1s Period, S_{D1}	**0.28**
Long-Period Transitions, T_L	**8 sec**

The results of this analysis also indicate that the adjusted Peak Ground Acceleration (PGA_m) for the MCE_G is 0.54g.

3.4 Tank Spread/Ring Footing Foundations

The proposed foundations and slabs should be designed in accordance with the structural consultants' design, the minimum geotechnical recommendations presented herein, and applicable ANSI/AWWA D100-11 requirements.

3.4.1 Minimum Embedment and Width

Conventional shallow spread/ring footings may be used to support the proposed tank, bearing solely on an undisturbed granitic rock approved by the geotechnical consultant. Tank footings should be embedded at least 12-inch below lowest adjacent grade, with a minimum width of 12-inch. These footings should have a minimum of 15 feet setback from adjacent descending slope/daylight.

3.4.2 Allowable Bearing Pressure

An allowable bearing pressure of 5,000 pounds-per-square-foot (psf) may be used for static and sustained live loads, based on minimum embedment depth and widths recommended above. The bearing pressure value may be increased by

250 psf for each additional foot of embedment or each additional foot of width to a maximum vertical bearing value of 6,000 psf. These allowable bearing pressures are for total dead loads and frequently applied live loads, and can be increased by one-third for short duration wind and seismic loads. Where applicable, a modulus of subgrade reaction of 450 pci may be used for design of footings/pads or any structures founded on this Formation.

All continuous footings should be reinforced with top and bottom reinforcing steel to provide structural continuity and to permit spanning of local irregularities. It is essential that we observe tank pad and footing excavations before reinforcing steel is placed.

3.4.3 Lateral Load Resistance

Lateral (horizontal) loads on foundations may be resisted by both frictional resistance along the base of the footing and passive resistance in properly compacted fill adjacent to the sides of footings. Frictional resistance between the base of footings poured (cast) directly on native rock or aggregate base may be computed using a coefficient of friction of 0.35, or 35-percent of sustained dead loads. Passive resistance may be computed using an equivalent fluid pressure of 300 pounds-per-cubic-foot (pcf) for undisturbed Pauba and/or new properly compacted fill. Passive pressure should not exceed 3,000 psf. These values may be increased by one-third when considering wind and seismic forces. Both friction and passive values have already been reduced by a factor-of-safety of 1.5, and can be used in combination.

3.4.4 Settlement Estimates

Based on the tank hydrostatic pressures presented in Section 1.2 (< 2,500 psf) and bearing on native rock, the settlement is expected to be less-than (<) ½-inch at the center of the tank and on the order of ¼-inch to negligible at the edge/perimeter.

3.5 Lateral Pressures for Retaining Structures

The lateral earth pressures below are provided for the design permanent retaining structures/walls. Earth pressures provided are ultimate values and a safety factor should be applied as appropriate.

Table 2. Static Lateral Earth Pressures

Conditions	Equivalent Fluid Weight (pcf)		
	Level Backfill[2]	2:1 Slope Backfill	1.5:1 Slope Backfill
Active (cantilever)	35	55	70
At-Rest (braced)	50	75	95
Passive[3]	250	-	-

Notes:
(1) Assumes drained condition
(2) Assumes a level condition behind and in front of wall foundation of project.
(3) Maximum passive pressure = 3,500 psf, level conditions.

Determination of appropriate design conditions (active or at-rest) depends on wall flexibility. If a rotation of more than 0.001 radian (0.06 degrees) is allowed, active pressure conditions apply; otherwise, at-rest condition governs.

Surcharge due to above grade loads on the wall backfill, such as traffic, should be considered in design of retaining walls. Vertical surcharge loads behind the retaining wall on or in the backfill within a 1:1 (horizontal:vertical) plane projection up and out from the retaining wall toe, should be considered as lateral and vertical surcharge. Unrestrained (cantilever) retaining walls should be designed to resist one-third of these surcharge loads applied as a uniform horizontal pressure on the wall. Braced walls should also be designed to resist an additional uniform horizontal-pressure equivalent to one-half of uniform vertical surcharge-loads.

Additional lateral earth pressures due to seismic shaking should also be considered in the design. In accordance with current engineering practices and research, an increment of lateral earth pressure equal to $14H^2$ where H is the height of the wall, may be applied at a distance of 0.5H above the toe of the wall. If the wall is restrained, the above increment of lateral earth pressure should be doubled. Under the combined effects of static and earthquake loads on the wall, a factor of safety between 1.1 and 1.2 is acceptable when evaluating the stability (sliding, overturning) of the wall (NAVFAC DM 7.2).

Where applicable, a coefficient of friction of 0.35 may be considered between the concrete/shotcrete walls and the backfill surrounding the tank to estimate downward drag forces.

3.6 Asphalt Paving for Driveway / Access Road

Pavement construction associated with the proposed access road should conform to latest version of *Caltrans Standard Specifications* or the *Standard Specifications for Public Works Construction* (Greenbook), and applicable County Standards. Based on design procedures outlined in the current Caltrans *Highway Design Manual*, recommended flexible (asphalt) pavement section is tabulated below for an assumed Traffic Index (TI) of 4.0 and R-value of 40.

Table 3. Preliminary Asphalt Pavement Section

Traffic Index	Thickness (inches)	
	Asphalt Concrete	Class 2 Aggregate Base
4.0	3.0	4.0

Representative samples of the actual subgrade materials for R-value testing, during subgrade preparation or prior to pavement construction, can be performed to refine this pavement design. An appropriate Traffic Index (TI) should be selected or verified by the project Civil Engineer prior to finalizing this pavement section design, based on anticipated truck traffic. This TI is based on only light auto and pickup-truck traffic.

Pavement subgrade soils should be prepared in accordance with Section 3.1 above. The Aggregate Base (AB) should be compacted to a minimum of 95 percent relative compaction (modified Proctor, ASTM D 1557). Aggregate base may be waived is asphalt concrete is placed directly on granitic rock.

3.7 Soil Corrosivity

3.7.1 Sulfate Attack

Sulfate ions in the soil can lower soil resistivity and can be highly aggressive to Portland cement concrete by combining chemically with certain constituents of the concrete, principally tricalcium aluminate. This reaction is accompanied by expansion and eventual disruption of the concrete matrix. Potentially high sulfate content could also cause corrosion of the reinforcing steel in concrete. The table below summarizes current standards for concrete exposed to sulfate-containing solutions:

Table 4. Sulfate Concentration and Sulfate Exposure

Sulfate In Water (parts-per-million)	Water-Soluble Sulfate (SO4) in soil (percentage by weight)	Sulfate Exposure
0-150	0.00 - 0.10	Negligible
150-1,500	0.10 - 0.20	Moderate (Seawater)
1,500-10,000	0.20 - 2.00	Severe
>10,000	Over 2.00	Very Severe

3.7.2 Ferrous Corrosivity

Many factors can affect corrosion potential of soil including soil moisture content, resistivity, permeability and pH, as well as chloride and sulfate concentration. In general, soil resistivity, which is a measure of how easily electrical current flows through soils, is the most influential factor. Based on the findings of studies presented in ASTM STP 1013 titled "Effects of Soil Characteristics on Corrosion" (February, 1989), the relationship between soil resistivity and soil corrosiveness was developed as tabulated below:

Table 5. Relationship between Soil Resistivity and Soil Corrosivity

Soil Resistivity (ohm-cm)	Classification of Soil Corrosiveness
0 to 900	Very Severely Corrosive
900 to 2,300	Severely Corrosive
2,300 to 5,000	Moderately Corrosive
5,000 to 10,000	Mildly Corrosive
10,000 to >100,000	Very Mildly Corrosive

Acidity is an important factor of soil corrosivity. The lower the pH (the more acidic the environment), the higher the soil corrosivity will be with respect to buried metallic structures and utilities. As soil pH increases above 7 (the neutral value), the soil is increasingly more alkaline and less corrosive to buried steel structures, due to protective surface films, which form on steel in high pH environments. Chloride and sulfate ion concentrations, and pH appear to play secondary roles in affecting corrosion potential. High chloride levels tend to reduce soil resistivity and break down otherwise protective surface deposits, which can result in corrosion of buried steel or reinforced concrete structures.

3.7.3 Soil Corrosivity Test Results Summary

As a preliminary screening process for sulfates in soils, we have performed laboratory tests on a representative surface soil-sample. As summarized in Table 6 (below), our laboratory test results indicated negligible concentration of soluble sulfates. No special measures to mitigate sulfate exposure are recommended

based on the test results. Import soils (if any) should also be tested for sulfate content.

Based on minimum-resistivity laboratory test results, the onsite soil is generally considered very mildly-corrosive to ferrous metals. Ferrous pipe can be protected by polyethylene bags, tape or coatings, di-electric fittings, concrete encasement or other means to separate the pipe from wet onsite clayey soils. Further testing of import and possibly site soil corrosivity could be performed and specific recommendations for corrosion protection may need to be provided by a qualified corrosion engineer.

Table 6. Soil Corrosivity Test Results Summary

Boring Number	Sample Depth (feet)	Sulfate Content (ppm)	Chloride Content (ppm)	pH	Resistivity (ohm-cm)
S-1	0 to 1	**111**	**20**	6.7	13,000

4.0 CONSTRUCTION CONSIDERATIONS

4.1 Trench Excavations

Based on our field observations, caving of cohesionless and sandy soils will likely be encountered in unshored trench excavations. To protect workers entering excavations, excavations should be performed in accordance with OSHA and Cal-OSHA requirements, and the current edition of the California Construction Safety Orders, see: http://www.dir.ca.gov/title8/sb4a6.html

Contractors should be advised that fill and cohesionless alluvial/colluvial soils should be considered Type C soils as defined in the California Construction Safety Orders. As such, excavations less-than (<) 20 feet deep within Type C soils should be sloped back no steeper than 1½:1 (horizontal:vertical), where workers are to enter the excavation. Weathered granitic rock may be classified as OSHA soil Type A. Therefore, unshored temporary cut slopes should be no steeper than ¾:1 (horizontal:vertical), for a height no-greater-than (≤) 10 feet. These recommended temporary cut slopes assume a level ground surface for a distance equal to one-and-a-half (x1.5) the depth of excavation. However, unshored excavations may be impractical near adjacent existing utilities and structures; so shoring may still be required depending on trench locations.

During construction, soil conditions should be regularly evaluated to verify that conditions are as anticipated. The contractor is responsible for providing the "competent person" required by OSHA standards to evaluate soil conditions. Close coordination between the competent person and Leighton. should be maintained to facilitate construction while providing safe excavations.

4.2 Temporary Trench Shoring

Typical cantilever shoring can be designed based on the active equivalent fluid pressure of 33 pounds-per-cubic-foot (pcf) where there is no adverse bedding. If excavations are braced at the top and at specific depth intervals, then braced earth pressure may be approximated by a uniform rectangular soil pressure distribution. This uniform pressure expressed in pounds-per-square-foot (psf), may be assumed to be 20 multiplied by H for design, where H is equal to the depth of the excavation being shored, in feet. These recommendations are valid only for trenches not exceeding 10-feet in depth at this site.

4.3 Geotechnical Services during Construction

Our geotechnical recommendations presented in this report are based on subsurface conditions as interpreted from limited subsurface explorations and limited geotechnical laboratory testing. Our geotechnical recommendations provided in this report are based on information available at the time the report was prepared and may change as plans are developed. Additional geotechnical exploration, testing and/or analysis may be required based on final plans. Leighton and Associates, Inc. should review site grading, foundation and shoring (if any) plans when available, to comment further on geotechnical aspects of this project and check to see general conformance of final project plans to recommendations presented in this report.

Leighton and Associates, Inc. should be retained to provide geotechnical observation and testing during excavation and all phases of earthwork. Our conclusions and recommendations should be reviewed and verified by us during construction and revised accordingly if geotechnical conditions encountered vary from our findings and interpretations. Geotechnical observation and testing should be provided:

- During all cut excavation,
- During compaction of all fill materials,
- After excavation of all footings and prior to placement of concrete,
- During utility trench backfilling and compaction,
- During pavement subgrade and base preparation (if any), and/or
- If and when any unusual geotechnical/geologic conditions are encountered.

5.0 LIMITATIONS

This report was necessarily based in part upon data obtained from a limited number of observances, site visits, soil samples, tests, analyses, histories of occurrences, spaced subsurface explorations and limited information on historical events and observations. Such information is necessarily incomplete. The nature of many sites is such that differing characteristics can be experienced within small distances and under various climatic conditions. Changes in subsurface conditions can and do occur over time. This exploration was performed with the understanding that this subject site is proposed for development as described in Section 1.2 of this report. Please refer to Appendix E, ASFE's *Important Information About Your Geotechnical Report*, prepared by the Associated Soil and Foundation Engineers (ASFE) presenting additional information and limitations regarding geotechnical engineering studies and reports.

This report was prepared for Richland Communities, Inc. based on their needs, directions and requirements at the time of our exploration. This report is not authorized for use by, and is not to be relied upon by any party except Richland Communities, Inc., and their successors and assigns, with whom Leighton has contracted for the work. Use of or reliance on this report by any other party is at that party's risk. Unauthorized use of or reliance on this report constitutes an agreement to defend and indemnify Leighton from and against any liability which may arise as a result of such use or reliance, regardless of any fault, negligence, or strict liability of Leighton.

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Aerial Photos Reviewed:

3-12-99 C135 – 39 – 135-136

9-11-97 C116 – 39 – 46-47

10-4-95 CAP – 125-127

1-30-95 C104 – 39 – 10

2-2-93 C86 – 39 – 13

10-12-90 90205 – 125-126

7-30-86 86084

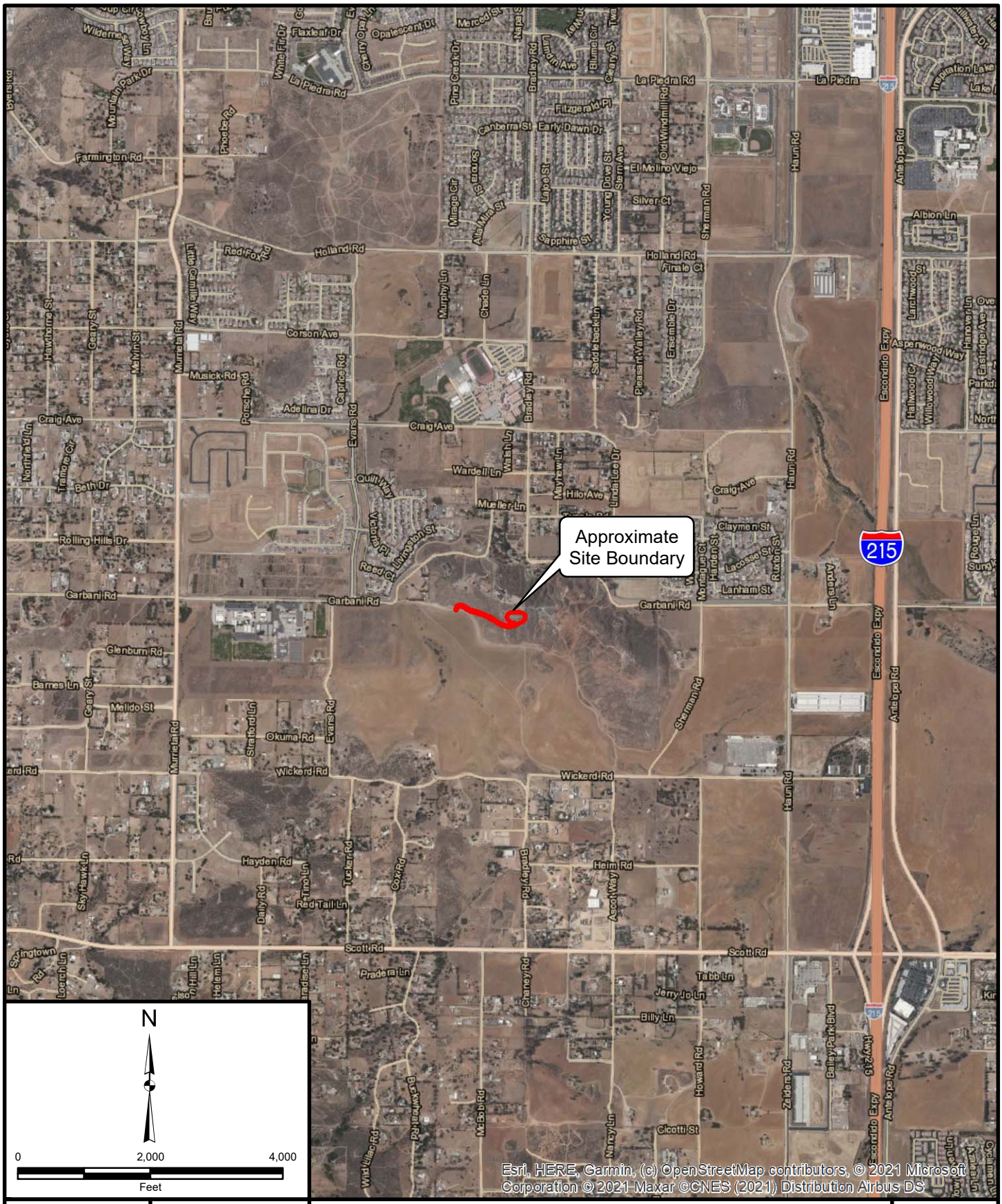
6-14-83 83045 – 101

12-14-79 79274 – 161A

5-15-67 2HH – 191-192

5-15-67 3HH – 20

5-23-49 9F – 124-125



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Scale:1 " = 2,000 '	Date: March 2021

Base Map: ESRI ArcGIS Online 2021
Thematic Information: Leighton
Author: Leighton Geomatics (btran)

SITE LOCATION MAP

Golden Meadows Tank Site
Tract 31194
Menifee Area, Riverside County, California

Figure 1

Leighton

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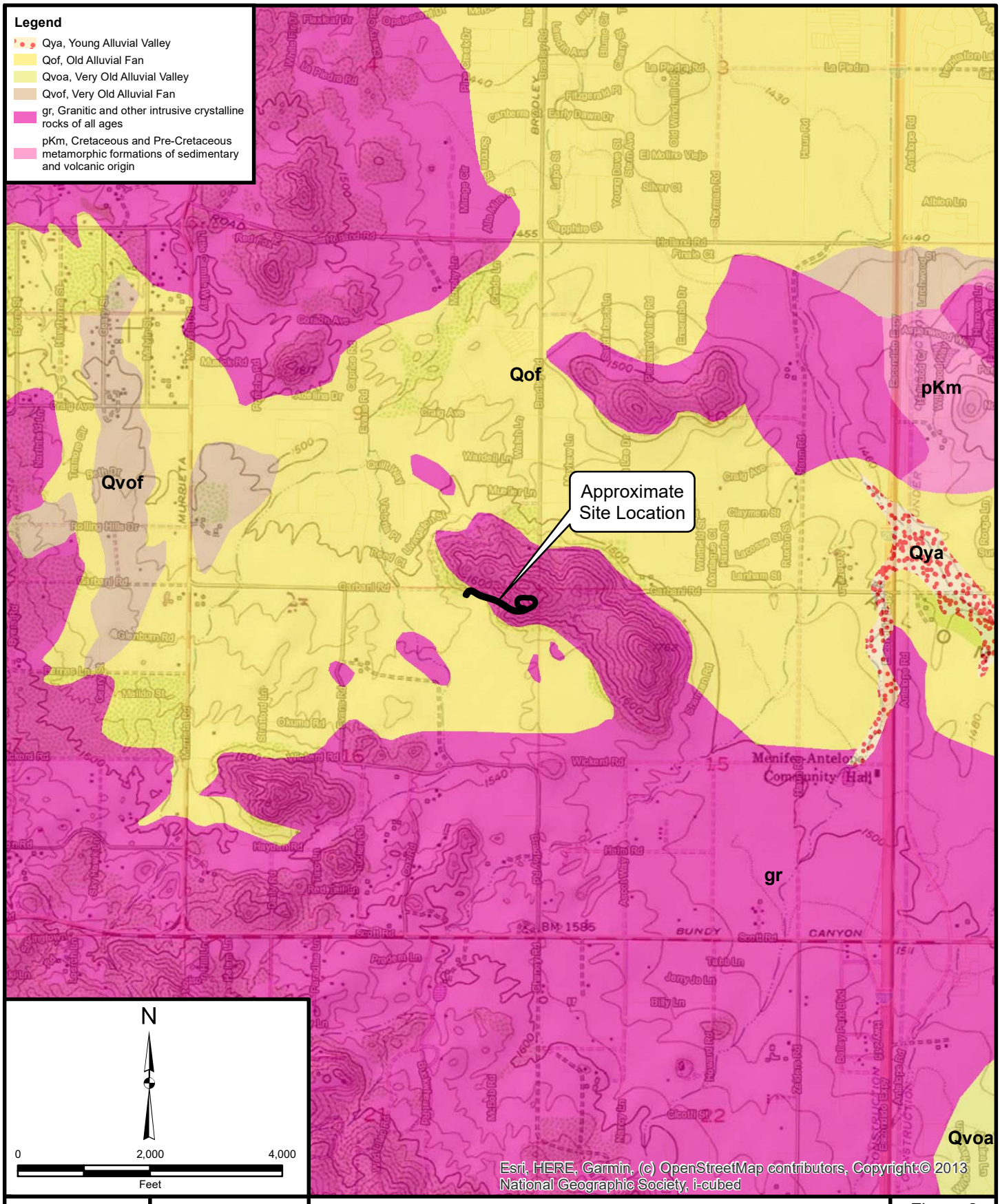

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Base Map: ESRI ArcGIS Online 2021
Thematic Information: Leighton, USGS
Author: Leighton Geomatics (btran)

REGIONAL GEOLOGY MAP

Golden Meadows Tank Site
Tract 31194
Menifee Area, Riverside County, California

Figure 2

Leighton

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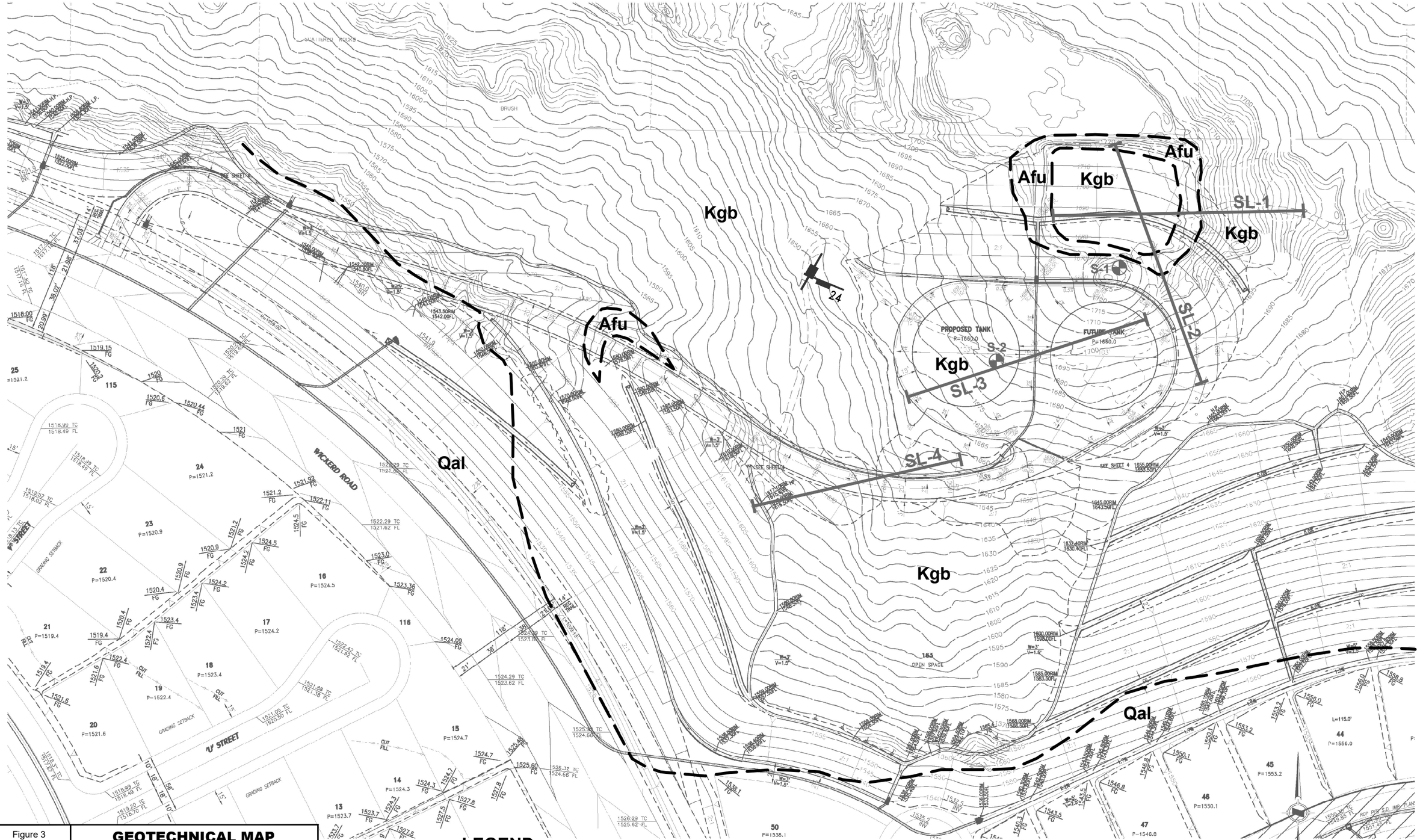
TRACT 31194 – TANK SITE GRADING EXHIBIT



LEGEND

Afu	ARTIFICIAL FILL UNDOCUMENTED	24	STRIKE AND DIP OF BEDROCK JOINT
Qal	QUATERNARY ALLUVIUM	SL-4	APPROXIMATE LOCATION OF SEISMIC REFRACTION LINE
Kgb	CRETACEOUS AGED GABBRO	S-2	APPROXIMATE LOCATION OF SURFACE SAMPLE

Figure 3

Leighton

GEOTECHNICAL MAP

Golden Meadows Tank Site
Tract 31194
Menifee Area, Riverside County, California

Proj: 11813.002	Eng/Geol: SIS/RFR
Scale: As Shown	Date: March 2021

V:\DRAFTING\11813\02\CAD\2021-02-23\11813-002_FD3_GM_2021-03-10.DWG (03-10-21 9:09:58AM) Plotted by: btran | Checked By: BQT | Drafted By: BQT

JANUARY 2020

APPENDIX A

Laboratory Test Results

Leighton

TESTS for SULFATE CONTENT
CHLORIDE CONTENT and pH of SOILS

Project Name: Golden Meadows TR31194 Tank Geo Tested By : M. Vinet Date: 02/22/21

Project No. : 11813.002 Data Input By: M. Vinet Date: 02/23/21

Boring No.	S-1			
Sample No.	S-1			
Sample Depth (ft)	0 - 1.0			
Soil Identification:	Poorly Graded Sand with Silt (SP-SM)			
Wet Weight of Soil + Container (g)	100.00			
Dry Weight of Soil + Container (g)	100.00			
Weight of Container (g)	0.00			
Moisture Content (%)	0.00			
Weight of Soaked Soil (g)	100.00			

SULFATE CONTENT, DOT California Test 417, Part II

Beaker No.	1			
Crucible No.	1			
Furnace Temperature (°C)	850			
Time In / Time Out	Timer			
Duration of Combustion (min)	45			
Wt. of Crucible + Residue (g)	25.1122			
Wt. of Crucible (g)	25.1095			
Wt. of Residue (g) (A)	0.0027			
PPM of Sulfate (A) x 41150	111.11			
PPM of Sulfate, Dry Weight Basis	**111**			

CHLORIDE CONTENT, DOT California Test 422

ml of Extract For Titration (B)	30			
ml of AgNO3 Soln. Used in Titration (C)	0.4			
PPM of Chloride (C -0.2) * 100 * 30 / B	20			
PPM of Chloride, Dry Wt. Basis	**20**			

pH TEST, DOT California Test 643

pH Value	**6.70**			
Temperature °C	21.0			

Leighton

SOIL RESISTIVITY TEST

DOT CA TEST 643

Project Name:	Golden Meadows TR31194 Tank Geo		Tested By :	M. Vinet	Date: 02/22/21
Project No. :	11813.002		Data Input By:	M. Vinet	Date: 02/23/21
Boring No.:	S-1		Depth (ft.) :	0 - 1.0	
Sample No. :	S-1				

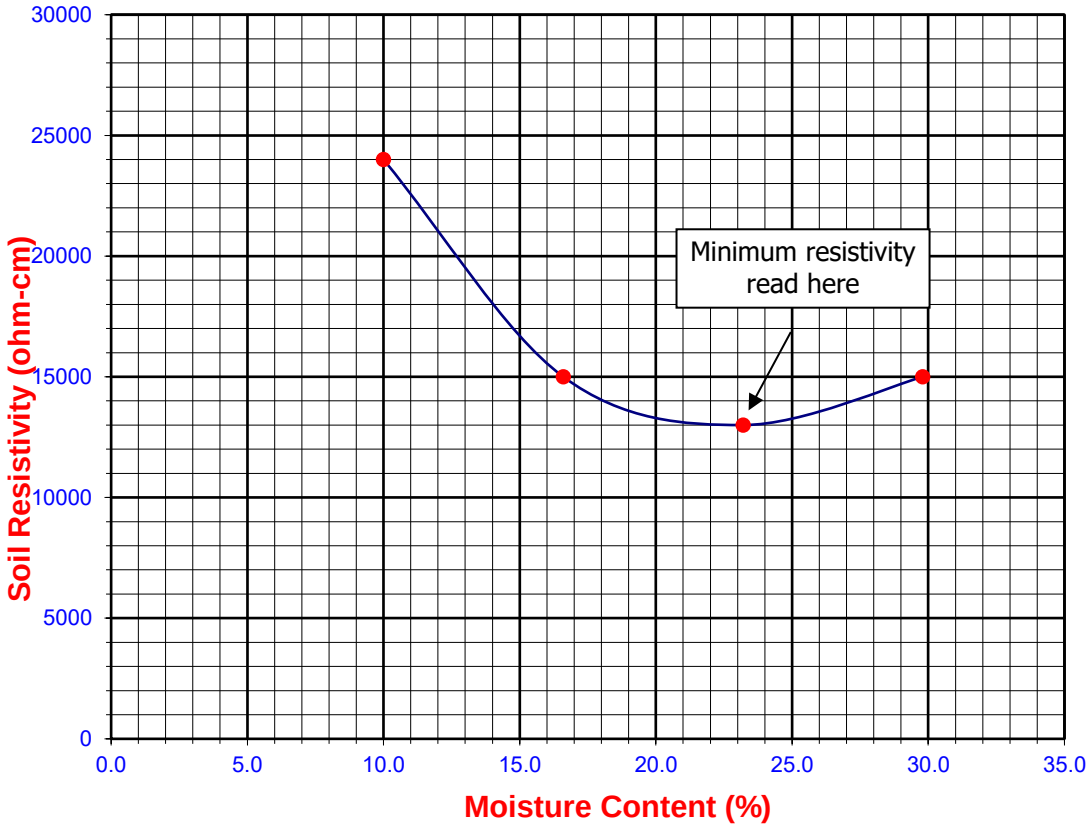
Soil Identification:* Poorly Graded Sand with Silt (SP-SM)

*California Test 643 requires soil specimens to consist only of portions of samples passing through the No. 8 US Standard Sieve before resistivity testing. Therefore, this test method may not be representative for coarser materials.

Specimen No.	Water Added (ml) (Wa)	Adjusted Moisture Content (MC)	Resistance Reading (ohm)	Soil Resistivity (ohm-cm)
1	50	10.00	24000	24000
2	83	16.60	15000	15000
3	116	23.20	13000	13000
4	149	29.80	15000	15000
5				

Moisture Content (%) (MCi)	0.00
Wet Wt. of Soil + Cont. (g)	100.00
Dry Wt. of Soil + Cont. (g)	100.00
Wt. of Container (g)	0.00
Container No.	A
Initial Soil Wt. (g) (Wt)	500.00
Box Constant	1.000
MC =(((1+Mci/100)x(Wa/Wt+1))-1)x100	

Min. Resistivity (ohm-cm)	Moisture Content (%)	Sulfate Content (ppm)	Chloride Content (ppm)	Soil pH	
				pH	Temp. (°C)
DOT CA Test 643		DOT CA Test 417 Part II	DOT CA Test 422	DOT CA Test 643	
13000	**23.2**	**111**	**20**	**6.70**	**21.0**



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EXPANSION INDEX of SOILS

ASTM D 4829

Project Name:	Golden Meadows TR31194 Tank Geo	Tested By:	M. Vinet	Date:	2/18/21
Project No. :	11813.002	Checked By:	M. Vinet	Date:	2/19/21
Boring No.:	S-1	Depth:	0 - 1.0		
Sample No. :	S-1	Location:	N/A		
Sample Description:	Poorly Graded Sand with Silt (SP-SM), Olive Brown.				

Dry Wt. of Soil + Cont. (gm.)	3350.7
Wt. of Container No. (gm.)	0.0
Dry Wt. of Soil (gm.)	3350.7
Weight Soil Retained on #4 Sieve	124.3
Percent Passing # 4	96.3

MOLDED SPECIMEN	Before Test	After Test
Specimen Diameter (in.)	4.01	4.01
Specimen Height (in.)	1.0000	0.9935
Wt. Comp. Soil + Mold (gm.)	590.0	619.8
Wt. of Mold (gm.)	200.0	200.0
Specific Gravity (Assumed)	2.70	2.70
Container No.	11	11
Wet Wt. of Soil + Cont. (gm.)	627.8	619.8
Dry Wt. of Soil + Cont. (gm.)	599.3	352.9
Wt. of Container (gm.)	327.8	200.0
Moisture Content (%)	10.5	18.9
Wet Density (pcf)	117.6	127.5
Dry Density (pcf)	106.5	107.2
Void Ratio	0.584	0.573
Total Porosity	0.368	0.364
Pore Volume (cc)	76.3	74.9
Degree of Saturation (%) [S meas]	**48.6**	**89.2**

SPECIMEN INUNDATION in distilled water for the period of 24 h or expansion rate < 0.0002 in./h.

Date	Time	Pressure (psi)	Elapsed Time (min.)	Dial Readings (in.)
2/18/21	11:30	1.0	0	0.5000
2/18/21	11:40	1.0	10	0.5000
	Add Distilled Water to the Specimen			
2/19/21	7:00	1.0	1160	0.4935
2/19/21	8:00	1.0	1220	0.4935

Expansion Index (EI meas) = ((Final Rdg - Initial Rdg) / Initial Thick.) x 1000	-6.5
Expansion Index (Report) = Nearest Whole Number or Zero (0) if Initial Height is > than Final Height	**0**

Rev. 03-08

APPENDIX B

Results of Seismic Refraction Survey



SEISMIC REFRACTION STUDY

GOLDEN MEADOWS TANK EXPLORATION

Menifee, California

PREPARED FOR:

Jeffery Deland
Leighton & Associates, Inc.
41715 Enterprise Circle North, Suite 103
Temecula, CA 92590

PREPARED BY:

Atlas Technical Consultants, LLC
6280 Riverdale Street
San Diego, CA 92120

March 9, 2021

6280 Riverdale Street
San Diego, CA 92120
(877) 215-4321 | oneatlas.com

March 9, 2021

Atlas No. 121058SWG
Report No. 1

MR. JEFFERY DELAND
LEIGHTON & ASSOCIATES, INC.
17781 COWAN
IRVINE, CA 92614

Subject: Seismic Refraction Study
Golden Meadows Tank Exploration
Menifee, California

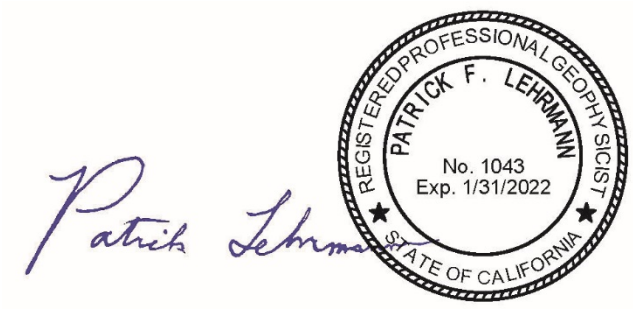
Dear Mr. Deland:

In accordance with your authorization, Atlas Technical Consultants has performed a seismic refraction study pertaining to the Golden Meadows Tank Exploration project located in Menifee, California. Specifically, our evaluation consisted of performing four seismic P-wave refraction traverses at the project site. The purpose of our evaluation was to develop subsurface velocity profiles of the study areas in order to assess the depth to bedrock and apparent rippability of the subsurface materials. Our field services were conducted on February 17th, 2021. This data report presents our methodology, equipment used, analysis, and results.

If you have any questions, please call us at 619.280.4321.

Respectfully submitted,
Atlas Technical Consultants LLC





Evan C. Anderson
Senior Staff Geophysicist

Patrick F. Lehrmann, P.G., P.Gp.
Principal Geologist/Geophysicist

ECA:PFL:ds

Distribution: Mr. Jeffery DeLand at @leightongroup.com

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2. SCOPE OF SERVICES 1
3. SITE AND PROJECT DESCRIPTION 1
4. STUDY METHODOLOGY 1
5. DATA ANALYSIS 3
6. RESULTS AND CONCLUSIONS 3
7. LIMITATIONS 3
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Figure 4a P-Wave Profile (SL-1)
Figure 4b P-Wave Profile (SL-2)
Figure 4c P-Wave Profile (SL-3)
Figure 4d P-Wave Profile (SL-4)

1. INTRODUCTION

In accordance with your authorization, Atlas Technical Consultants has performed an additional seismic refraction study pertaining to the Golden Meadows Tank Exploration project located in Menifee, California (Figure 1). Specifically, our evaluation consisted of performing four seismic P-wave refraction traverses at the project site. The purpose of our evaluation was to develop subsurface velocity profiles of the study areas in order to assess the depth to bedrock and apparent rippability of the subsurface materials. Our field services were conducted on February 17th, 2021. This data report presents our methodology, equipment used, analysis, and results.

2. SCOPE OF SERVICES

Our scope of services included:

- Performance of four seismic P-wave refraction traverses at the project site.
- Compilation and analysis of the data collected.
- Preparation of this data report presenting our results and conclusions.

3. SITE AND PROJECT DESCRIPTION

The project site is generally located west of State Route 215 and east of State Route 15 in Menifee, California (Figure 1). Specifically, the seismic traverses are located at the termination of Garbani Road along the southern slope of the adjacent hill. The seismic traverses were performed over slight to moderately steep terrain. Granite outcrops were present throughout the study areas. The study site was marked by dry, knee-high brush throughout. Figures 2 and 3 depict the general site conditions in the areas of the seismic traverses.

Based on our discussions with you, it is our understanding that new construction activities are proposed at the site and the results of our study may be used for the design and construction parameters pertaining to the project.

4. STUDY METHODOLOGY

A seismic P-wave (compression wave) refraction study was conducted at the project site to evaluate the rippability characteristics of the subsurface materials and to develop subsurface velocity profiles of the area studied. The seismic refraction method uses first-arrival times of refracted seismic waves to estimate the thicknesses and seismic velocities of subsurface layers. Seismic P-waves generated at the surface, using a hammer and plate, are refracted at boundaries separating materials of contrasting velocities. These refracted seismic waves are then detected by a series of surface vertical component 14.5-Hz geophones and recorded with a 24-channel Geometrics Geode seismograph. The travel times of the seismic P-waves are used in conjunction with the shot-to-geophone distances to obtain thickness and velocity information on the subsurface materials.

Four seismic traverses (SL-1 and SL-4) were conducted in the study area. The general locations and lengths of the lines were determined by surface conditions, site access, and depth of investigation. Shot points (signal generation locations) were conducted along the lines at the ends, midpoint, and intermediate points between the ends and the midpoint.

The seismic refraction theory requires that subsurface velocities increase with depth. A layer having a velocity lower than that of the layer above will not generally be detectable by the seismic refraction method and, therefore, could lead to errors in the depth calculations of subsequent layers. In addition, lateral variations in velocity, such as those caused by core stones, intrusions, or boulders can also result in the misinterpretation of the subsurface conditions. In general, the effective depth of evaluation for a seismic refraction traverse is approximately one-third to one-fifth of the length of the spread.

In general, the seismic P-wave velocity of a material can be correlated to rippability (see Table 1 below), or to some degree "hardness." Table 1 is based on published information from the Caterpillar Performance Handbook (Caterpillar, 2018), as well as our experience with similar materials, and assumes that a Caterpillar D-9 dozer ripping with a single shank is used. We emphasize that the cutoffs in this classification scheme are approximate and that rock characteristic, such as fracture spacing and orientation, play a significant role in determining rock quality or rippability. The rippability of a mass is also dependent on the excavation equipment used and the skill and experience of the equipment operator.

For trenching operations**,** the rippability values should be scaled downward. For example, velocities as low as 3,500 feet/second may indicate difficult ripping during trenching operations. In addition, the presence of boulders, which can be troublesome in narrow trenching operations, should be anticipated.

Table 1 – Rippability Classification

Seismic P-wave Velocity	Rippability
0 to 2,000 feet/second	Easy
2,000 to 4,000 feet/second	Moderate
4,000 to 5,500 feet/second	Difficult, Possible Blasting
5,500 to 7,000 feet/second	Very Difficult, Probable Blasting
Greater than 7,000 feet/second	Blasting Generally Required

It should be noted that the rippability cutoffs presented in Table 1 are slightly more conservative than those published in the Caterpillar Performance Handbook. Accordingly, the above classification scheme should be used with discretion, and contractors should not be relieved of making their own independent evaluation of the rippability of the on-site materials prior to submitting their bids.

5. DATA ANALYSIS

The collected data was processed using SIPwin (Rimrock Geophysics, 2003), a seismic interpretation program, and analyzed using SeisOpt Pro (Optim, 2008). SeisOpt Pro uses first arrival picks and elevation data to produce subsurface velocity models through a nonlinear optimization technique called adaptive simulated annealing. The resulting velocity model provides a tomography image of the estimated geologic conditions. Both vertical and lateral velocity information is contained in the tomography model. Changes in layer velocity are revealed as gradients rather than discrete contacts, which typically are more representative of actual conditions.

6. RESULTS AND CONCLUSIONS

As previously indicated, four seismic traverses were conducted as part of our study. Figures 4a, 4b, 4c, and 4d present the velocity models generated from our analysis. Based on the results, it appears the project site is underlain by moderately low-velocity materials in the very near-surface and higher velocity materials in the shallow surface. Distinct vertical and lateral velocity variations are evident in the models. Moreover, the degree of weathering and the depth to possible bedrock varies across the study area.

Based on the refraction results, variability in the excavatability (including depth of rippability) of the subsurface materials should be expected across the project areas. In addition, oversized materials should be expected. A contractor with excavation experience in similarly difficult conditions should be consulted for expert advice on excavation methodology, equipment, and production rate.

7. LIMITATIONS

The field evaluation and geophysical analyses presented in this report have been conducted in general accordance with current practice and the standard of care exercised by consultants performing similar tasks in the project area. No warranty, express or implied, is made regarding the conclusions, recommendations, and opinions presented in this report. There is no evaluation detailed enough to reveal every subsurface condition. Variations may exist and conditions not observed or described in this report may be present. Uncertainties relative to subsurface conditions can be reduced through additional subsurface exploration. Additional subsurface surveying will be performed upon request.

This document is intended to be used only in its entirety. No portion of the document, by itself, is designed to completely represent any aspect of the project described herein. Atlas should be contacted if the reader requires additional information or has questions regarding the content, interpretations presented, or completeness of this document. This report is intended exclusively for use by the client. Any use or reuse of the findings, conclusions, and/or recommendations of this report by parties other than the client is undertaken at said parties' sole risk.

8. SELECTED REFERENCES

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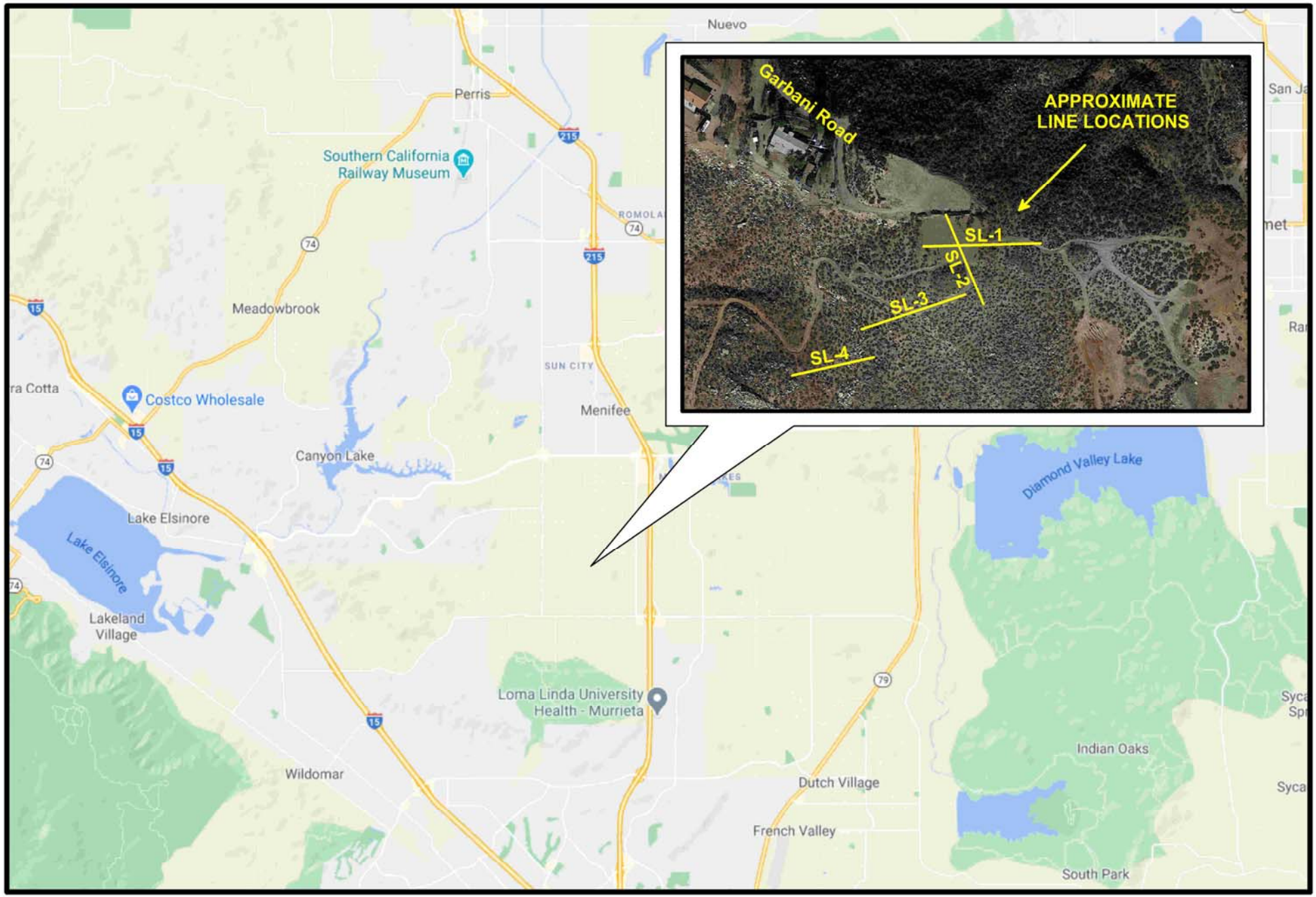


SITE LOCATION MAP

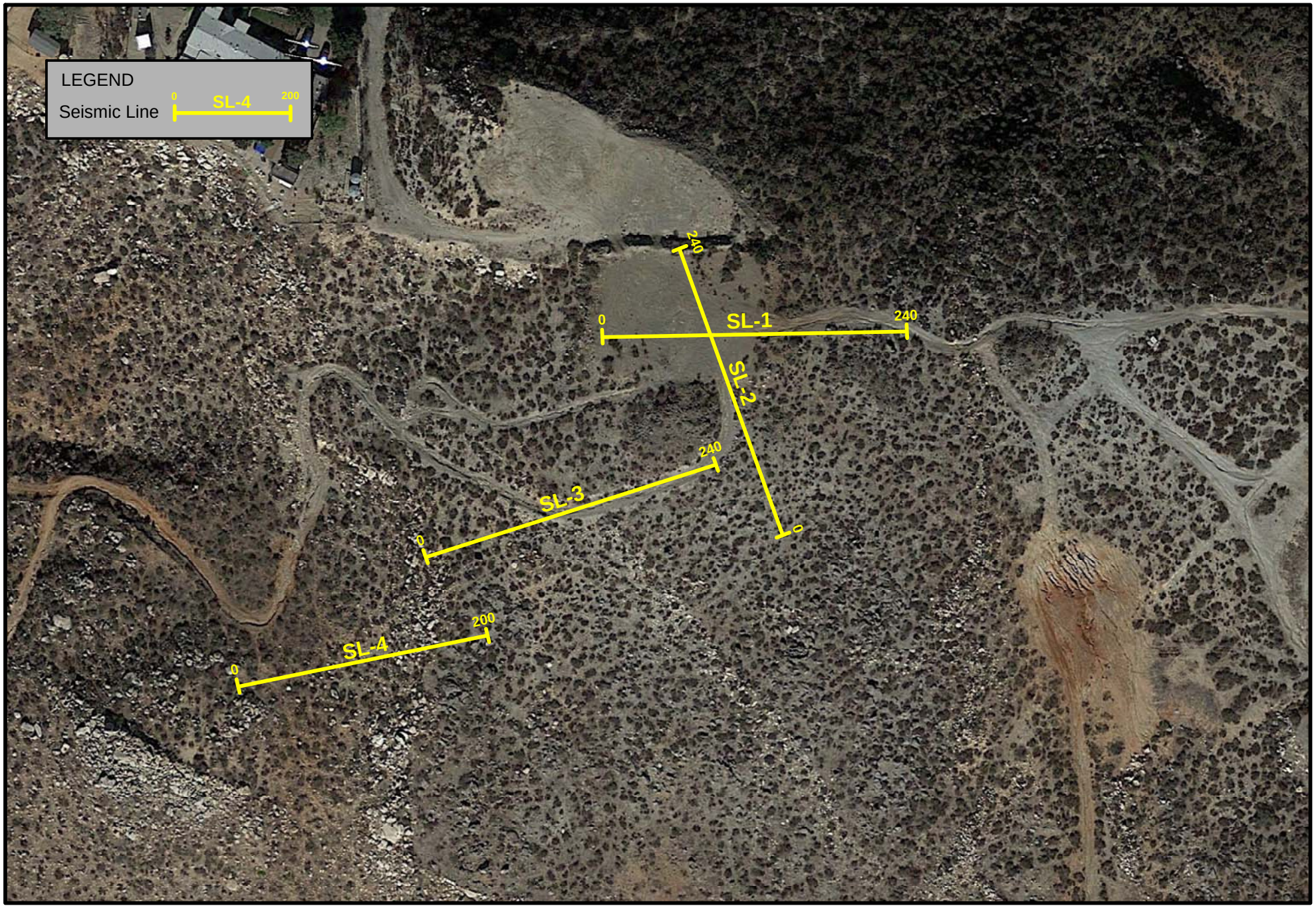
N

Golden Meadows Tank Exploration
Menifee, California

Project No.: 121058SWG | Date: 03/21

ATLAS

Figure 1



SEISMIC LINE LOCATION MAP

N

Golden Meadows Tank Exploration
Menifee, California

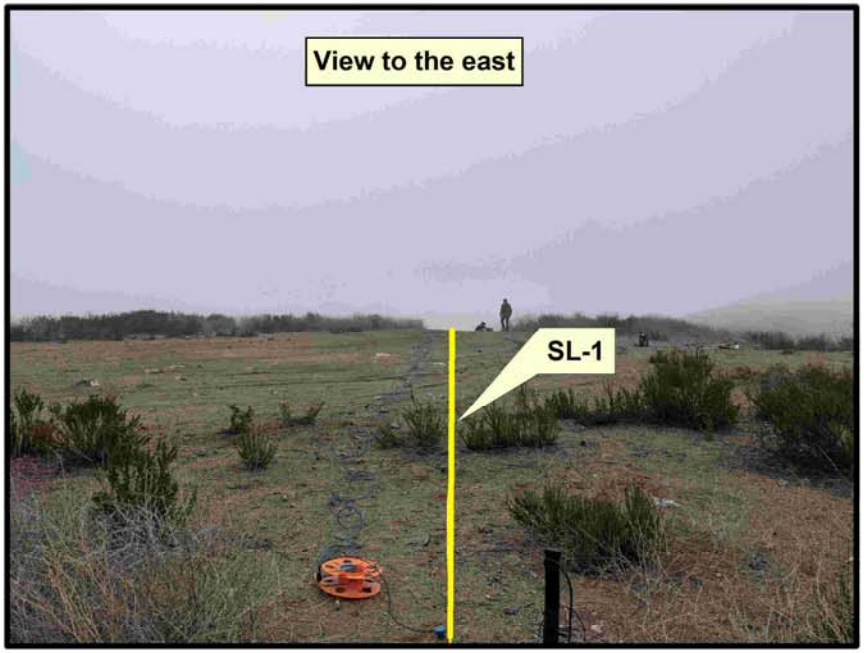
Project No.: 121058SWG | Date: 03/21

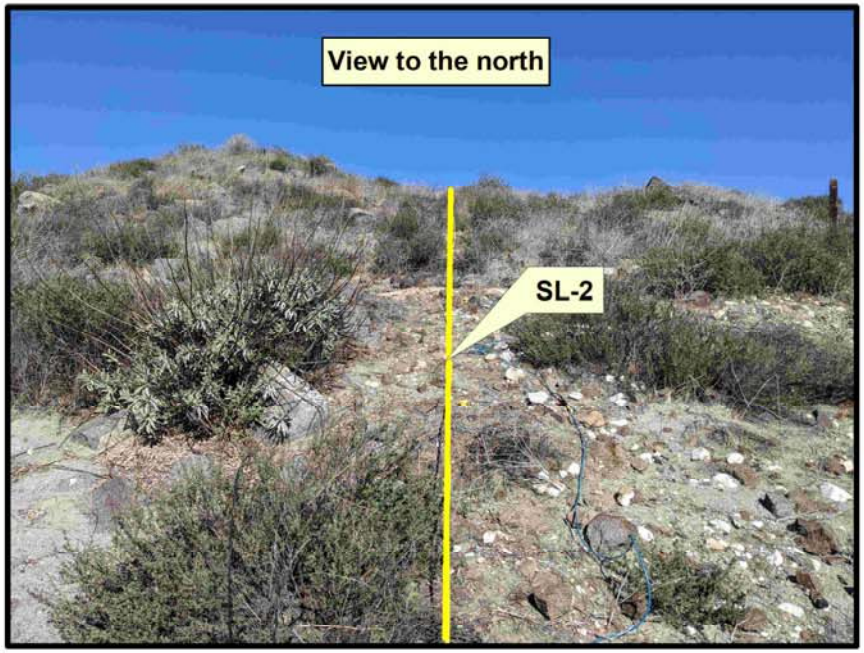
ATLAS

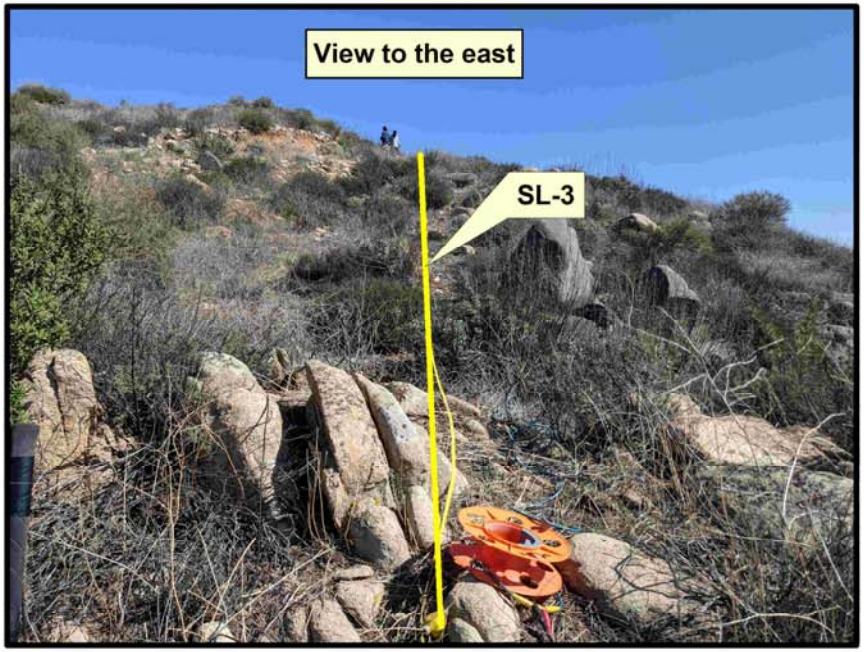
Figure 2

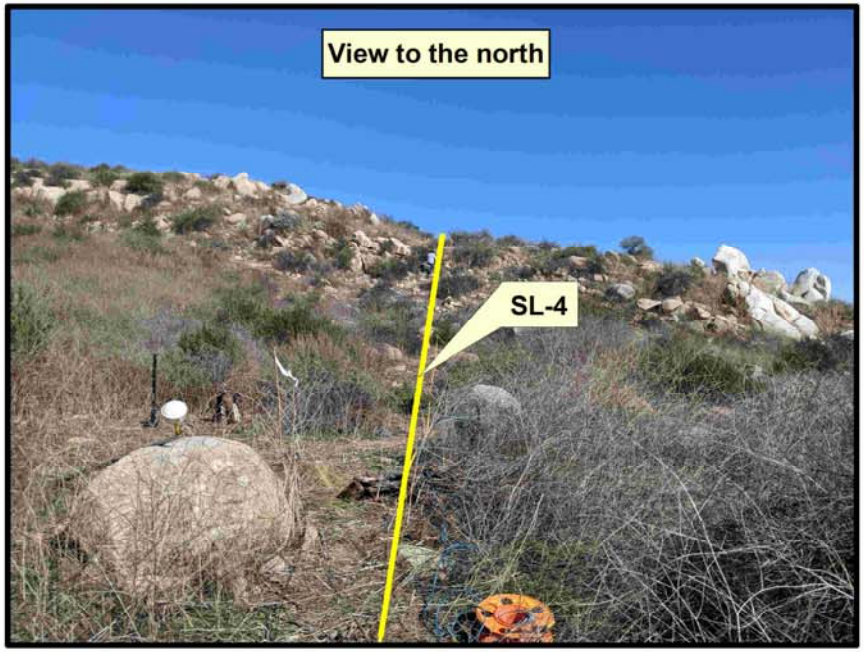
0 100 200

approximate scale in feet









SITE PHOTOGRAPHS

Golden Meadows Tank Exploration
Menifee, California

Project No.: 121058SWG | Date: 03/21

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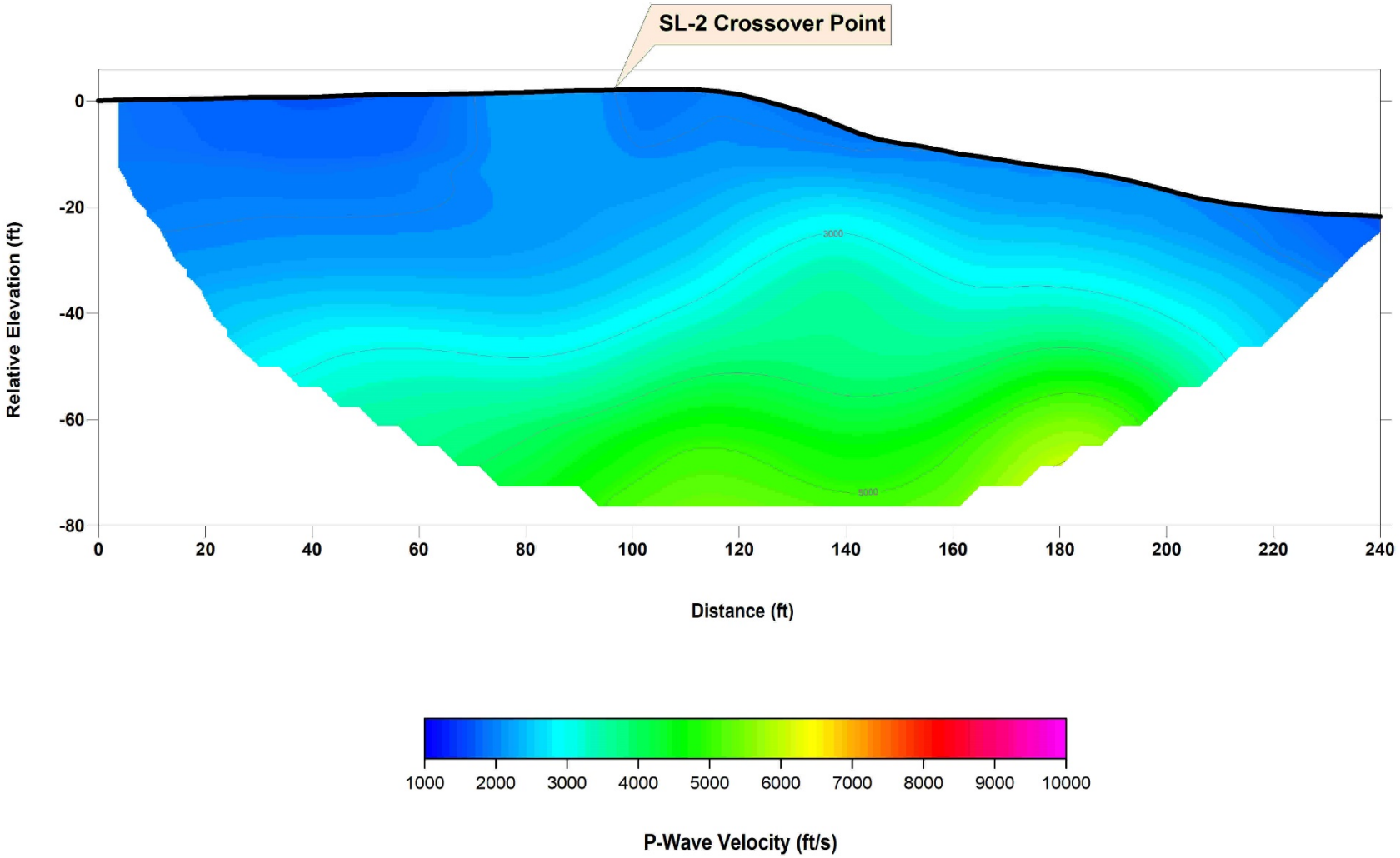
Figure 3

TOMOGRAPHY MODEL

SL-1

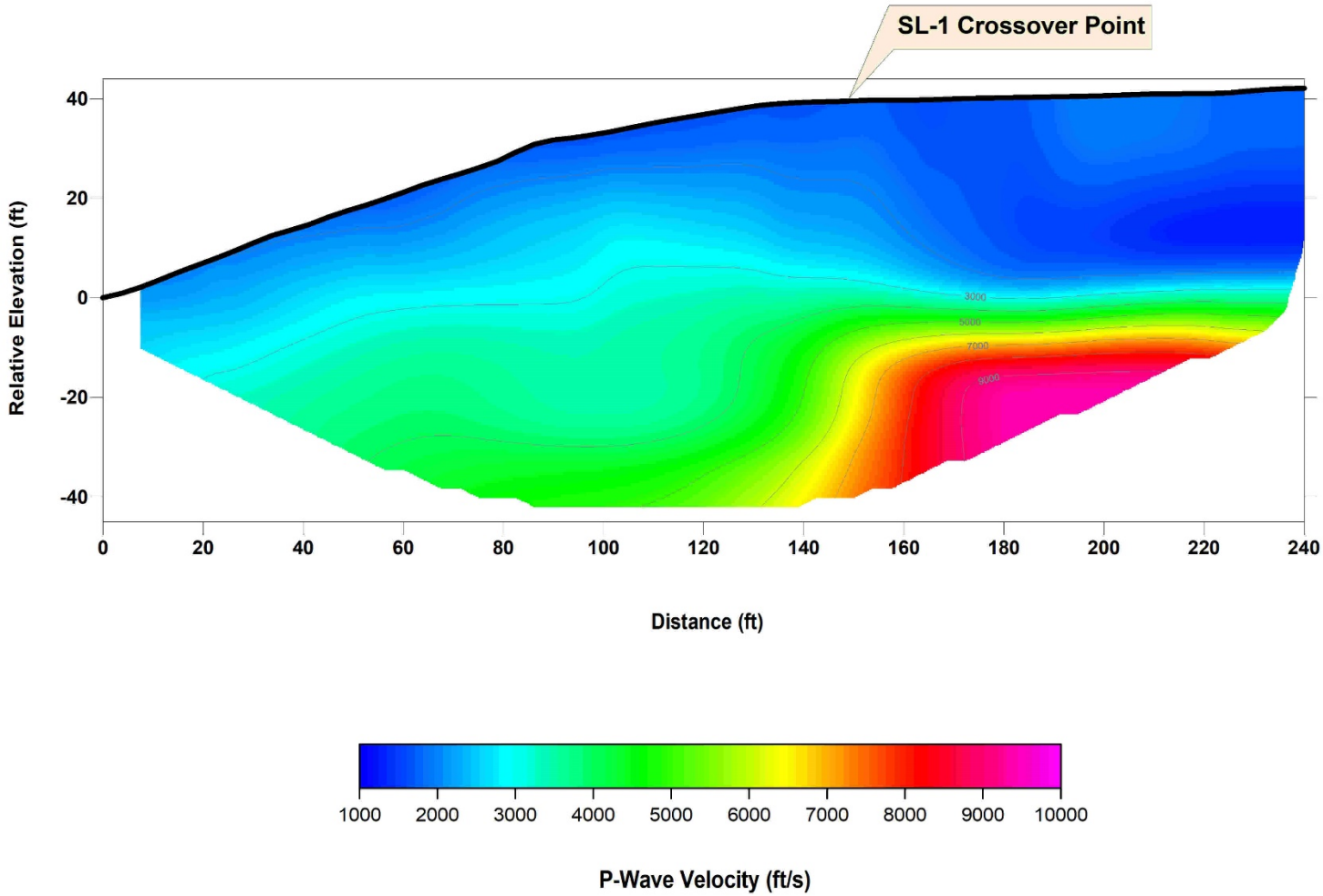


SEISMIC PROFILE SL-1	Golden Meadows Tank Exploration Menifee, California	ATLAS Figure 4a
	Project No.: 121058SWG | Date: 03/21	

Note: Contour Interval = 1,000 feet per second

TOMOGRAPHY MODEL

SL-2

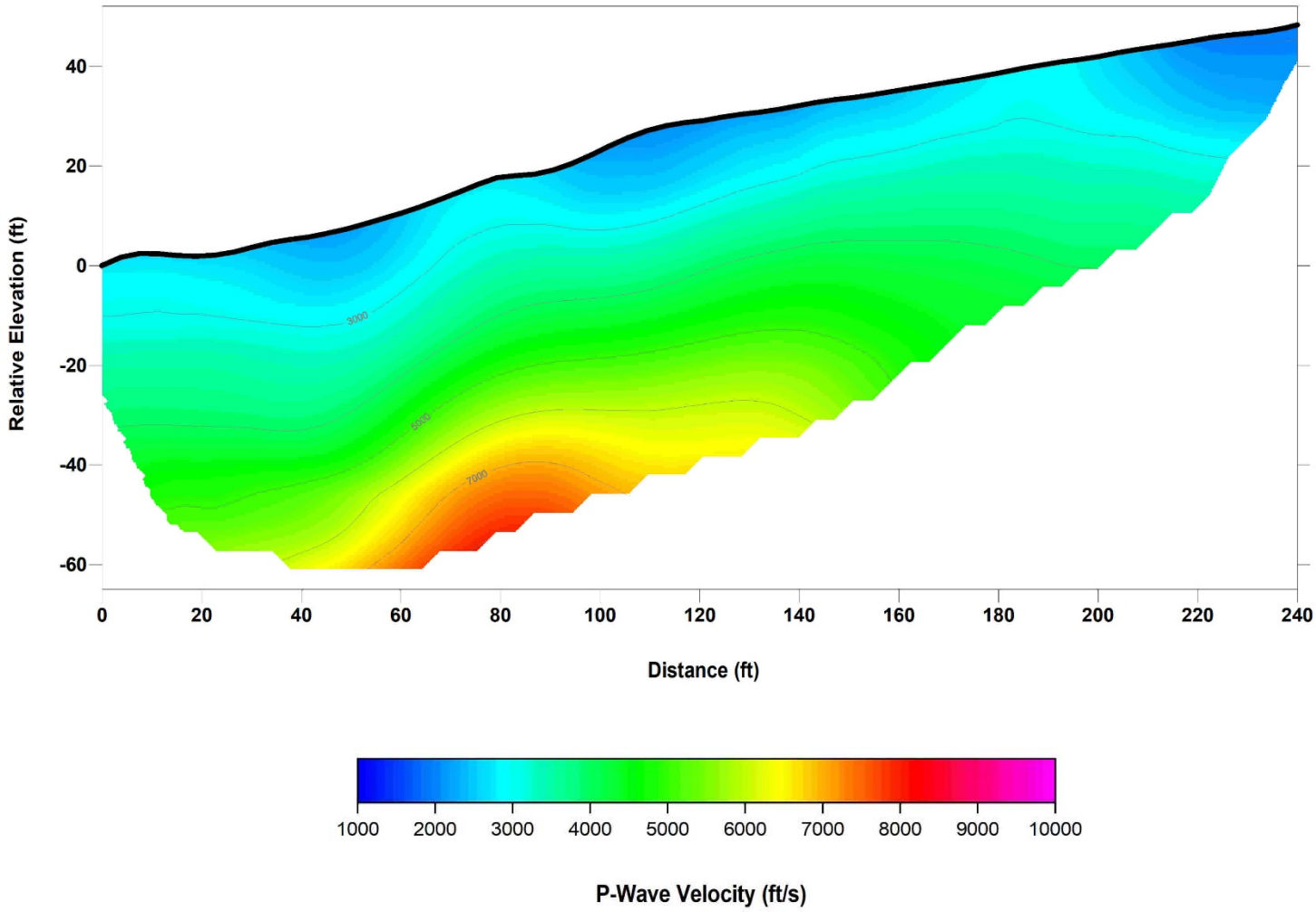


SEISMIC PROFILE SL-2	Golden Meadows Tank Exploration Menifee, California Project No.: 121058SWG | Date: 03/21	ATLAS Figure 4b

Note: Contour Interval = 1,000 feet per second

TOMOGRAPHY MODEL

SL-3

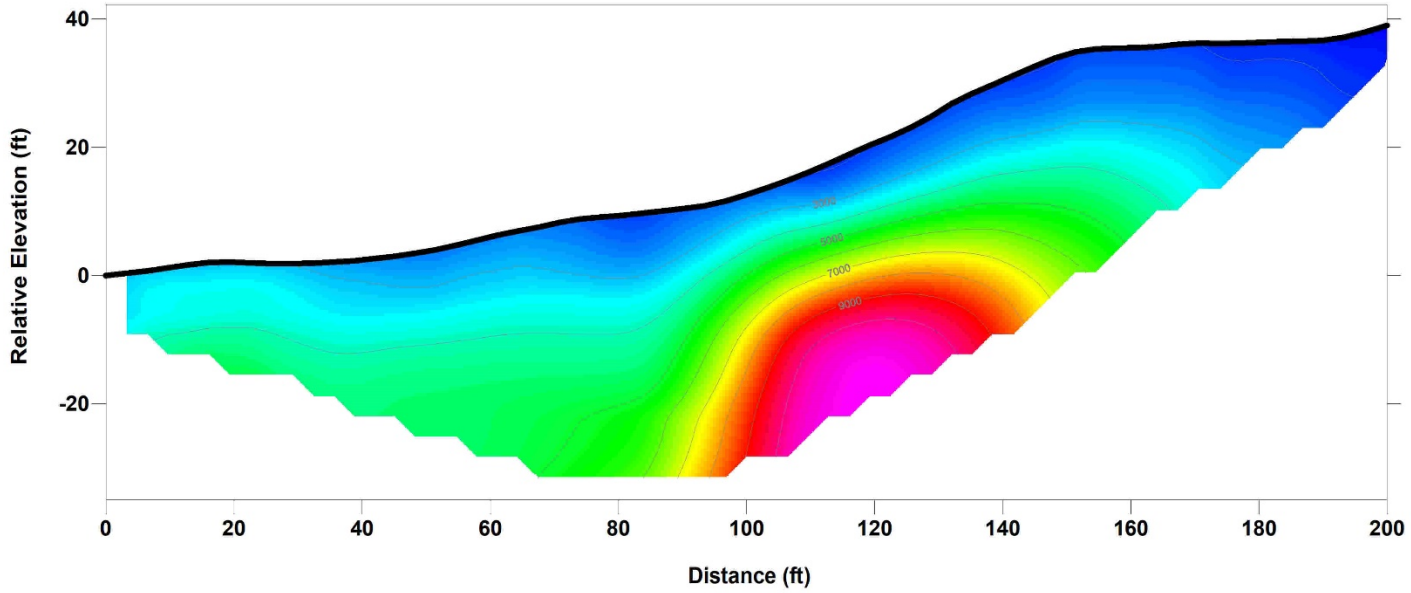


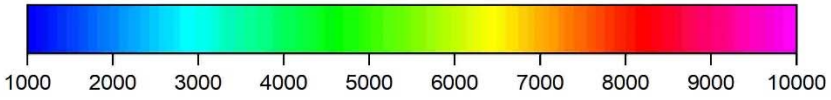
SEISMIC PROFILE SL-3	Golden Meadows Tank Exploration Menifee, California	ATLAS Figure 4c
	Project No.: 121058SWG | Date: 03/21	

Note: Contour Interval = 1,000 feet per second

TOMOGRAPHY MODEL

SL-4





SEISMIC PROFILE SL-4	Golden Meadows Tank Exploration Menifee, California	ATLAS Figure 4d
	Project No.: 121058SWG | Date: 03/21	

Note: Contour Interval = 1,000 feet per second

APPENDIX C

Site-Specific Seismic Coefficients

Golden Meadows Tank Site

Latitude, Longitude: 33.6555, -117.18905



Date	4/1/2021, 5:36:15 PM
Design Code Reference Document	ASCE7-16
Risk Category	IV
Site Class	B - Rock

Type	Value	Description
S_S	1.405	MCE_R ground motion. (for 0.2 second period)
S_1	0.52	MCE_R ground motion. (for 1.0s period)
S_{MS}	1.264	Site-modified spectral acceleration value
S_{M1}	0.416	Site-modified spectral acceleration value
S_{DS}	0.843	Numeric seismic design value at 0.2 second SA
S_{D1}	0.277	Numeric seismic design value at 1.0 second SA

Type	Value	Description
SDC	D	Seismic design category
F_a	0.9	Site amplification factor at 0.2 second
F_v	0.8	Site amplification factor at 1.0 second
PGA	0.597	MCE_G peak ground acceleration
F_{PGA}	0.9	Site amplification factor at PGA
PGA_M	0.537	Site modified peak ground acceleration
T_L	8	Long-period transition period in seconds
SsRT	1.405	Probabilistic risk-targeted ground motion. (0.2 second)
SsUH	1.516	Factored uniform-hazard (2% probability of exceedance in 50 years) spectral acceleration
SsD	1.501	Factored deterministic acceleration value. (0.2 second)
S1RT	0.52	Probabilistic risk-targeted ground motion. (1.0 second)
S1UH	0.568	Factored uniform-hazard (2% probability of exceedance in 50 years) spectral acceleration.
S1D	0.6	Factored deterministic acceleration value. (1.0 second)
PGAd	0.638	Factored deterministic acceleration value. (Peak Ground Acceleration)
C_{RS}	0.926	Mapped value of the risk coefficient at short periods
C_{R1}	0.916	Mapped value of the risk coefficient at a period of 1 s

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APPENDIX D

General Earthwork Grading Guidelines

Leighton

LEIGHTON AND ASSOCIATES, INC.

GENERAL EARTHWORK AND GRADING SPECIFICATIONS FOR ROUGH GRADING

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Standard Details

A - Keying and Benching	Rear of Text

1.0 General

1.1 Intent

These General Earthwork and Grading Specifications are for the grading and earthwork shown on the approved grading plan(s) and/or indicated in the geotechnical report(s). These Specifications are a part of the recommendations contained in the geotechnical report(s). In case of conflict, the specific recommendations in the geotechnical report shall supersede these more general Specifications. Observations of the earthwork by the project Geotechnical Consultant during the course of grading may result in new or revised recommendations that could supersede these specifications or the recommendations in the geotechnical report(s).

1.2 The Geotechnical Consultant of Record

Prior to commencement of work, the owner shall employ the Geotechnical Consultant of Record (Geotechnical Consultant). The Geotechnical Consultants shall be responsible for reviewing the approved geotechnical report(s) and accepting the adequacy of the preliminary geotechnical findings, conclusions, and recommendations prior to the commencement of the grading.

Prior to commencement of grading, the Geotechnical Consultant shall review the "work plan" prepared by the Earthwork Contractor (Contractor) and schedule sufficient personnel to perform the appropriate level of observation, mapping, and compaction testing.

During the grading and earthwork operations, the Geotechnical Consultant shall observe, map, and document the subsurface exposures to verify the geotechnical design assumptions. If the observed conditions are found to be significantly different than the interpreted assumptions during the design phase, the Geotechnical Consultant shall inform the owner, recommend appropriate changes in design to accommodate the observed conditions, and notify the review agency where required. Subsurface areas to be geotechnically observed, mapped, elevations recorded, and/or tested include natural ground after it has been cleared for receiving fill but before fill is placed, bottoms of all "remedial removal" areas, all key bottoms, and benches made on sloping ground to receive fill.

The Geotechnical Consultant shall observe the moisture-conditioning and processing of the subgrade and fill materials and perform relative compaction testing of fill to determine the attained level of compaction. The Geotechnical Consultant shall provide the test results to the owner and the Contractor on a routine and frequent basis.

1.3 The Earthwork Contractor

The Earthwork Contractor (Contractor) shall be qualified, experienced, and knowledgeable in earthwork logistics, preparation and processing of ground to receive fill, moisture-conditioning and processing of fill, and compacting fill. The Contractor shall review and accept the plans, geotechnical report(s), and these Specifications prior to commencement of grading. The Contractor shall be solely responsible for performing the grading in accordance with the plans and specifications.

The Contractor shall prepare and submit to the owner and the Geotechnical Consultant a work plan that indicates the sequence of earthwork grading, the number of "spreads" of work and the estimated quantities of daily earthwork contemplated for the site prior to commencement of grading. The Contractor shall inform the owner and the Geotechnical Consultant of changes in work schedules and updates to the work plan at least 24 hours in advance of such changes so that appropriate observations and tests can be planned and accomplished. The Contractor shall not assume that the Geotechnical Consultant is aware of all grading operations.

The Contractor shall have the sole responsibility to provide adequate equipment and methods to accomplish the earthwork in accordance with the applicable grading codes and agency ordinances, these Specifications, and the recommendations in the approved geotechnical report(s) and grading plan(s). If, in the opinion of the Geotechnical Consultant, unsatisfactory conditions, such as unsuitable soil, improper moisture condition, inadequate compaction, insufficient buttress key size, adverse weather, etc., are resulting in a quality of work less than required in these specifications, the Geotechnical Consultant shall reject the work and may recommend to the owner that construction be stopped until the conditions are rectified.

2.0 Preparation of Areas to be Filled

2.1 Clearing and Grubbing

Vegetation, such as brush, grass, roots, and other deleterious material shall be sufficiently removed and properly disposed of in a method acceptable to the owner, governing agencies, and the Geotechnical Consultant.

The Geotechnical Consultant shall evaluate the extent of these removals depending on specific site conditions. Earth fill material shall not contain more than 1 percent of organic materials (by volume). No fill lift shall contain more than 5 percent of organic matter. Nesting of the organic materials shall not be allowed.

If potentially hazardous materials are encountered, the Contractor shall stop work in the affected area, and a hazardous material specialist shall be informed immediately for proper evaluation and handling of these materials prior to continuing to work in that area.

As presently defined by the State of California, most refined petroleum products (gasoline, diesel fuel, motor oil, grease, coolant, etc.) have chemical constituents that are considered to be hazardous waste. As such, the indiscriminate dumping or spillage of these fluids onto the ground may constitute a misdemeanor, punishable by fines and/or imprisonment, and shall not be allowed.

2.2 Processing

Existing ground that has been declared satisfactory for support of fill by the Geotechnical Consultant shall be scarified to a minimum depth of 6 inches. Existing ground that is not satisfactory shall be overexcavated as specified in the following section. Scarification shall continue until soils are broken down and free of large clay lumps or clods and the working surface is reasonably uniform, flat, and free of uneven features that would inhibit uniform compaction.

2.3 Overexcavation

In addition to removals and overexcavations recommended in the approved geotechnical report(s) and the grading plan, soft, loose, dry, saturated, spongy, organic-rich, highly fractured or otherwise unsuitable ground shall be overexcavated to competent ground as evaluated by the Geotechnical Consultant during grading.

2.4 Benching

Where fills are to be placed on ground with slopes steeper than 5:1 (horizontal to vertical units), the ground shall be stepped or benched. The lowest bench or key shall be a minimum of 15 feet wide and at least 2 feet deep, into competent material as evaluated by the Geotechnical Consultant. Other benches shall be excavated a minimum height of 4 feet into competent material or as otherwise recommended by the Geotechnical Consultant. Fill placed on ground sloping flatter than 5:1 shall also be benched or otherwise overexcavated to provide a flat subgrade for the fill.

2.5 Evaluation/Acceptance of Fill Areas

All areas to receive fill, including removal and processed areas, key bottoms, and benches, shall be observed, mapped, elevations recorded, and/or tested prior to being accepted by the Geotechnical Consultant as suitable to receive fill. The Contractor shall obtain a written acceptance from the Geotechnical Consultant

prior to fill placement. A licensed surveyor shall provide the survey control for determining elevations of processed areas, keys, and benches.

3.0 Fill Material

3.1 General

Material to be used as fill shall be essentially free of organic matter and other deleterious substances evaluated and accepted by the Geotechnical Consultant prior to placement. Soils of poor quality, such as those with unacceptable gradation, high expansion potential, or low strength shall be placed in areas acceptable to the Geotechnical Consultant or mixed with other soils to achieve satisfactory fill material.

3.2 Oversize

Oversize material defined as rock, or other irreducible material with a maximum dimension greater than 8 inches, shall not be buried or placed in fill unless location, materials, and placement methods are specifically accepted by the Geotechnical Consultant. Placement operations shall be such that nesting of oversized material does not occur and such that oversize material is completely surrounded by compacted or densified fill. Oversize material shall not be placed within 10 vertical feet of finish grade or within 2 feet of future utilities or underground construction.

3.3 Import

If importing of fill material is required for grading, proposed import material shall meet the requirements of Section 3.1. The potential import source shall be given to the Geotechnical Consultant at least 48 hours (2 working days) before importing begins so that its suitability can be determined and appropriate tests performed.

4.0 Fill Placement and Compaction

4.1 Fill Layers

Approved fill material shall be placed in areas prepared to receive fill (per Section 3.0) in near-horizontal layers not exceeding 8 inches in loose thickness. The Geotechnical Consultant may accept thicker layers if testing indicates the grading procedures can adequately compact the thicker layers. Each layer shall be spread evenly and mixed thoroughly to attain relative uniformity of material and moisture throughout.

4.2 Fill Moisture Conditioning

Fill soils shall be watered, dried back, blended, and/or mixed, as necessary to attain a relatively uniform moisture content at or slightly over optimum. Maximum density and optimum soil moisture content tests shall be performed in accordance with the American Society of Testing and Materials (ASTM Test Method D1557).

4.3 Compaction of Fill

After each layer has been moisture-conditioned, mixed, and evenly spread, it shall be uniformly compacted to not less than 90 percent of maximum dry density (ASTM Test Method D1557). Compaction equipment shall be adequately sized and be either specifically designed for soil compaction or of proven reliability to efficiently achieve the specified level of compaction with uniformity.

4.4 Compaction of Fill Slopes

In addition to normal compaction procedures specified above, compaction of slopes shall be accomplished by backrolling of slopes with sheepsfoot rollers at increments of 3 to 4 feet in fill elevation, or by other methods producing satisfactory results acceptable to the Geotechnical Consultant. Upon completion of grading, relative compaction of the fill, out to the slope face, shall be at least 90 percent of maximum density per ASTM Test Method D1557.

4.5 Compaction Testing

Field-tests for moisture content and relative compaction of the fill soils shall be performed by the Geotechnical Consultant. Location and frequency of tests shall be at the Consultant's discretion based on field conditions encountered. Compaction test locations will not necessarily be selected on a random basis. Test locations shall be selected to verify adequacy of compaction levels in areas that are judged to be prone to inadequate compaction (such as close to slope faces and at the fill/bedrock benches).

4.6 Frequency of Compaction Testing

Tests shall be taken at intervals not exceeding 2 feet in vertical rise and/or 1,000 cubic yards of compacted fill soils embankment. In addition, as a guideline, at least one test shall be taken on slope faces for each 5,000 square feet of slope face and/or each 10 feet of vertical height of slope. The Contractor shall assure that fill construction is such that the testing schedule can be accomplished by the Geotechnical Consultant. The Contractor shall stop or slow down the earthwork construction if these minimum standards are not met.

4.7 Compaction Test Locations

The Geotechnical Consultant shall document the approximate elevation and horizontal coordinates of each test location. The Contractor shall coordinate with the project surveyor to assure that sufficient grade stakes are established so that the Geotechnical Consultant can determine the test locations with sufficient accuracy. At a minimum, two grade stakes within a horizontal distance of 100 feet and vertically less than 5 feet apart from potential test locations shall be provided.

5.0 Subdrain Installation

Subdrain systems shall be installed in accordance with the approved geotechnical report(s), the grading plan. The Geotechnical Consultant may recommend additional subdrains and/or changes in subdrain extent, location, grade, or material depending on conditions encountered during grading. All subdrains shall be surveyed by a land surveyor/civil engineer for line and grade after installation and prior to burial. Sufficient time should be allowed by the Contractor for these surveys.

6.0 Excavation

Excavations, as well as over-excavation for remedial purposes, shall be evaluated by the Geotechnical Consultant during grading. Remedial removal depths shown on geotechnical plans are estimates only. The actual extent of removal shall be determined by the Geotechnical Consultant based on the field evaluation of exposed conditions during grading. Where fill-over-cut slopes are to be graded, the cut portion of the slope shall be made, evaluated, and accepted by the Geotechnical Consultant prior to placement of materials for construction of the fill portion of the slope, unless otherwise recommended by the Geotechnical Consultant.

7.0 Trench Backfills

7.1 Safety

The Contractor shall follow all OSHA and Cal/OSHA requirements for safety of trench excavations.

7.2 Bedding and Backfill

All bedding and backfill of utility trenches shall be performed in accordance with the applicable provisions of Standard Specifications of Public Works Construction. Bedding material shall have a Sand Equivalent greater than 30 (SE>30). The bedding shall be placed to 1 foot over the top of the conduit and densified by jetting. Backfill shall be placed and densified to a minimum of 90 percent of relative compaction from 1 foot above the top of the conduit to the surface.

The Geotechnical Consultant shall test the trench backfill for relative compaction. At least one test should be made for every 300 feet of trench and 2 feet of fill.

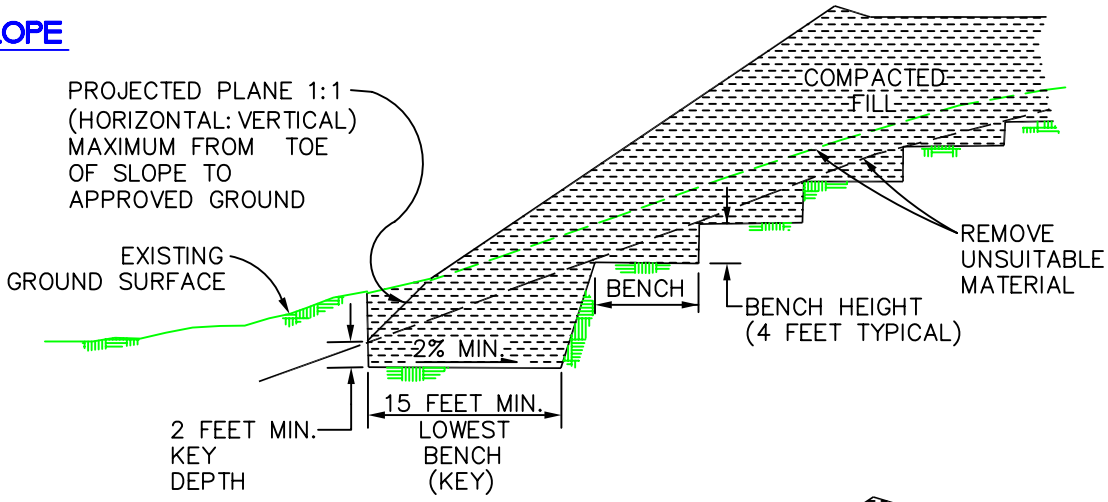
7.3 Lift Thickness

Lift thickness of trench backfill shall not exceed those allowed in the Standard Specifications of Public Works Construction unless the Contractor can demonstrate to the Geotechnical Consultant that the fill lift can be compacted to the minimum relative compaction by his alternative equipment and method.

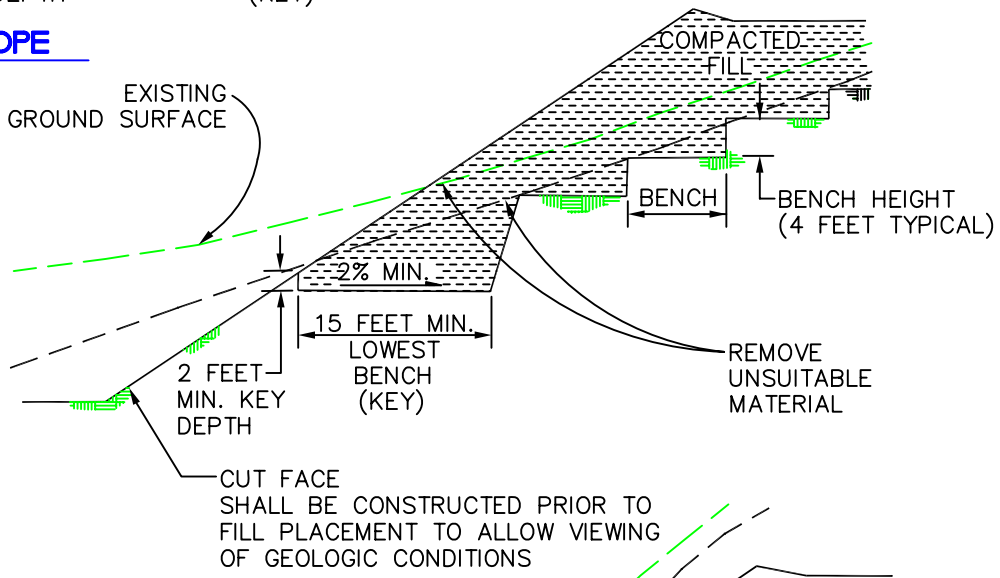
7.4 Observation and Testing

The jetting of the bedding around the conduits shall be observed by the Geotechnical Consultant.

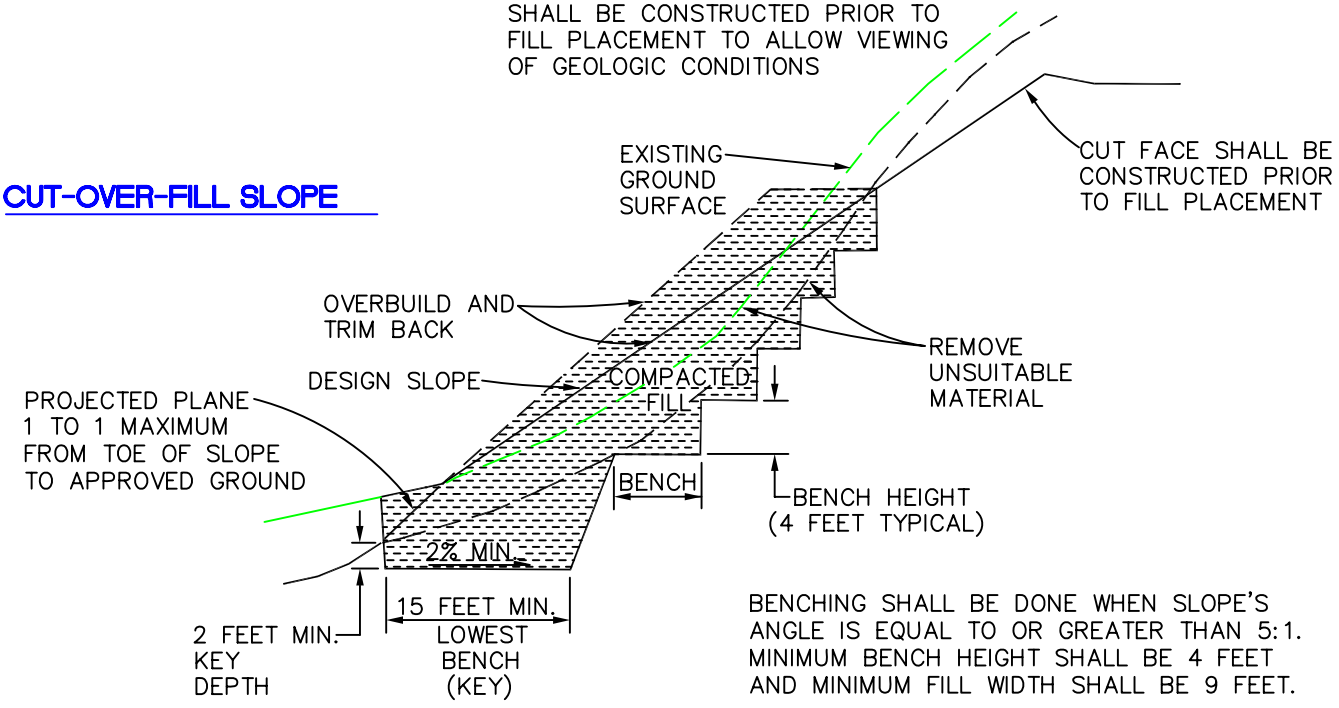
FILL SLOPE



FILL-OVER-CUT SLOPE



CUT-OVER-FILL SLOPE



BENCHING SHALL BE DONE WHEN SLOPE'S ANGLE IS EQUAL TO OR GREATER THAN 5:1. MINIMUM BENCH HEIGHT SHALL BE 4 FEET AND MINIMUM FILL WIDTH SHALL BE 9 FEET.

KEYING AND BENCHING	GENERAL EARTHWORK AND GRADING SPECIFICATIONS STANDARD DETAILS A	Leighton

APPENDIX E

ASFE - Important Information About Your Geotechnical Report

Important Information about This

Geotechnical-Engineering Report

Subsurface problems are a principal cause of construction delays, cost overruns, claims, and disputes.

While you cannot eliminate all such risks, you can manage them. The following information is provided to help.

The Geoprofessional Business Association (GBA) has prepared this advisory to help you – assumedly a client representative – interpret and apply this geotechnical-engineering report as effectively as possible. In that way, you can benefit from a lowered exposure to problems associated with subsurface conditions at project sites and development of them that, for decades, have been a principal cause of construction delays, cost overruns, claims, and disputes. If you have questions or want more information about any of the issues discussed herein, contact your GBA-member geotechnical engineer. Active engagement in GBA exposes geotechnical engineers to a wide array of risk-confrontation techniques that can be of genuine benefit for everyone involved with a construction project.

Understand the Geotechnical-Engineering Services Provided for this Report

Geotechnical-engineering services typically include the planning, collection, interpretation, and analysis of exploratory data from widely spaced borings and/or test pits. Field data are combined with results from laboratory tests of soil and rock samples obtained from field exploration (if applicable), observations made during site reconnaissance, and historical information to form one or more models of the expected subsurface conditions beneath the site. Local geology and alterations of the site surface and subsurface by previous and proposed construction are also important considerations. Geotechnical engineers apply their engineering training, experience, and judgment to adapt the requirements of the prospective project to the subsurface model(s). Estimates are made of the subsurface conditions that will likely be exposed during construction as well as the expected performance of foundations and other structures being planned and/or affected by construction activities.

The culmination of these geotechnical-engineering services is typically a geotechnical-engineering report providing the data obtained, a discussion of the subsurface model(s), the engineering and geologic engineering assessments and analyses made, and the recommendations developed to satisfy the given requirements of the project. These reports may be titled investigations, explorations, studies, assessments, or evaluations. Regardless of the title used, the geotechnical-engineering report is an engineering interpretation of the subsurface conditions within the context of the project and does not represent a close examination, systematic inquiry, or thorough investigation of all site and subsurface conditions.

Geotechnical-Engineering Services are Performed for Specific Purposes, Persons, and Projects, and At Specific Times

Geotechnical engineers structure their services to meet the specific needs, goals, and risk management preferences of their clients. A geotechnical-engineering study conducted for a given civil engineer will not likely meet the needs of a civil-works constructor or even a different civil engineer. Because each geotechnical-engineering study is unique, each geotechnical-engineering report is unique, prepared *solely* for the client.

Likewise, geotechnical-engineering services are performed for a specific project and purpose. For example, it is unlikely that a geotechnical-engineering study for a refrigerated warehouse will be the same as one prepared for a parking garage; and a few borings drilled during a preliminary study to evaluate site feasibility will not be adequate to develop geotechnical design recommendations for the project.

Do not rely on this report if your geotechnical engineer prepared it:

- for a different client;
- for a different project or purpose;
- for a different site (that may or may not include all or a portion of the original site); or
- before important events occurred at the site or adjacent to it; e.g., man-made events like construction or environmental remediation, or natural events like floods, droughts, earthquakes, or groundwater fluctuations.

Note, too, the reliability of a geotechnical-engineering report can be affected by the passage of time, because of factors like changed subsurface conditions; new or modified codes, standards, or regulations; or new techniques or tools. *If you are the least bit uncertain* about the continued reliability of this report, contact your geotechnical engineer before applying the recommendations in it. A minor amount of additional testing or analysis after the passage of time – if any is required at all – could prevent major problems.

Read this Report in Full

Costly problems have occurred because those relying on a geotechnical-engineering report did not read the report in its entirety. Do not rely on an executive summary. Do not read selective elements only. *Read and refer to the report in full.*

You Need to Inform Your Geotechnical Engineer About Change

Your geotechnical engineer considered unique, project-specific factors when developing the scope of study behind this report and developing the confirmation-dependent recommendations the report conveys. Typical changes that could erode the reliability of this report include those that affect:

- the site's size or shape;
- the elevation, configuration, location, orientation, function or weight of the proposed structure and the desired performance criteria;
- the composition of the design team; or
- project ownership.

As a general rule, *always* inform your geotechnical engineer of project or site changes – even minor ones – and request an assessment of their impact. *The geotechnical engineer who prepared this report cannot accept*

responsibility or liability for problems that arise because the geotechnical engineer was not informed about developments the engineer otherwise would have considered.

Most of the "Findings" Related in This Report Are Professional Opinions

Before construction begins, geotechnical engineers explore a site's subsurface using various sampling and testing procedures. *Geotechnical engineers can observe actual subsurface conditions only at those specific locations where sampling and testing is performed.* The data derived from that sampling and testing were reviewed by your geotechnical engineer, who then applied professional judgement to form opinions about subsurface conditions throughout the site. Actual sitewide-subsurface conditions may differ – maybe significantly – from those indicated in this report. Confront that risk by retaining your geotechnical engineer to serve on the design team through project completion to obtain informed guidance quickly, whenever needed.

This Report's Recommendations Are Confirmation-Dependent

The recommendations included in this report – including any options or alternatives – are confirmation-dependent. In other words, they are not final, because the geotechnical engineer who developed them relied heavily on judgement and opinion to do so. Your geotechnical engineer can finalize the recommendations *only after observing actual subsurface conditions* exposed during construction. If through observation your geotechnical engineer confirms that the conditions assumed to exist actually do exist, the recommendations can be relied upon, assuming no other changes have occurred. *The geotechnical engineer who prepared this report cannot assume responsibility or liability for confirmation-dependent recommendations if you fail to retain that engineer to perform construction observation.*

This Report Could Be Misinterpreted

Other design professionals' misinterpretation of geotechnical-engineering reports has resulted in costly problems. Confront that risk by having your geotechnical engineer serve as a continuing member of the design team, to:

- confer with other design-team members;
- help develop specifications;
- review pertinent elements of other design professionals' plans and specifications; and
- be available whenever geotechnical-engineering guidance is needed.

You should also confront the risk of constructors misinterpreting this report. Do so by retaining your geotechnical engineer to participate in prebid and preconstruction conferences and to perform construction-phase observations.

Give Constructors a Complete Report and Guidance

Some owners and design professionals mistakenly believe they can shift unanticipated-subsurface-conditions liability to constructors by limiting the information they provide for bid preparation. To help prevent the costly, contentious problems this practice has caused, include the complete geotechnical-engineering report, along with any attachments or appendices, with your contract documents, *but be certain to note conspicuously that you've included the material for information purposes only.* To avoid misunderstanding, you may also want to note that "informational purposes" means constructors have no right to rely on the interpretations, opinions, conclusions, or recommendations in the report. Be certain that constructors know they may learn about specific project requirements, including options selected from the report, *only* from the design drawings and specifications. Remind constructors that they may perform their own studies if they want to, and *be sure to allow enough time* to permit them to do so. Only then might you be in a position to give constructors the information available to you, while requiring them to at least share some of the financial responsibilities stemming from unanticipated conditions. Conducting prebid and preconstruction conferences can also be valuable in this respect.

Read Responsibility Provisions Closely

Some client representatives, design professionals, and constructors do not realize that geotechnical engineering is far less exact than other engineering disciplines. This happens in part because soil and rock on project sites are typically heterogeneous and not manufactured materials with well-defined engineering properties like steel and concrete. That lack of understanding has nurtured unrealistic expectations that have resulted in disappointments, delays, cost overruns, claims, and disputes. To confront that risk, geotechnical engineers commonly include explanatory provisions in their reports. Sometimes labeled "limitations," many of these provisions indicate where geotechnical engineers' responsibilities begin and end, to help others recognize their own responsibilities and risks. *Read these provisions closely.* Ask questions. Your geotechnical engineer should respond fully and frankly.

Geoenvironmental Concerns Are Not Covered

The personnel, equipment, and techniques used to perform an environmental study – e.g., a "phase-one" or "phase-two" environmental site assessment – differ significantly from those used to perform a geotechnical-engineering study. For that reason, a geotechnical-engineering report does not usually provide environmental findings, conclusions, or recommendations; e.g., about the likelihood of encountering underground storage tanks or regulated contaminants. *Unanticipated subsurface environmental problems have led to project failures.* If you have not obtained your own environmental information about the project site, ask your geotechnical consultant for a recommendation on how to find environmental risk-management guidance.

Obtain Professional Assistance to Deal with Moisture Infiltration and Mold

While your geotechnical engineer may have addressed groundwater, water infiltration, or similar issues in this report, the engineer's services were not designed, conducted, or intended to prevent migration of moisture – including water vapor – from the soil through building slabs and walls and into the building interior, where it can cause mold growth and material-performance deficiencies. Accordingly, ***proper implementation of the geotechnical engineer's recommendations will not of itself be sufficient to prevent moisture infiltration. Confront the risk of moisture infiltration*** by including building-envelope or mold specialists on the design team. ***Geotechnical engineers are not building-envelope or mold specialists.***

GEOPROFESSIONAL BUSINESS ASSOCIATION

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APPENDIX E

Water Quality Management Plan and Hydrology Analysis, Hunsaker and Associates

Final Water Quality Management Plan
Supplemental to Tract 31194 – 'Golden Meadows'

Prepared for

Richland Communities, Inc.



June 2021

Hunsaker & Associates

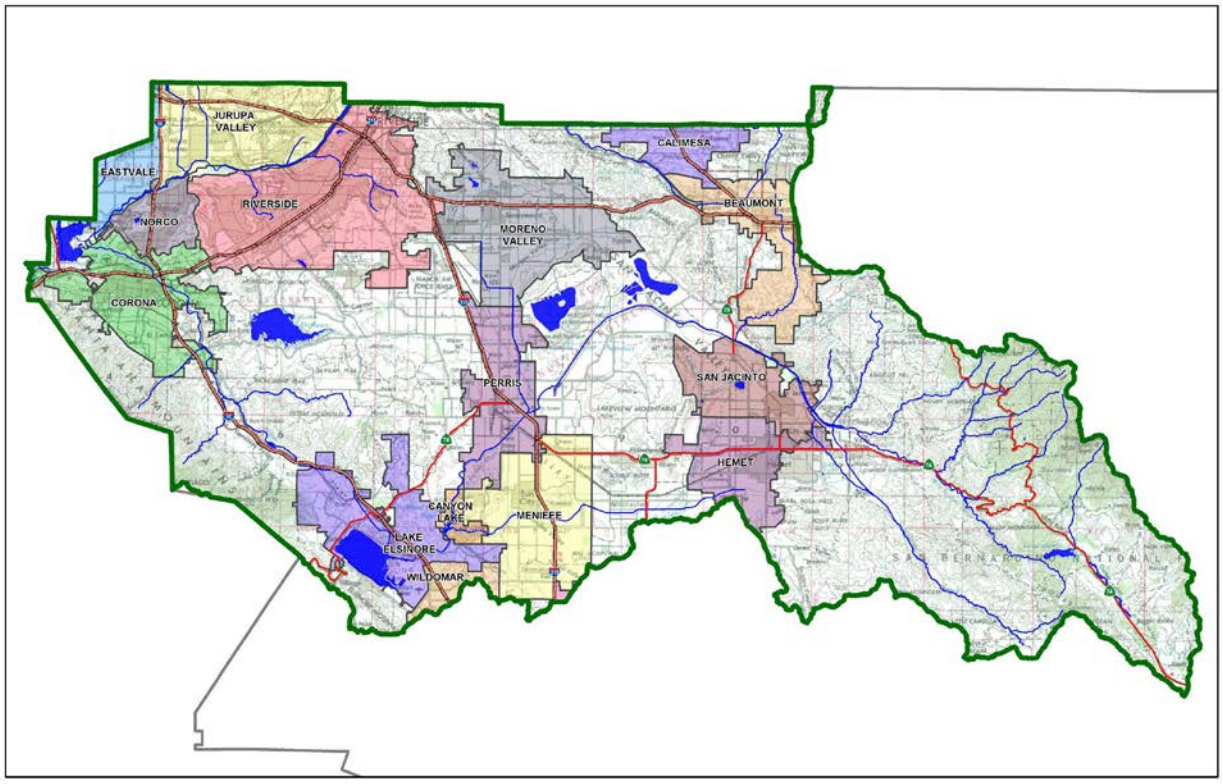
Project Specific Water Quality Management Plan
Supplemental to Tract 31194 WQMP

*A Template for Projects located within the **Santa Ana Watershed** Region of Riverside County*

Project Title: EMWD Tank site, a portion of Golden Meadows

Development No: Tract Number 31194

Design Review/Case No:



☐ **Preliminary**
☒ **Final**

Original Date Prepared: June 2021

Revision Date(s):

Prepared for Compliance with
Regional Board Order No. **R8-2010-0033**
Template revised June 30, 2016

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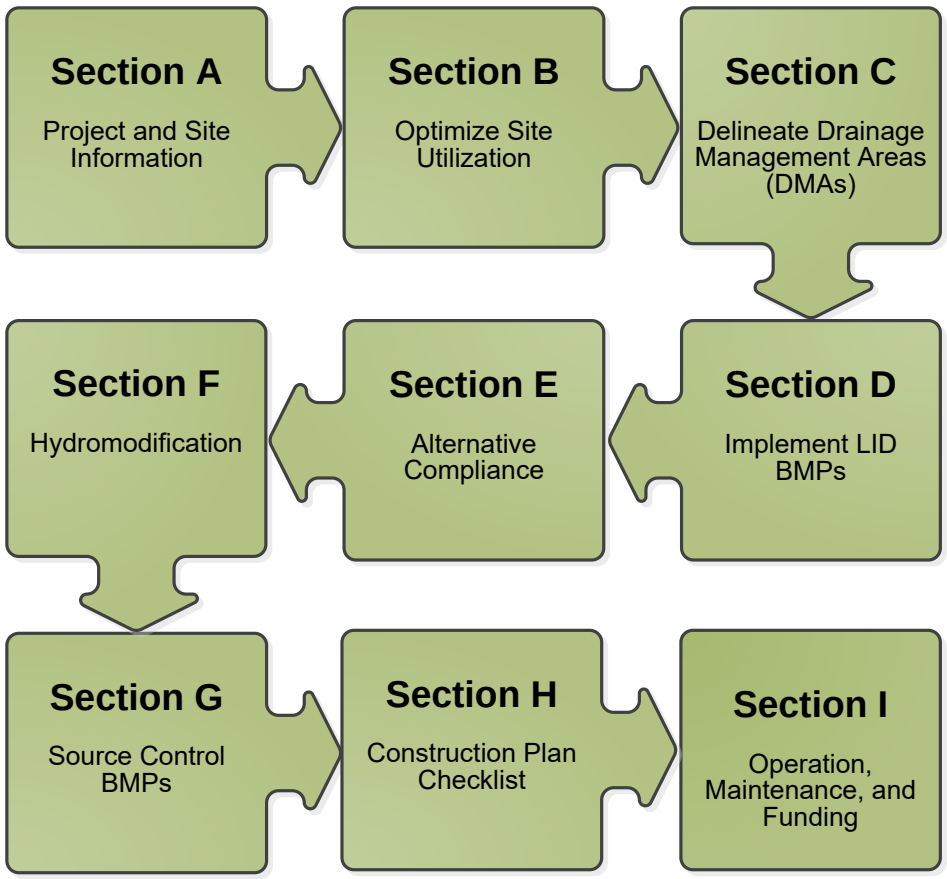
A Brief Introduction

This Project-Specific WQMP Template for the **Santa Ana Region** has been prepared to help guide you in documenting compliance for your project. Because this document has been designed to specifically document compliance, you will need to utilize the WQMP Guidance Document as your "how-to" manual to help guide you through this process. Both the Template and Guidance Document go hand-in-hand, and will help facilitate a well prepared Project-Specific WQMP. Below is a flowchart for the layout of this Template that will provide the steps required to document compliance.



OWNER'S CERTIFICATION

This Project-Specific Water Quality Management Plan (WQMP) has been prepared for **Richland Communities, Inc.** by **Hunsaker & Associates, Irvine Inc.** for the **Golden Meadows** project.

This WQMP is intended to comply with the requirements of the County or Riverside and the City of Menifee for City Ordinance Number 457, which includes the requirement for the preparation and implementation of a Project-Specific WQMP.

The undersigned, while owning the property/project described in the preceding paragraph, shall be responsible for the implementation and funding of this WQMP and will ensure that this WQMP is amended as appropriate to reflect up-to-date conditions on the site. In addition, the property owner accepts responsibility for interim operation and maintenance of Stormwater BMPs until such time as this responsibility is formally transferred to a subsequent owner. 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 Menifee Water Quality Ordinance number 457.

"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

PREPARER'S CERTIFICATION

"The selection, sizing and design of stormwater treatment and other stormwater quality and quantity control measures in this plan meet the requirements of Regional Water Quality Control Board Order No. **R8-2010-0033** and any subsequent amendments thereto."

Preparer's Signature	June 3, 2021 Date
Brian Lowell, PE Preparer's Printed Name	Engineer Preparer's Title/Position

Preparer's Licensure:



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Section A: Project and Site Information

PROJECT INFORMATION	
Type of Project:	Eastern Municipal Water District Potable Water Tank Site
Planning Area:	N/A
Community Name:	Portion of Golden Meadows
Development Name:	Portion of Tract 31194

PROJECT LOCATION
Latitude & Longitude (DMS): 33°39'17.47"N, 117°11'32.65"W
Project Watershed and Sub-Watershed: Santa Ana River Watershed – San Jacinto Sub-Watershed
Gross Acres: 9.0 acre Tank Site (a Portion of Tract 31194, 206.8 acres overall)
APN(s): 360-300-003
Map Book and Page No.: Thomas Brothers Map Page 868, Grid B-7, C-7 and D-7

PROJECT CHARACTERISTICS		
Proposed or Potential Land Use(s)	Potable Water Tank Site	
Proposed or Potential SIC Code(s)	2371 – Water & Sewer line; Related Structures	
Existing Area of Impervious Project Footprint (SF)	0 sf	
Total Area of proposed Impervious Surfaces within the Project Footprint (SF)/or Replacement	54,430 sf	
Does the project consist of offsite road improvements?	☐ Y	☒ N
Does the project propose to construct unpaved roads?	☐ Y	☒ N
Is the project part of a larger common plan of development (phased project)?	☒ Y	☐ N

EXISTING SITE CHARACTERISTICS		
Total area of existing Impervious Surfaces within the Project limits Footprint (SF)	0 sf	
Is the project located within any MSHCP Criteria Cell?	☐ Y	☒ N
If so, identify the Cell number:	n/a	
Are there any natural hydrologic features on the project site?	☐ Y	☒ N
Is a Geotechnical Report attached?	☒ Y	☐ N
If no Geotech. Report, list the NRCS soils type(s) present on the site (A, B, C and/or D)	n/a	
What is the Water Quality Design Storm Depth for the project?	0.60 In.	

A.1 Maps and Site Plans

When completing your Project-Specific WQMP, include a map of the local vicinity and existing site. In addition, include all grading, drainage, landscape/plant palette and other pertinent construction plans in Appendix 2. At a **minimum**, your WQMP Site Plan should include the following:

- Drainage Management Areas
- Proposed Structural BMPs
- Drainage Path
- Drainage Infrastructure, Inlets, Overflows
- Source Control BMPs
- Buildings, Roof Lines, Downspouts
- Impervious Surfaces
- Standard Labeling
- BMP Locations (Lat/Long)

Use your discretion on whether or not you may need to create multiple sheets or can appropriately accommodate these features on one or two sheets. Keep in mind that the Co-Permittee plan reviewer must be able to easily analyze your project utilizing this template and its associated site plans and maps.

A.2 Identify Receiving Waters

Using Table A.1 below, list in order of upstream to downstream, the receiving waters that the project site is tributary to. Continue to fill each row with the Receiving Water's 303(d) listed impairments (if any), designated beneficial uses, and proximity, if any, to a RARE beneficial use. Include a map of the receiving waters in Appendix 1.

Table A.1 Identification of Receiving Waters

Receiving Waters	EPA Approved 303(d) List Impairments	Designated Beneficial Uses	Proximity to RARE Beneficial Use
Existing Paloma Valley High School Channel	None	None	No RARE designation
Salt Creek Channel	None	none	No RARE designation
Canyon Lake (a.k.a. San Jacinto River Reach 2)Hydrologic Unit 802.11	Pathogens, Nutrients	MUN, AGR, GWR, REC1, REC2, WARM, WILD	No RARE designation
San Jacinto River (Reach 1) Hydrologic Unit 802.32	None	GWR, MUN, AGR, REC1, REC2, WARM, WILD	No RARE designation
Lake Elsinore Santa Ana River Basin WQCP Hydrologic Unit 802.31	Nutrients, organic enrichment/low dissolved oxygen, PCBs, sediment toxicity, unknown toxicity	REC1, REC2, WARM, WILD	No RARE designation

A.3 Additional Permits/Approvals required for the Project:

Table A.2 Other Applicable Permits

Agency	Permit Required	
State Department of Fish and Game, 1602 Streambed Alteration Agreement	☐ Y	☒ N
State Water Resources Control Board, Clean Water Act (CWA) Section 401 Water Quality Cert.	☒ 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
Statewide Construction General Permit Coverage	☒ Y	☐ N
Statewide Industrial General Permit Coverage	☐ Y	☒ N
Western Riverside MSHCP Consistency Approval (e.g., JPR, DBESP)	☐ Y	☒ N
Other *(please list in the space below as required)* State Department of Fish and Game, 1602 Streambed Alteration Agreement City of Menifee Grading Permit	☒ Y	☐ N

If yes is answered to any of the questions above, the Co-Permittee may require proof of approval/coverage from those agencies as applicable including documentation of any associated requirements that may affect this Project-Specific WQMP.

Section B: Optimize Site Utilization (LID Principles)

Review of the information collected in Section 'A' will aid in identifying the principal constraints on site design and selection of LID BMPs as well as opportunities to reduce imperviousness and incorporate LID Principles into the site and landscape design. For example, **constraints** might include impermeable soils, high groundwater, groundwater pollution or contaminated soils, steep slopes, geotechnical instability, high-intensity land use, heavy pedestrian or vehicular traffic, utility locations or safety concerns. **Opportunities** might include existing natural areas, low areas, oddly configured or otherwise unbuildable parcels, easements and landscape amenities including open space and buffers (which can double as locations for bioretention BMPs), and differences in elevation (which can provide hydraulic head). Prepare a brief narrative for each of the site optimization strategies described below. This narrative will help you as you proceed with your LID design and explain your design decisions to others.

The 2010 Santa Ana MS4 Permit further requires that LID Retention BMPs (Infiltration Only or Harvest and Use) be used unless it can be shown that those BMPs are infeasible. Therefore, it is important that your narrative identify and justify if there are any constraints that would prevent the use of those categories of LID BMPs. Similarly, you should also note opportunities that exist which will be utilized during project design. Upon completion of identifying Constraints and Opportunities, include these on your WQMP Site plan in Appendix 1.

Consideration of "highest and best use" of the discharge should also be considered. For example, Lake Elsinore is evaporating faster than runoff from natural precipitation can recharge it. Requiring infiltration of 85% of runoff events for projects tributary to Lake Elsinore would only exacerbate current water quality problems associated with Pollutant concentration due to lake water evaporation. In cases where rainfall events have low potential to recharge Lake Elsinore (i.e. no hydraulic connection between groundwater to Lake Elsinore, or other factors), requiring infiltration of Urban Runoff from projects is counterproductive to the overall watershed goals. Project proponents, in these cases, would be allowed to discharge Urban Runoff, provided they used equally effective filtration-based BMPs.

Site Optimization

The following questions are based upon Section 3.2 of the WQMP Guidance Document. Review of the WQMP Guidance Document will help you determine how best to optimize your site and subsequently identify opportunities and/or constraints, and document compliance.

Did you identify and preserve existing drainage patterns? If so, how? If not, why?

- *Yes, the development will mimic the sites existing drainage patterns, this portion of the overall project typically flows south and west in both the existing and proposed conditions.*

Did you identify and protect existing vegetation? If so, how? If not, why?

- *Where feasible, the existing vegetation will be preserved.*

Did you identify and preserve natural infiltration capacity? If so, how? If not, why?

- Where feasible the natural inflation capacity was preserved and infiltration basins are proposed throughout the overall project

Did you identify and minimize impervious area? If so, how? If not, why?

- *The projects streets were designed to meet the minimum width requirements per the City of Menifee design standards.*

Did you identify and disperse runoff to adjacent pervious areas? If so, how? If not, why?

- *Where feasible, landscape lots are included into the site design to receive runoff prior to being conveyed to the site's storm drain system.*

Section C: Delineate Drainage Management Areas (DMAs)

Utilizing the procedure in Section 3.3 of the WQMP Guidance Document which discusses the methods of delineating and mapping your project site into individual DMAs, complete Table C.1 below to appropriately categorize the types of classification (e.g., Type A, Type B, etc.) per DMA for your project site. Upon completion of this table, this information will then be used to populate and tabulate the corresponding tables for their respective DMA classifications.

Table C.1 DMA Classifications

DMA Name or ID	Surface Type(s)[1][2]	Area (Sq. Ft.)	DMA Type
Portion of DMA 'A'	Mixed		Type 'D', Areas Draining to BMPs

[1]Reference Table 2-1 in the WQMP Guidance Document to populate this column
[2]If multi-surface provide back-up

Table C.2 Type 'A', Self-Treating Areas

DMA Name or ID	Area (Sq. Ft.)	Stabilization Type	Irrigation Type (if any)
n/a			

Table C.3 Type 'B', Self-Retaining Areas

Self-Retaining Area				**Type 'C' DMAs that are draining to the Self-Retaining Area**		
DMA Name/ ID	Post-project surface type	Area (square feet) [A]	Storm Depth (inches) [B]	DMA Name / ID	[C] from Table C.4 = [C]	Required Retention Depth (inches) [D]
n/a						

$$[D] = [B] + \frac{[B] \cdot [C]}{[A]}$$

Table C.4 Type 'C', Areas that Drain to Self-Retaining Areas

DMA					Receiving Self-Retaining DMA		
DMA Name/ ID	Area (square feet)	Post-project surface type	Impervious fraction	Product	DMA name /ID	Area (square feet)	Ratio
	[A]		[B]	[C] = [A] x [B]		[D]	[C]/[D]
n/a							

Table C.5 Type 'D', Areas Draining to BMPs

DMA Name or ID	BMP Name or ID
Portion of DMA 'A'	Extended Detention Basin DMA 'A'

Note: More than one drainage management area can drain to a single LID BMP, however, one drainage management area may not drain to more than one BMP.

Section D: Implement LID BMPs

D.1 Infiltration Applicability

Is there an approved downstream 'Highest and Best Use' for stormwater runoff (see discussion in Chapter 2.4.4 of the WQMP Guidance Document for further details)? ☐ Y ☒ N

If yes has been checked, Infiltration BMPs shall not be used for the site; proceed to section D.3

If no, continue working through this section to implement your LID BMPs. It is recommended that you contact your Co-Permittee to verify whether or not your project discharges to an approved downstream 'Highest and Best Use' feature.

Geotechnical Report

A Geotechnical Report or Phase I Environmental Site Assessment may be required by the Copermittee to confirm present and past site characteristics that may affect the use of Infiltration BMPs. In addition, the Co-Permittee, at their discretion, may not require a geotechnical report for small projects as described in Chapter 2 of the WQMP Guidance Document. If a geotechnical report has been prepared, include it in Appendix 3. In addition, if a Phase I Environmental Site Assessment has been prepared, include it in Appendix 4.

Is this project classified as a small project consistent with the requirements of Chapter 2 of the WQMP Guidance Document? ☐ Y ☒ N

Infiltration Feasibility

Table D.1 below is meant to provide a simple means of assessing which DMAs on your site support Infiltration BMPs and is discussed in the WQMP Guidance Document in Chapter 2.4.5. Check the appropriate box for each question and then list affected DMAs as applicable. If additional space is needed, add a row below the corresponding answer.

Table D.1 Infiltration Feasibility

Does the project site…	YES	NO
…have any DMAs with a seasonal high groundwater mark shallower than 10 feet?		X
If Yes, list affected DMAs:		
…have any DMAs located within 100 feet of a water supply well?		X
If Yes, list affected DMAs:		
…have any areas identified by the geotechnical report as posing a public safety risk where infiltration of stormwater could have a negative impact?		X
If Yes, list affected DMAs:		
…have measured in-situ infiltration rates of less than 1.6 inches / hour?	X	
If Yes, list affected DMAs: DMA 'A'		
…have significant cut and/or fill conditions that would preclude in-situ testing of infiltration rates at the final infiltration surface?		X
If Yes, list affected DMAs:		
…geotechnical report identify other site-specific factors that would preclude effective and safe infiltration?		X
Describe here:		

If you answered "Yes" to any of the questions above for any DMA, Infiltration BMPs should not be used for those DMAs and you should proceed to the assessment for Harvest and Use below.

D.2 Harvest and Use Assessment

Please check what applies*:*

☐ Reclaimed water will be used for the non-potable water demands for the project.

☐Downstream water rights may be impacted by Harvest and Use as approved by the Regional Board (verify with the Copermittee).

☒The Design Capture Volume will be addressed using Infiltration Only BMPs. In such a case, Harvest and Use BMPs are still encouraged, but it would not be required if the Design Capture Volume will be infiltrated or evapotranspired.

If any of the above boxes have been checked, Harvest and Use BMPs need not be assessed for the site. If none of the above criteria applies, follow the steps below to assess the feasibility of irrigation use, toilet use and other non-potable uses (e.g., industrial use).

Irrigation Use Feasibility

Complete the following steps to determine the feasibility of harvesting stormwater runoff for Irrigation Use BMPs on your site:

Step 1: Identify the total area of irrigated landscape on the site, and the type of landscaping used.

Total Area of Irrigated Landscape: 70,768 sf (1.6 ac)

Type of Landscaping (Conservation Design or Active Turf): Conservative Design

Step 2: Identify the planned total of all impervious areas on the proposed project from which runoff might be feasibly captured and stored for irrigation use. Depending on the configuration of buildings and other impervious areas on the site, you may consider the site as a whole, or parts of the site, to evaluate reasonable scenarios for capturing and storing runoff and directing the stored runoff to the potential use(s) identified in Step 1 above.

Total Area of Impervious Surfaces: 54,430 sf (1.25 ac)

Step 3: Cross reference the Design Storm depth for the project site (see Exhibit A of the WQMP Guidance Document) with the left column of Table 2-3 in Chapter 2 to determine the minimum area of Effective Irrigated Area per Tributary Impervious Area (EIATIA).

Enter your EIATIA factor: 0.79

Step 4: Multiply the unit value obtained from Step 3 by the total of impervious areas from Step 2 to develop the minimum irrigated area that would be required.

Minimum required irrigated area: 43,000 sf (0.987 AC)

Step 5: Determine if harvesting stormwater runoff for irrigation use is feasible for the project by comparing the total area of irrigated landscape (Step 1) to the minimum required irrigated area (Step 4).

Minimum required irrigated area (Step 4)	Available Irrigated Landscape (Step 1)
0.987 ac	1.6 ac

Toilet Use Feasibility

Complete the following steps to determine the feasibility of harvesting stormwater runoff for toilet flushing uses on your site:

Step 1: Identify the projected total number of daily toilet users during the wet season, and account for any periodic shut downs or other lapses in occupancy:

Projected Number of Daily Toilet Users: 0 Users

Project Type: Potable Water Storage Tank

Step 2: Identify the planned total of all impervious areas on the proposed project from which runoff might be feasibly captured and stored for toilet use. Depending on the configuration of buildings and other impervious areas on the site, you may consider the site as a whole, or parts of the site, to evaluate reasonable scenarios for capturing and storing runoff and directing the stored runoff to the potential use(s) identified in Step 1 above.

Total Area of Impervious Surfaces: 70,768 sf (1.62 ac)

Step 3: Enter the Design Storm depth for the project site (see Exhibit A) into the left column of Table 2-2 in Chapter 2 to determine the minimum number or toilet users per tributary impervious acre (TUTIA).

Enter your TUTIA factor: 101 TU/Ac

Step 4: Multiply the unit value obtained from Step 3 by the total of impervious areas from Step 2 to develop the minimum number of toilet users that would be required.

Minimum number of toilet users: 164 TU

Step 5: Determine if harvesting stormwater runoff for toilet flushing use is feasible for the project by comparing the Number of Daily Toilet Users (Step 1) to the minimum required number of toilet users (Step 4).

Minimum required Toilet Users (Step 4)	**Projected number of toilet users (Step 1)**
164 TU	0 TU

Other Non-Potable Use Feasibility

Are there other non-potable uses for stormwater runoff on the site (e.g. industrial use)? See Chapter 2 of the Guidance for further information. If yes, describe below. If no, write N/A.

none

If Irrigation, Toilet and Other Use feasibility anticipated demands are less than the applicable minimum values, Harvest and Use BMPs are not required and you should proceed to utilize LID Bioretention and Biotreatment per Section 3.4.2 of the WQMP Guidance Document.

D.3 Bioretention and Biotreatment Assessment

Other LID Bioretention and Biotreatment BMPs as described in Chapter 2.4.7 of the WQMP Guidance Document are feasible on nearly all development sites with sufficient advance planning.

Select one of the following:

☒ LID Bioretention/Biotreatment BMPs will be used for some or all DMAs of the project as noted below in Section D.4 (note the requirements of Section 3.4.2 in the WQMP Guidance Document). **(The Improvements proposed with the tank site are tributary DMA 'A' within the approved WQMP for overall Golden Meadows Residential Project, Tract 31194)**

☐ A site-specific analysis demonstrating the technical infeasibility of all LID BMPs has been performed and is included in Appendix 5. If you plan to submit an analysis demonstrating the technical infeasibility of LID BMPs, request a pre-submittal meeting with the Copermittee to discuss this option. Proceed to Section E to document your alternative compliance measures.

D.4 Feasibility Assessment Summaries

From the Infiltration, Harvest and Use, Bioretention and Biotreatment Sections above, complete Table D.2 below to summarize which LID BMPs are technically feasible, and which are not, based upon the established hierarchy.

Table D.2 LID Prioritization Summary Matrix

DMA Name/ID	LID BMP Hierarchy				No LID (Alternative Compliance)
	1. Infiltration	2. Harvest and use	3. Bioretention	4. Biotreatment	
A	☐	☐	☐	☒	☐

For those DMAs where LID BMPs are not feasible, provide a brief narrative below summarizing why they are not feasible, include your technical infeasibility criteria in Appendix 5, and proceed to Section E below to document Alternative Compliance measures for those DMAs. Recall that each proposed DMA must pass through the LID BMP hierarchy before alternative compliance measures may be considered.

n/a

D.5 LID BMP Sizing

Each LID BMP must be designed to ensure that the Design Capture Volume will be addressed by the selected BMPs. First**,** calculate the Design Capture Volume for each LID BMP using the V_{BMP} worksheet in Appendix F of the LID BMP Design Handbook. Second**,** design the LID BMP to meet the required V_{BMP} using a method approved by the Copermittee. Utilize the worksheets found in the LID BMP Design Handbook or consult with your Copermittee to assist you in correctly sizing your LID BMPs. Complete Table D.3 below to document the Design Capture Volume and the Proposed Volume for each LID BMP. Provide the completed design procedure sheets for each LID BMP in Appendix 6. You may add additional rows to the table below as needed.

Table D.3 DCV Calculations for LID BMPs

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Impervious Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	*Enter BMP Name / Identifier Here*		
	[A]		[B]	[C]	[A] x [C]			
						Design Storm Depth (in)	*Design Capture Volume,* $\mathbf{V_{BMP}}$ *(cubic feet)*	*Proposed Volume on Plans (cubic feet)*
	$A_T = \Sigma[A]$				Σ= [D]	[E]	$[F] = \frac{[D]x[E]}{12}$	[G]

[B], [C] is obtained as described in Section 2.3.1 of the WQMP Guidance Document

[E] is obtained from Exhibit A in the WQMP Guidance Document

[G] is obtained from a design procedure sheet, such as in LID BMP Design Handbook and placed in Appendix 6

See calculations in Appendix 6.

Section E: Alternative Compliance (LID Waiver Program)

LID BMPs are expected to be feasible on virtually all projects. Where LID BMPs have been demonstrated to be infeasible as documented in Section D, other Treatment Control BMPs must be used (subject to LID waiver approval by the Copermittee). Check one of the following Boxes:

☒ LID Principles and LID BMPs have been incorporated into the site design to fully address all Drainage Management Areas. No alternative compliance measures are required for this project and thus this Section is not required to be completed.

- *Or* -

☐ The following Drainage Management Areas are unable to be addressed using LID BMPs. A site-specific analysis demonstrating technical infeasibility of LID BMPs has been approved by the Co-Permittee and included in Appendix 5. Additionally, no downstream regional and/or sub-regional LID BMPs exist or are available for use by the project. The following alternative compliance measures on the following pages are being implemented to ensure that any pollutant loads expected to be discharged by not incorporating LID BMPs, are fully mitigated.

Section F: Hydromodification

F.1 Hydrologic Conditions of Concern (HCOC) Analysis

Once you have determined that the LID design is adequate to address water quality requirements, you will need to assess if the proposed LID Design may still create a HCOC. Review Chapters 2 and 3 (including Figure 3-7) of the WQMP Guidance Document to determine if your project must mitigate for Hydromodification impacts. If your project meets one of the following criteria which will be indicated by the check boxes below, you do not need to address Hydromodification at this time. However, if the project does not qualify for Exemptions 1, 2 or 3, then additional measures must be added to the design to comply with HCOC criteria. This is discussed in further detail below in Section F.2.

HCOC EXEMPTION 1: The Priority Development Project disturbs less than one acre. The Co-permittee has the discretion to require a Project-Specific WQMP to address HCOCs on projects less than one acre on a case by case basis. The disturbed area calculation should include all disturbances associated with larger common plans of development.

Does the project qualify for this HCOC Exemption? ☐ Y ☒ N

If Yes, HCOC criteria do not apply.

HCOC EXEMPTION 2: The volume and time of concentration[1] of storm water runoff for the post-development condition is not significantly different from the pre-development condition for a 2-year return frequency storm (a difference of 5% or less is considered insignificant) using one of the following methods to calculate:

- Riverside County Hydrology Manual
- Technical Release 55 (TR-55): Urban Hydrology for Small Watersheds (NRCS 1986), or derivatives thereof, such as the Santa Barbara Urban Hydrograph Method
- Other methods acceptable to the Co-Permittee

Does the project qualify for this HCOC Exemption? ☒ Y ☐ N

If Yes, report results in Table F.1 below and provide your substantiated hydrologic analysis in Appendix 7.

Table F.1 Hydrologic Conditions of Concern Summary

	2 year – 24 hour		
	Pre-condition	**Post-condition**	**% Difference**
Time of Concentration	23.97 min.	16.57 min	69.1%
Volume (Cubic Feet)	125,700 cf	378,914 cf	301%

[1] Time of concentration is defined as the time after the beginning of the rainfall when all portions of the drainage basin are contributing to flow at the outlet.

Although the proposed project will increase the storm volume run-off and reduce the time of concentration, the proposed water waulity and detention basin will mitigate these increases to be less than or equal to the existing condition (5% increase is considered acceptable and an insignificant increase). Please reference the overall project WQMP for tract 31194, for complete DMA basin design and routing.

HCOC EXEMPTION 3: All downstream conveyance channels to an adequate sump (for example, Prado Dam, Lake Elsinore, Canyon Lake, Santa Ana River, or other lake, reservoir or naturally erosion resistant feature) that will receive runoff from the project are engineered and regularly maintained to ensure design flow capacity; no sensitive stream habitat areas will be adversely affected; or are not identified on the Co-Permittees Hydromodification Susceptibility Maps.

Does the project qualify for this HCOC Exemption? ☐ Y ☒ N

If Yes, HCOC criteria do not apply and note below which adequate sump applies to this HCOC qualifier:

F.2 HCOC Mitigation

If none of the above HCOC Exemption Criteria are applicable, HCOC criteria is considered mitigated if they meet one of the following conditions:

a. Additional LID BMPS are implemented onsite or offsite to mitigate potential erosion or habitat impacts as a result of HCOCs. This can be conducted by an evaluation of site-specific conditions utilizing accepted professional methodologies published by entities such as the California Stormwater Quality Association (CASQA), the Southern California Coastal Water Research Project (SCCRWP), or other Co-Permittee approved methodologies for site-specific HCOC analysis.

b. The project is developed consistent with an approved Watershed Action Plan that addresses HCOC in Receiving Waters.

c. Mimicking the pre-development hydrograph with the post-development hydrograph, for a 2-year return frequency storm. Generally, the hydrologic conditions of concern are not significant, if the post-development hydrograph is no more than 10% greater than pre-development hydrograph. In cases where excess volume cannot be infiltrated or captured and reused, discharge from the site must be limited to a flow rate no greater than 110% of the pre-development 2-year peak flow.

Be sure to include all pertinent documentation used in your analysis of the items a, b or c in Appendix 7.

Section G: Source Control BMPs

Source control BMPs include permanent, structural features that may be required in your project plans — such as roofs over and berms around trash and recycling areas — and Operational BMPs, such as regular sweeping and "housekeeping", that must be implemented by the site's occupant or user. The MEP standard typically requires both types of BMPs. In general, Operational BMPs cannot be substituted for a feasible and effective permanent BMP. Using the Pollutant Sources/Source Control Checklist in Appendix 8, review the following procedure to specify Source Control BMPs for your site:

1. ***Identify Pollutant Sources*:** Review Column 1 in the Pollutant Sources/Source Control Checklist. Check off the potential sources of Pollutants that apply to your site.

2. ***Note Locations on Project-Specific WQMP Exhibit*:** Note the corresponding requirements listed in Column 2 of the Pollutant Sources/Source Control Checklist. Show the location of each Pollutant source and each permanent Source Control BMP in your Project-Specific WQMP Exhibit located in Appendix 1.

3. ***Prepare a Table and Narrative*:** Check off the corresponding requirements listed in Column 3 in the Pollutant Sources/Source Control Checklist. In the left column of Table G.1 below, list each potential source of runoff Pollutants on your site (from those that you checked in the Pollutant Sources/Source Control Checklist). In the middle column, list the corresponding permanent, Structural Source Control BMPs (from Columns 2 and 3 of the Pollutant Sources/Source Control Checklist) used to prevent Pollutants from entering runoff. **Add additional narrative** in this column that explains any special features, materials or methods of construction that will be used to implement these permanent, Structural Source Control BMPs.

4. ***Identify Operational Source Control BMPs:*** To complete your table, refer once again to the Pollutant Sources/Source Control Checklist. List in the right column of your table the Operational BMPs that should be implemented as long as the anticipated activities continue at the site. Copermittee stormwater ordinances require that applicable Source Control BMPs be implemented; the same BMPs may also be required as a condition of a use permit or other revocable Discretionary Approval for use of the site.

Table G.1 Permanent and Operational Source Control Measures

Potential Sources of Runoff Pollutants	Structural Source Control BMPs	Operational Source Control BMPs
On-site storm drain inlets	Mark all inlets with the words "Only Rain Down the Storm Drain" or similar. Catch Basin Makers may be available from the Riverside County Flood Control and Water Conservation District, call 951.955.1200 to verify	Maintain and periodically repaint or replace inlet markings. Provide stormwater pollution prevention information to new site owners, lessees, or operators. See applicable operational BMPs in Fact Sheet SC-44, "Drainage System Maintenance," in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com Include the following in lease agreements: "Tenant shall not allow anyone to discharge anything to storm drains or to store or deposit materials so as

		to create a potential discharge to storm drains."
Landscape/Outdoor Pesticide Use	Preserve, existing native trees, shrubs, and ground cover to the maximum extent possible. Design landscaping to minimize irrigation and runoff, to promote surface infiltration where appropriate, and to minimize the use of fertilizers and pesticides that can contribute to stormwater pollution. Where landscaping areas are used to retain or detain stormwater, specify plants that are tolerant of saturated soil conditions. Consider using pest-resistant plants, especially to hardscape. To insure successful establishment, select plants appropriate to site soils, slopes, climate, sun, wind, rain, land use, air movement, ecological consistency, and plant interactions.	Maintain landscaping using minimum or no pesticides. See applicable operation BMPs in "What you show know for…..Landscaping and Gardening". Provide IPM information to new owners, lessees and operators.
Pools, spas, ponds, decorative fountains, and other water features.	If the Co-Permittee requires pools to be plumbed to the sanitary sewer, place a note on the plans and state in the narrative that this connection will be made according to local requirements.	See applicable operational BMPs in "Guidelines for Maintaining Your Swimming Pool, Jacuzzi and Garden Fountain"
Vehicle/Equipment Repair and Maintenance	Vehicle repairs shall be kept to those that can be considered "self-contained". Clean-up methods shall be done by dry methods. Fluids drained from a vehicle should be contained in a recyclable container and turned into a local facility for recycling.	No person shall dispose of, nor permit the disposal, directly or indirectly of vehicle fluids, hazardous materials, or rinse water from parts cleaning into storm drains.
Fire Sprinkler Test Water	Fire sprinkler test water shall be drained to the sanitary sewer.	See the note in Fact Sheet SC – 41, "Building and Grounds Maintenance,' in the CASQA Stormwater Quality Handbooks at ww.cabmphandbooks.com
Miscellaneous Drain or Wash Water or Other Sources Roofing, gutters, and trim	Avoid roofing, gutters, and trim made of copper or other unprotected metals	

Section H: Construction Plan Checklist

Populate Table H.1 below to assist the plan checker in an expeditious review of your project. The first two columns will contain information that was prepared in previous steps, while the last column will be populated with the corresponding plan sheets. This table is to be completed with the submittal of your final Project-Specific WQMP.

Table H.1 Construction Plan Cross-reference

BMP No. or ID	BMP Identifier and Description	Corresponding Plan Sheet(s)	BMP Location (Lat/Long)
DMA 'A'	Extended Detention Basin DMA 'A'	Rough Grading Plan	LAT: 33°39'17.97"N LON:117°11'41.01"W

Note that the updated table — or Construction Plan WQMP Checklist — is **only a reference tool** to facilitate an easy comparison of the construction plans to your Project-Specific WQMP. Co-Permittee staff can advise you regarding the process required to propose changes to the approved Project-Specific WQMP.

Section I: Operation, Maintenance and Funding

The Copermittee will periodically verify that Stormwater BMPs on your site are maintained and continue to operate as designed. To make this possible, your Copermittee will require that you include in Appendix 9 of this Project-Specific WQMP:

1. A means to finance and implement facility maintenance in perpetuity, including replacement cost.
2. Acceptance of responsibility for maintenance from the time the BMPs are constructed until responsibility for operation and maintenance is legally transferred. A warranty covering a period following construction may also be required.
3. An outline of general maintenance requirements for the Stormwater BMPs you have selected.
4. Figures delineating and designating pervious and impervious areas, location, and type of Stormwater BMP, and tables of pervious and impervious areas served by each facility. Geo-locating the BMPs using a coordinate system of latitude and longitude is recommended to help facilitate a future statewide database system.
5. A separate list and location of self-retaining areas or areas addressed by LID Principles that do not require specialized O&M or inspections but will require typical landscape maintenance as noted in Chapter 5, pages 85-86, in the WQMP Guidance. Include a brief description of typical landscape maintenance for these areas.

Your local Co-Permittee will also require that you prepare and submit a detailed Stormwater BMP Operation and Maintenance Plan that sets forth a maintenance schedule for each of the Stormwater BMPs built on your site. An agreement assigning responsibility for maintenance and providing for inspections and certification may also be required.

Details of these requirements and instructions for preparing a Stormwater BMP Operation and Maintenance Plan are in Chapter 5 of the WQMP Guidance Document.

Maintenance Mechanism: Home Owners Association (HOA)

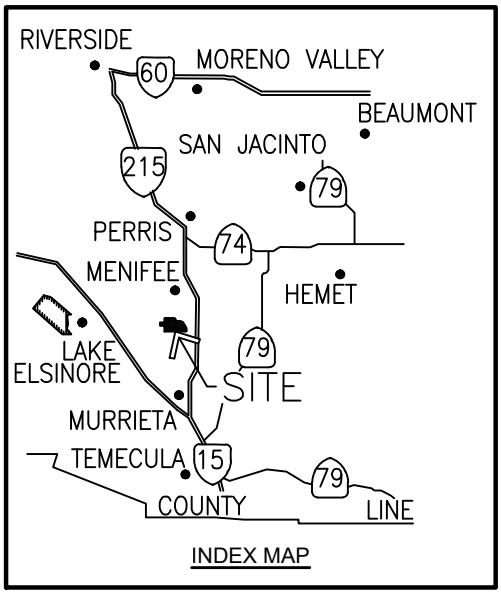
Will the proposed BMPs be maintained by a Home Owners' Association (HOA) or Property Owners Association (POA)?

☒ Y ☐ N

Include your Operation and Maintenance Plan and Maintenance Mechanism in Appendix 9. Additionally, include all pertinent forms of educational materials for those personnel that will be maintaining the proposed BMPs within this Project-Specific WQMP in Appendix 10.

Appendix 1: Maps and Site Plans

Location Map, WQMP Site Plan and Receiving Waters Map



RAILROAD CANYON ROAD

NEWPORT ROAD

MURRIETA ROAD

EVANS ROAD

SITE

215

MENIFEE ROAD

GARBANI ROAD

WICKERD ROAD

SCOTT ROAD

15

N

W HUNSAKER E

S

NOT TO SCALE

HUNSAKER & ASSOCIATES
IRVINE, INC
INLAND EMPIRE REGION
2900 ADAMS STREET, SUITE A-15
RIVERSIDE CA 92504 (951)352-7200
PLANNING/ENGINEERING/SURVEYING/GOVERNMENT RELATIONS

FIGURE 1: VICINITY MAP

THOMAS BROTHERS MAPS:
PAGE 868, GRID B-6, B-7, C-6, C-7, D-6 & D-7

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FIGURE 2: AERIAL PHOTOGRAPH

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DANIEL ROAD

EVANS ROAD

WICKERD ROAD

ASCOT WAY

DIEGO WAY

P.M. 54/22-23

DMA 'A'

DMA 'B'

DMA 'C'

DMA 'D'

DMA 'E'

DMA 'F'

PROPOSED TANK

FUTURE TANK

SITE

INDEX MAP

VICINITY MAP

NOT TO SCALE

NEWPORT ROAD

HOLLAND ROAD

SCOTT ROAD

MURRIETA ROAD

HAUN ROAD

MENIFEE ROAD

RIVERSIDE

MORENO VALLEY

SAN JACINTO

BEAUMONT

PERRIS

LAKE ELSINORE

MENIFEE

HEMET

MURRIETA

TEMECULA

COUNTY LINE

N

W HUNSAKER E

S

0 75 150 300

SCALE: 1" = 150'

LEGEND

DRAINAGE MANAGEMENT AREA 'A' (TRIBUTARY TO TR. 31194 DMA 'A')	=	9.00 AC.
NAP (TRACT 31194 DRAINAGE MANAGEMENT AREA 'A')	=	88.71 AC.
NAP (TRACT 31194 DRAINAGE MANAGEMENT AREA 'B')	=	20.45 AC.
NAP (TRACT 31194 DRAINAGE MANAGEMENT AREA 'C')	=	14.17 AC.
NAP (TRACT 31194 DRAINAGE MANAGEMENT AREA 'D')	=	9.49 AC.
NAP (TRACT 31194 DRAINAGE MANAGEMENT AREA 'E')	=	1.68 AC.
NAP (TRACT 31194 DRAINAGE MANAGEMENT AREA 'F')	=	14.49 AC.

RIVERSIDE COUNTY FLOOD COLTROL DISTRICT
FINAL W.Q.M.P. EXHIBIT

DRAINAGE MANAGEMENT AREA MAP FOR 'EMWD TANK SITE' SUPPLEMENTAL WQMP - TRACT 31194

SCALE:	1" = 150'
DATE:	MAY 2021
DESIGNED:	CAE
CHECKED:	BRL
PLN CK REF:	
F.B.	

HUNSAKER & ASSOCIATES
IRVINE, INC
INLAND EMPIRE REGION
2900 ADAMS STREET, SUITE A-15
RIVERSIDE CA 92504 (951)352-7200
PLANNING/ENGINEERING/SURVEYING/GOVERNMENT RELATIONS

W.O.	3763-31194C
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OF	2 SHEETS
DWG. NO.	

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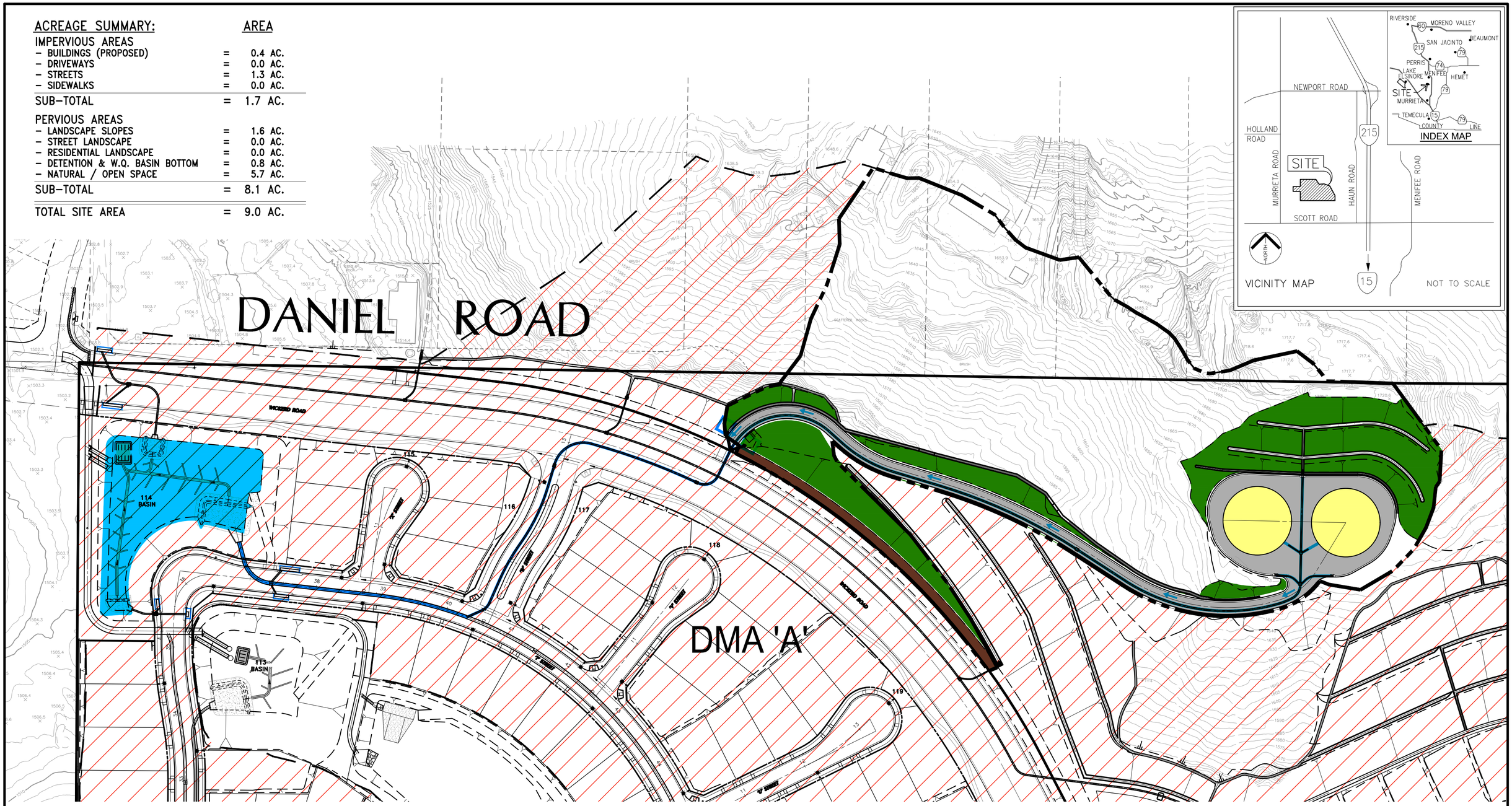
ACREAGE SUMMARY:

		AREA
IMPERVIOUS AREAS		
– BUILDINGS (PROPOSED)	=	0.4 AC.
– DRIVEWAYS	=	0.0 AC.
– STREETS	=	1.3 AC.
– SIDEWALKS	=	0.0 AC.
SUB–TOTAL	=	1.7 AC.
PERVIOUS AREAS		
– LANDSCAPE SLOPES	=	1.6 AC.
– STREET LANDSCAPE	=	0.0 AC.
– RESIDENTIAL LANDSCAPE	=	0.0 AC.
– DETENTION & W.Q. BASIN BOTTOM	=	0.8 AC.
– NATURAL / OPEN SPACE	=	5.7 AC.
SUB–TOTAL	=	8.1 AC.
TOTAL SITE AREA	=	9.0 AC.



LEGEND

- PROJECT BOUNDARY
- PROPOSED DRAINAGE BOUNDARY LINE
- DMA BOUNDARY
- NAP — NOT A PART
- PROPOSED STORM DRAIN & FLOW DIRECTION (ONSITE)
- DIRECTION OF SURFACE FLOW (ONSITE)
- DIRECTION OF SURFACE FLOW (OFFSITE)
- BUILDINGS
- LANDSCAPED SLOPES WITH BMPS SITE DESIGN/LANDSCAPE PLANNING SD–10 EFFICIENT IRRIGATION SD–12
- OPEN SPACE AREA
- DETENTION / WATER QUALITY BASIN
- PAVED AREA WITH STREET SWEEPING BMP
- BMP AREA 'A' TRIBUTARY TO WATER TANK SITE

N W HUNSAKER E S

0 50 100 200

SCALE: 1" = 100'

ADDITIONAL STRUCTURAL AND NONSTRUCTURAL SOURCE CONTROL BMP'S (SEE PROJECT WQMP OPERATIONS AND MAINTENANCE PLAN FOR DETAILS):

- EDUCATION FOR TENANTS AND EMPLOYEES
- ACTIVITY RESTRICTIONS
- LANDSCAPE MANAGEMENT
- BMP MAINTENANCE
- TITLE 22 COMPLIANCE
- SPILL CONTINGENCY PLAN
- HAZARDOUS MATERIALS DISCLOSURE COMPLIANCE
- UNIFORM FIRE CODE IMPLEMENTATION
- PEAK STORM FLOW MITIGATION
- PRIVATE STREETS AND PARKING LOTS STREET SWEEPING
- DESIGN AND CONSTRUCT TRASH AND WASTE STORAGE AREAS
- EFFICIENT IRRIGATION SYSTEM AND LANDSCAPE DESIGN
- PROTECTION OF SLOPES AND CHANNELS
- AT GRADE LOADING DOCKS/DELIVERY AREAS
- LITTER CONTROL

LID PRACTICES TO BE IMPLEMENTED FOR THIS PROJECT INCLUDE:

- IMPERVIOUS AREA DISPERSION (HSC–2)
- BIORETENTION WITH NO UNDER DRAIN (INF–3)
- STREET TREES (HSC–3)

SITE DESIGN AND SOURCE CONTROL BMP'S INCLUDE:

- INTEGRATED PEST MANAGEMENT (IPM) MEASURES
- SD–10 SITE DESIGN/LANDSCAPE PLANNING
- SD–11 ROOF RUNOFF CONTROLS
- SD–12 EFFICIENT IRRIGATION
- SD–13 STORM DRAIN SIGNAGE
- FIRE SPRINKLERS DRAIN TO PRIMED P–TRAP SANITARY SEWER
- SECONDARY CONTAINMENT FOR ANY ROOF AIR CONDITIONING UNITS

RIVERSIDE COUNTY FLOOD COLTROL DISTRICT
W.Q.M.P. EXHIBIT

BEST MANAGEMENT PRACTICES MAP FOR 'EMWD TANK SITE' SUPPLEMENTAL WQMP - TRACT 31194

SCALE:	1" = 120'
DATE:	APR 2021
DESIGNED:	CE
CHECKED:	BRL
PLN CK REF:	
F.B.	

H&A
HUNSAKER & ASSOCIATES
IRVINE, INC
INLAND EMPIRE REGION
2900 ADAMS STREET, SUITE A–15
RIVERSIDE CA 92504 (951)352–7200
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W.O.	3763–31194
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Appendix 2: Construction Plans

Grading and Drainage Plans

GRADING & GEOTECHNICAL SPECIFICATIONS

1. ALL GRADING SHALL BE DONE UNDER OBSERVATION AND TESTING BY A QUALIFIED CIVIL ENGINEER OR GEOTECHNICAL ENGINEER AND, IF REQUIRED, BOTH A QUALIFIED CIVIL ENGINEER OR GEOTECHNICAL ENGINEER AND AN ENGINEERING GEOLOGIST. ALL GRADING MUST BE PERFORMED IN ACCORDANCE WITH APPLICABLE CITY ORDINANCE AND THE RECOMMENDATIONS AND SPECIFICATIONS SET FORTH IN THE SOILS REPORT OR GEOLOGICAL/GEOTECHNICAL INVESTIGATION ENTITLED: [REPORT TITLE, PROJECT NAME, PROJECT LOCATION, PREPARED BY (COMPANY NAME), DATED (THEIR COMPANY PROJECT NO.)]
2. ALL FILL MATERIAL SHALL BE COMPACTED TO A MINIMUM OF 90% OF THE MAXIMUM DRY DENSITY AS DETERMINED BY THE MOST RECENT VERSION OF A.S.T.M. D-1557 OR AN APPROVED ALTERNATIVE STANDARD.
3. AT THE COMPLETION OF THE GRADING OPERATIONS FOR THE EARTHWORK SHOWN ON THIS PLAN, AN AS-GRADED SOILS REPORT, OR IF REQUIRED, AN AS-GRADED GEOTECHNICAL REPORT WILL BE PREPARED. THE FINAL "AS-GRADED" GEOTECHNICAL REPORT WILL BE SUBMITTED TO THE CITY. THE FINAL REPORT MUST ALSO BE REVIEWED AND SIGNED BY A CALIFORNIA CERTIFIED ENGINEERING GEOLOGIST.
4. IF THE GEOTECHNICAL CONSULTANT OF RECORD IS CHANGED FOR THE PROJECT, THE WORK SHALL BE STOPPED UNTIL THE REPLACEMENT HAS AGREED IN WRITING TO ACCEPT THE RESPONSIBILITY WITHIN THE AREA OF THEIR TECHNICAL COMPETENCE FOR APPROVAL UPON COMPLETION OF THE WORK. IT SHALL BE THE DUTY OF THE PERMITTEE TO NOTIFY THE CITY ENGINEER IN WRITING OF SUCH CHANGE PRIOR TO THE RECOMMENCEMENT OF GRADING.
5. THESE GRADING PLANS HAVE BEEN REVIEWED BY THE UNDERSIGNED AND FOUND TO BE IN CONFORMANCE WITH THE RECOMMENDATIONS AND SPECIFICATIONS CONTAINED IN THE REFERENCED GEOTECHNICAL REPORT(S) PREPARED FOR THIS PROJECT.

(SIGNATURE)
ENGINEER'S NAME R.C.E. OR G.E. DATE

(SIGNATURE)
GEOLOGIST'S NAME C.E.G. DATE

COMPANY NAME*
ADDRESS
TELEPHONE NUMBER

*IF THE SOILS ENGINEER (R.C.E. OR G.E.) AND CERTIFIED ENGINEERING GEOLOGIST (C.E.G.) SIGNING THIS STATEMENT ARE NOT FROM THE SAME COMPANY, BOTH COMPANY NAMES AND PHONE NUMBERS MUST BE PROVIDED.

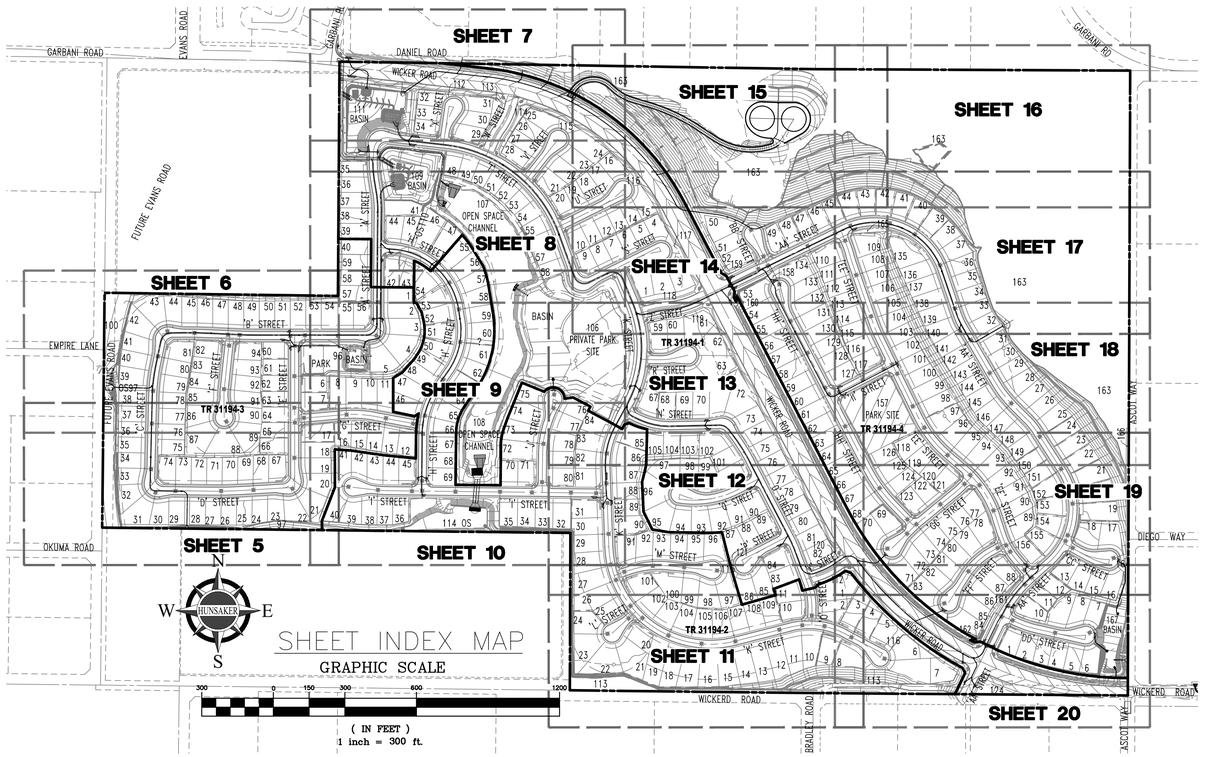
DECLARATION OF RESPONSIBLE CHARGE

I HEREBY DECLARE THAT I AM THE ENGINEER OF WORK FOR THIS PROJECT. THAT I HAVE EXERCISED RESPONSIBLE CHARGE OVER THE DESIGN OF THE PROJECT AS DEFINED IN SECTION 6703 OF THE BUSINESS AND PROFESSIONS CODE, AND THAT THE DESIGN IS CONSISTENT WITH CURRENT STANDARDS.

I UNDERSTAND THAT THE CHECK OF PROJECT DRAWINGS AND SPECIFICATIONS BY THE CITY OF MENIFEE IS CONFINED TO A REVIEW ONLY AND DOES NOT RELIEVE ME, AS ENGINEER OF WORK, OF MY RESPONSIBILITIES FOR PROJECT DESIGN.

NAME OF ENGINEER DATE
R.C.E. #
EXP. DATE

GRADING PLANS FOR:
GOLDEN MEADOWS - TRACT NO. 31194



SHEET INDEX MAP

GRAPHIC SCALE

300 0 150 300 600 1200

(IN FEET)
1 inch = 300 ft.

GRADING QUANTITIES

GRADED AREA _____ XXXX [ACRES] MAX. CUT DEPTH _____ [FT]
CUT QUANTITIES _____ XXXX [CYD] MAX CUT SLOPE RATIO (2:1MAX) _____
FILL QUANTITIES _____ XXXX [CYD] MAX. FILL DEPTH _____ [FT]
IMPORT/EXPORT _____ XXXX [CYD] MAX FILL SLOPE RATIO (2:1MAX) _____

THIS PROJECT PROPOSES TO EXPORT _____ CUBIC YARDS OF MATERIAL FROM THIS SITE. ALL EXPORT MATERIAL SHALL BE DISCHARGED TO A LEGAL DISPOSAL SITE. THE APPROVAL OF THIS PROJECT DOES NOT ALLOW PROCESSING AND SALE OF THE MATERIAL. ALL SUCH ACTIVITIES REQUIRE A SEPARATE CONDITIONAL USE PERMIT.

EARTH QUANTITY ESTIMATES:

CUT: 793,000 C.Y.
FILL: 793,000 C.Y.
IMPORT/EXPORT -0-

TOTAL DISTURBED AREA

TOTAL SITE DISTURBED AREA IN ACRES IS REQUIRED FOR STORM WATER PURPOSES

TOPOGRAPHY SOURCE

R.J. LUNG & ASSOCIATES
2832 WALNUT, SUITE E
TUSTIN, CA 92780
(714) 832-2077
COMPILED BY PHOTOGRAMMETRIC METHODS.
CONTOURS WERE STREAM DIGITIZED.
FLOWN DEC., 2002

BENCHMARK

THIS BENCHMARK MUST BE TAKEN FROM THE COUNTY OF RIVERSIDE VERTICAL CONTROL BOOK.

ASSESSORS PARCEL NUMBER

360-300-002, 360-300-003, 360-300-004,
360-300-005,360-300-006, 360-300-009 AND 360-350-001

LEGAL DESCRIPTION

IN UNINCORPORATED TERRITORY OF THE COUNTY OF RIVERSIDE, STATE OF CALIFORNIA, BEING A PORTION OF THE WEST HALF OF THE NORTHWEST QUARTER OF SECTION 15, TOWNSHIP 6 SOUTH, RANGE 3 WEST, SAN BERNARDINO MERIDIAN, ALONG WITH PARCELS 2 THROUGH 6, INCLUSIVE, PARCEL 8, PARCELS B THROUGH H, INCLUSIVE, AND PARCEL K, ALL OF PARCEL MAP NO. 8433, SECTION 16, TOWNSHIP 6S, RANGE 3W AND SECTION 15, TOWNSHIP 6S, RANGE 3W PER MAP FILED IN BOOK 38, PAGE 33 OF PARCEL MAPS IN THE OFFICE OF THE COUNTY RECORDER OF SAID COUNTY.

NOTICE TO CONTRACTOR:

CONTRACTOR AGREES THAT HE SHALL ASSUME SOLE AND COMPLETE RESPONSIBILITY FOR JOB SITE CONDITIONS DURING THE COURSE OF CONSTRUCTION OF THIS PROJECT, INCLUDING SAFETY OF ALL PERSONS AND PROPERTY; THAT THIS REQUIREMENT SHALL APPLY CONTINUOUSLY AND NOT BE LIMITED TO NORMAL WORKING HOURS; AND THAT THE CONTRACTOR SHALL DEFEND, INDEMNIFY AND HOLD THE OWNER AND THE ENGINEER HARMLESS FROM ANY AND ALL LIABILITY, REAL OR ALLEGED, IN CONNECTION WITH THE PERFORMANCE OF WORK ON THIS PROJECT, EXCEPTING FOR LIABILITY ARISING FROM THE SOLE NEGLIGENCE OF THE OWNER OR THE ENGINEER.

THE EXISTENCE AND LOCATION OF ANY UNDERGROUND UTILITIES OR STRUCTURES SHOWN ON THESE PLANS ARE OBTAINED BY A SEARCH OF AVAILABLE RECORDS. TO THE BEST OF OUR KNOWLEDGE, THERE ARE NO EXISTING UTILITIES EXCEPT THOSE SHOWN ON THESE PLANS. THE CONTRACTOR IS REQUIRED TO TAKE ALL PRECAUTIONARY MEASURES TO PROTECT THE UTILITIES SHOWN, AND ANY OTHER LINES OR STRUCTURES NOT SHOWN ON THESE PLANS AND IS RESPONSIBLE FOR THE PROTECTION OF OR ANY DAMAGE TO THESE LINES OR STRUCTURES.

ALL RETAINING WALLS SHOWN ON THESE PLANS ARE SHOWN FOR REFERENCE ONLY AND ARE TO BE CONSTRUCTED PER SEPARATE PERMIT.

CONTRACTOR SHALL VERIFY ALL CONDITIONS AND DIMENSIONS AND SHALL REPORT ALL DISCREPANCIES TO THE ENGINEER PRIOR TO COMMENCEMENT OF WORK.

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

INDEX OF SHEETS

SHEET NO.	SHEET DESCRIPTION
1	TITLE SHEET
2	GENERAL NOTES
3	SECTIONS & DETAILS
4	SECTIONS & DETAILS
5	PLAN SHEET
6	PLAN SHEET
7	PLAN SHEET
8	PLAN SHEET
9	PLAN SHEET
10	PLAN SHEET
11	PLAN SHEET
12	PLAN SHEET
13	PLAN SHEET
14	PLAN SHEET
15	PLAN SHEET
16	PLAN SHEET
17	PLAN SHEET
18	PLAN SHEET
19	PLAN SHEET
20	PLAN SHEET

OWNER

RICHLAND COMMUNITIES
3161 MICHELSON DRIVE SUITE 425
IRVINE, CA 92612
Tel: (949) 858-4980

SOILS ENGINEER

LEIGHTON & ASSOCIATES
41715 ENTERPRISE CIRCLE N., SUITE 103
TEMECULA, CA. 92590
Tel: (951) 296-0530

CONSTRUCTION NOTES		QNTY	UNITS
1	DOWN DRAIN PER DETAIL ON SHEET 4		
2	8 FT WIDE BENCH & TERRANCE DRAIN PER DETAIL ON SHEET 4		
3	12 FT WIDE BENCH & TERRANCE DRAIN PER DETAIL ON SHEET 4		
4	SPLASH WALL PER DETAIL ON SHEET 4		
5	36" TOE DITCH PER DETAIL ON SHEET 4		
6	INTERCEPTER DRAIN PER DETAIL ON SHEET 4		
7	CONCRETE DRAIN TO PIPE TRANSITION PER DETAIL ON SHEET 4		
8	CONCRETE COLLAR PER DETAIL ON SHEET 4		
9	DOWN DRAIN TO PIPE TRANSITION PER DETAIL ON SHEET 4		
10	24" HDPE - N 12		
11	18" HDPE - N 12		
12	RIP-RAP PAD PER DETAIL ON SHEET 4		
13	CONSTRUCT CONCRETE SPILL WAY DETAIL ON SHEET 3		
14	CONSTRUCT DOWNDRAIN INLET PER DETAIL ON SHEET 3		
15	6" PVC - SCHEDULE 80		
16	8" PVC - SCHEDULE 80		
17	8" PVC - SCHEDULE 80 - PERFORATED		
18	CONST 18		
19	CONST 19		
20	CONST 20		
21	CONST 21		
22	CONST 22		
23	CONST 23		
24	CONST 24		
25	CONST 25		
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WDID # :_____

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REVISIONS

SHT.	DESCRIPTION	DATE	BY	APRD

HUNSAKER & ASSOCIATES
IRVINE, INC
INLAND EMPIRE REGION
2900 ADAMS STREET, SUITE A-15
RIVERSIDE CA 92504 (951)352-7200
PLANNING/ENGINEERING/SURVEYING/GOVERNMENT RELATIONS

PREPARED BY: R.C.E. NO. 58020
PAUL R. HUDDLESTON, JR. Apr 01, 2021 DATE

ENGINEER SEAL
REGISTERED PROFESSIONAL ENGINEER PAUL R. HUDDLESTON JR. NO. 58020 CIVIL STATE OF CALIFORNIA

SCALE: 1" = XX'
DESIGN: XXX
DRAWN: XXX
CHECKED: XXX
APPROVED: XXX
DATE: XXXX XX, 201X

CITY OF MENIFEE
ENGINEERING DEPARTMENT

JONATHAN G. SMITH RCE 61253 DATE
DIRECTOR OF PUBLIC WORKS/ EXP. 6/30/19
CITY ENGINEER

RECOMMENDED BY: DATE

SEAL: CITY OF MENIFEE OCTOBER 1, 2008

CITY OF MENIFEE
ENGINEERING DEPARTMENT

ROUGH GRADING PLAN
TRACT 31194
TITLE SHEET

SHEET NO. 1 1 of 20

PROJECT NO: GPXX-XXX

PLOTTED BY: Danielle Fregoso DATE: Apr. 01, 2021 10:18:22 AM FILE: H:\00546\Engineering\Rough\RG31194-01.dwg

GENERAL NOTES

1. ALL WORK SHALL CONFORM TO THE REQUIREMENTS OF THE CITY OF MENIFEE GRADING ORDINANCE 2013–135, CALIFORNIA BUILDING CODE APPENDIX J, THE CITY OF MENIFEE STANDARD DETAILS AND SPECIFICATIONS, POLICIES, CODES AND PERMIT REQUIREMENTS; IN ADDITION, THE WORK SHALL CONFORM TO THE CURRENT STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION (THE "GREENBOOK"), THE RIVERSIDE COUNTY STREET IMPROVEMENT STANDARDS AND SPECIFICATIONS AND STANDARD PLANS; COUNTY ORDINANCE NO. 461; CALTRANS STANDARD PLANS AND SPECIFICATIONS; CALIFORNIA MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES.
2. A GRADING PERMIT SHALL BE OBTAINED FROM THE CITY OF MENIFEE ENGINEERING DEPARTMENT PRIOR TO START OF WORK.
3. AN ENCROACHMENT PERMIT SHALL BE OBTAINED FROM THE CITY OF MENIFEE PRIOR TO START OF WORK FOR WORK PERFORMED WITHIN PUBLIC RIGHT–OF–WAY.
4. WORK IN PUBLIC STREETS, ONCE BEGUN, SHALL BE PROSECUTED TO COMPLETION WITHOUT DELAY O AS TO PROVIDE MINIMUM INCONVENIENCE TO ADJACENT PROPERTY OWNERS AND TO THE TRAVELING PUBLIC.
5. PRIOR TO START OF WORK, THE DEVELOPER/CONTRACTOR SHALL APPLY TO THE CALIFORNIA DEPARTMENT OF TRANSPORTATION (CALTRANS) FOR AN ENCROACHMENT PERMIT FOR WORK PERFORMED WITHIN THE STATE RIGHT–OF–WAY.
6. WHEN GRADING PLANS HAVE BEEN SUBMITTED TO THE CITY FOR CHECKING AND THE CHECKING PROCESS HAS BEEN INTERRUPTED FOR A PERIOD OF ONE YEAR OR MORE, THE PLANS SHALL BE DEEMED ABANDONED. APPROVED GRADING PLANS FOR ALL SUBDIVISIONS SHALL BE DEEMED ABANDONED IF CONSTRUCTION HAS NOT COMMENCED WITHIN TWO YEARS OF THE LATEST APPROVAL DATE (ONE YEAR FOR NON–SUBDIVISIONS). IF CONSTRUCTION IS INTERRUPTED FOR A PERIOD OF ONE YEAR OR MORE, THE PLANS SHALL BE DEEMED ABANDONED. ABANDONED PLANS SHALL BE RESUBMITTED FOR REVIEW AND ALL FEES SHALL BE PAID IN ACCORDANCE WITH THE PLAN CHECK AND PROCESSING POLICY PRIOR TO ANY PERMITS BEING ISSUED.
7. NOTIFY UNDERGROUND SERVICE ALERT, (800) 227–2600, AND ALL CONCERNED UTILITY COMPANIES AT LEAST TWO WORKING DAYS IN ADVANCE OF EXCAVATION.
8. LOCATIONS OF EXISTING UNDERGROUND UTILITIES ARE APPROXIMATE. THE DEVELOPER/CONTRACTOR SHALL DETERMINE THE EXACT LOCATIONS AND VERIFY CONDITIONS ON THE JOB SITE PRIOR TO COMMENCING WORK. THE DEVELOPER/CONTRACTOR SHALL BE FULLY RESPONSIBLE FOR DAMAGES OCCURRED DUE TO FAILURE TO LOCATE AND PRESERVE UNDERGROUND UTILITIES. HAND DIG AS NEEDED UNTIL CLEAR OF OBSTRUCTIONS.
9. APPROVAL OF THIS PLAN BY THE CITY OF MENIFEE DOES NOT CONSTITUTE A REPRESENTATION AS TO THE ACCURACY OF, THE LOCATION OF, OR THE EXISTENCE OR NON–EXISTENCE OF, ANY UNDERGROUND UTILITY PIPE OR STRUCTURE WITHIN THE LIMITS OF THIS PROJECT. THIS NOTE APPLIES TO ALL PAGES.
10. THE CONTRACTOR SHALL CONTACT THE CITY OF MENIFEE PUBLIC WORKS INSPECTOR 2 WORKING DAYS OR 48 HOURS PRIOR TO CONSTRUCTION AT (951) 672–6777.
11. A PRECONSTRUCTION MEETING WITH THE PUBLIC WORKS INSPECTOR IS REQUIRED PRIOR TO START OF WORK.
12. RIGHT OF ENTRY FOR ANY WORK PERFORMED ON ADJACENT PROPERTIES IS REQUIRED. PERMISSION FOR RIGHT OF ENTRY SHALL BE OBTAINED IN WRITING AND THE LETTER SHALL COMPLY WITH CITY FORMAT.
13. APPROVAL OF PLANS AND / OR PERMIT ISSUANCE DOES NOT RELIEVE THE PERMITTEE OF THEIR RESPONSIBILITY TO MAINTAIN WORK WITHIN THE PROJECT PROPERTY BOUNDARIES AND DEDICATED CITY RIGHT–OF–WAY. TRESPASSING ON PRIVATE PROPERTY IS AGAINST THE LAW AND CAUSE FOR CANCELLATION OF PERMIT AND ISSUANCE OF STOP WORK NOTICE.
14. ALL REVISIONS TO GRADING PLANS, OR MATERIAL SUBSTITUTION REQUESTS, PROPOSED DURING CONSTRUCTION SHALL BE SUBMITTED IN WRITING TO THE ENGINEERING DEPARTMENT BY THE ENGINEER OF RECORD AND SHALL FOLLOW THE PROCEDURES FOR APPROVAL OUTLINED IN THE MOST CURRENT CITY OF MENIFEE ENGINEERING DIRECTIVES.
15. IT IS THE RESPONSIBILITY OF THE PERMITTEE TO SUBMIT A REQUEST FOR PERMIT EXTENSION TO THE CITY ENGINEER IN WRITING PRIOR TO PERMIT EXPIRATION. EXTENSION AND EXPIRATION OF PERMITS SHALL BE IN ACCORDANCE WITH THE UNIFORM BUILDING CODE AND /OR THE CITY OF MENIFEE ENGINEERING DESIGN GUIDELINES POLICIES AND PROCEDURES.
16. THE DEVELOPER/CONTRACTOR SHALL BE RESPONSIBLE FOR ANY CLEAN UP ON CITY OF MENIFEE RIGHT–OF–WAY AFFECTED BY DEVELOPER'S/CONTRACTOR'S WORK. THE DEVELOPER/CONTRACTOR SHALL KEEP CITY OF MENIFEE RIGHT–OF–WAY CLEAN OF DEBRIS, WITH DUST AND OTHER NUISANCES BEING CONTROLLED AT ALL TIMES. METHOD OF STREET CLEANING SHALL BE STREET SWEEPING OF ALL PAVED AREAS. THERE SHALL BE NO STOCKPILING OF CONSTRUCTION MATERIALS WITHIN THE CITY OF MENIFEE RIGHT–OF–WAY WITHOUT THE PERMISSION OF THE MENIFEE CITY ENGINEER.
17. ALL PROPERTY CORNERS SHALL BE CLEARLY DELINEATED IN THE FIELD PRIOR TO COMMENCEMENT OF ANY CONSTRUCTION/GRADING.
18. THE ENGINEER OF WORK WHO PREPARED AND SIGNED THIS GRADING PLAN HAS VERIFIED THE CONSISTENCY BETWEEN THE WORK WITHIN THE RIGHT–OF–WAY AND THE ON–SITE GRADING WORK APPROVED SEPARATELY BY THE CITY OF MENIFEE ENGINEERING DEPARTMENT.
19. A GEOTECHNICAL REPORT PREPARED BY A REGISTERED PROFESSIONAL SHALL BE PROVIDED.

GRADING NOTES

1. THE CONTRACTOR SHALL TAKE ALL NECESSARY AND PROPER PRECAUTIONS TO PROTECT ADJACENT PROPERTIES FROM ANY AND ALL DAMAGE THAT MAY OCCUR FROM STORM WATER RUNOFF AND/OR DEPOSITION OF DEBRIS RESULTING FROM ANY AND ALL WORK IN CONNECTION WITH HIS PRIVATE DEVELOPMENT CONSTRUCTION.
2. PRIOR TO REMOVAL OF VEGETATION AND GRADING OF THE SITE, ALL MITIGATION MONITORING AS IDENTIFIED AND ITEMIZED IN THE PLANNING COMMISSION/COMMUNITY DEVELOPMENT CONDITIONS OF APPROVAL SHALL BE ADDRESSED TO THE SATISFACTION OF THE COMMUNITY DEVELOPMENT DIRECTOR AND THE CITY ENGINEER.
3. FILL AREAS SHALL BE CLEARED OF ALL VEGETATION AND DEBRIS, SCARIFIED, AND INSPECTED BY THE GRADING INSPECTOR AND SOILS ENGINEER PRIOR TO THE PLACING OF FILL.
4. ALL CESSPOOLS, SEPTIC TANKS, ETC., TO BE ABANDONED SHALL BE FILLED OR REMOVED IN ACCORDANCE WITH THE RIVERSIDE COUNTY HEALTH DEPARTMENT AND CERTIFIED BY THE SOILS ENGINEER AND AS APPROVED BY THE CITY ENGINEER.
5. ANY EXISTING WELLS NOT TO BE USED SHALL BE DESTROYED IN ACCORDANCE WITH RIVERSIDE COUNTY ORDINANCE 682.
6. DURING ROUGH GRADING OPERATIONS AND PRIOR TO CONSTRUCTION OF PERMANENT DRAINAGE STRUCTURES, TEMPORARY DRAINAGE CONTROL (BEST MANAGEMENT PRACTICES, BMPS) SHALL BE PROVIDED TO PREVENT PONDING WATER AND DAMAGE TO ADJACENT PROPERTIES
7. PRIOR TO ANY CONSTRUCTION, THE DEVELOPER SHALL PROVIDE THE CITY A COPY OF THE NOI WITH A VALID WDID NUMBER.

CUT/FILL NOTES

1. NO FILL SHALL BE PLACED ON EXISTING GROUND UNTIL THE GROUND HAS BEEN CLEARED OF WEEDS, DEBRIS, TOPSOIL AND OTHER DELETERIOUS MATERIAL.
2. CUT SLOPES SHALL BE NO STEEPER THAN 2 HORIZONTAL TO 1 VERTICAL, OR AS DETERMINED BY THE SOILS ENGINEER AND APPROVED BY THE CITY ENGINEER.
3. FILL SLOPES SHALL BE NO STEEPER THAN 2 HORIZONTAL TO 1 VERTICAL, OR AS DETERMINED BY THE SOILS ENGINEER AND APPROVED BY THE CITY ENGINEER.
4. MID SLOPE TERRACES AT LEAST SIX (6) FEET IN WIDTH SHALL BE ESTABLISHED AT NOT MORE THAN THIRTY (30) FOOT VERTICAL INTERVALS ON ALL CUT OR FILL SLOPES, EXCEPT THAT WHERE ONLY ONE (1) TERRACE IS REQUIRED, IT SHALL BE AT MID–HEIGHT. FOR CUT OR FILL SLOPES GREATER THAN 60 FEET AND UP TO 90 FEET IN VERTICAL HEIGHT, ONE TERRACE AT APPROXIMATELY MID–HEIGHT SHALL BE 12 FEET IN WIDTH. TERRACE WIDTHS AND SPACING FOR CUT AND FILL SLOPES GREATER THAN 90 FEET IN VERTICAL HEIGHT SHALL BE DESIGNED BY A PROFESSIONAL ENGINEER AND APPROVED BY THE CITY ENGINEER. SUITABLE ACCESS SHALL BE PROVIDED TO PERMIT PROPER CLEANING AND MAINTENANCE.
5. THE SLOPE STABILITY FOR CUT AND FILL SLOPES OVER 30 FEET IN VERTICAL HEIGHT AND FOR SLOPES STEEPER THAN 2:1 (H:V) SHALL BE VERIFIED WITH A FACTOR OF SAFETY OF AT LEAST 1.5 BY CALCULATIONS SUBMITTED BY THE SOILS ENGINEER TO THE CITY OF MENIFEE ENGINEERING DEPARTMENT.
6. FILLS SHALL BE PLACED IN THIN LIFTS (8 INCH MAX OR AS RECOMMENDED IN SOILS REPORT), COMPACTED AND TESTED AS GRADING PROGRESSES UNTIL FINAL GRADES ARE ATTAINED. FILLS ON SLOPES STEEPER THAN 5:1 (H:V) AND A HEIGHT GREATER THAN 5 FEET SHALL BE KEYED AND BENCHED INTO FIRM NATURAL SOIL FOR FULL SUPPORT. THE BENCH UNDER THE TOE SHALL BE 10 FEET WIDE MIN. AND 2' HIGH MIN.
7. NO ROCK OR SIMILAR IRREDUCIBLE MATERIAL WITH A MAXIMUM DIMENSION GREATER THAN 12 INCHES IN ANY DIMENSION SHALL BE BURIED OR PLACED IN FILLS.
8. STOCK PILE REQUIREMENTS: CASQA BEST MANAGEMENT PRACTICE, CONSTRUCTION, SECTION WM–3 – STOCKPILES WHICH HAVE NOT BEEN USED FOR 14 CALENDAR DAYS SHALL BE STABILIZED THROUGH THE APPLICATION OF SOD, SEED, AND ANCHORED STRAW MULCH, OR OTHER APPROVED STABILIZATION MEASURES.
9. WHEN MATERIAL IS BEING IMPORTED FROM AN APPROVED PERMITTED BORROW SITE, THE AFTER TOPOGRAPHICAL SURVEY OF THE EXCAVATED PORTION OF THE BASIN SHALL BE SUBMITTED ALONG WITH THE ROUGH GRADING CERTIFICATE(S).
10. HAULING AND/OR STOCKPILE PERMITS MAYBE NOT BE COMBINED WITH A GRADING PERMIT.

DRAINAGE NOTES

1. EXISTING DRAINAGE COURSES ON THE PROJECT SITE SHALL CONTINUE TO FUNCTION. PROTECTIVE MEASURES AND TEMPORARY DRAINAGE PROVISIONS SHALL BE USED TO PROTECT ADJOINING PROPERTIES DURING GRADING OPERATIONS AND SHALL BE APPROVED BY THE APPROPRIATE REGULATORY AGENCY.
2. DRAINAGE ACROSS THE PROPERTY LINE SHALL NOT EXCEED THAT WHICH EXISTED PRIOR TO GRADING. EXCESS OR CONCENTRATED DRAINAGE SHALL BE CONTAINED ON SITE OR DIRECTED TO AN APPROVED DRAINAGE FACILITY.
3. MID SLOPE SWALES OR DITCHES ON 6 FEET AND 12 FEET WIDE TERRACES SHALL HAVE A MINIMUM GRADIENT OF FIVE (5) PERCENT AND MUST BE PAVED WITH REINFORCED CONCRETE, OR APPROVED EQUAL, NOT LESS THAN THREE (3) INCHES IN THICKNESS. A SINGLE RUN OF SWALE OR DITCH SHALL NOT COLLECT RUNOFF FROM A TRIBUTARY AREA EXCEEDING 13,500 SQUARE FEET (PROJECTED) WITHOUT DISCHARGING INTO A DOWN DRAIN.
4. INTERCEPTOR DRAINS SHALL BE INSTALLED ALONG THE TOP OF CUT SLOPES RECEIVING DRAINAGE FROM A TRIBUTARY WIDTH GREATER THAN 40 FEET MEASURED HORIZONTALLY. INTERCEPTOR DRAINS SHALL BE 3 FEET WIDE MIN. AND 1 FOOT DEEP MIN., AND SHALL HAVE A MINIMUM GRADIENT OF TWO (2) PERCENT. THE DRAIN SHALL BE PAVED WITH CONCRETE NOT LESS THAN 3 INCHES THICK.
5. PROVIDE 4 FEET WIDE BY 1 FEET HIGH BERM ALONG THE TOP OF FILL SLOPES STEEPER THAN 3:1 (H:V) WHERE NECESSARY.
6. MINIMUM BUILDING PAD DRAINAGE GRADIENT SHALL BE = 1 PERCENT IF CUT OR FILL IS LESS THAN 10 FEET, 2 PERCENT IF CUT OR FILL IS GREATER THAN 10 FEET.
7. THE GROUND IMMEDIATELY ADJACENT TO THE BUILDING FOUNDATION SHALL BE SLOPED AWAY AT 2% MIN. TO 20% MAX. FOR THE FIRST THREE FEET, AND 1% THEREAFTER. SWALES SHALL HAVE A 1% MIN. SLOPE.
8. RESIDENTIAL LOT GRADING SHALL CONFORM TO THE CITY OF MENIFEE STANDARD PLAN NO.300.
9. THE ENGINEER MUST SET GRADE STAKES FOR ALL DRAINAGE DEVICES AND OBTAIN CITY INSPECTION CLEARANCE BEFORE PLACING CONCRETE.
10. RIPRAP SHALL BE GRADED STONE WHERE THE AVERAGE SIZE (D50) IS THE SIZE WHERE 50% OF THE RIPRAP BY WEIGHT IS SMALLER.
11. THE FORMULA FOR THE D50 STONE SIZE IS AS FOLLOWS:
    $d_{50} = 0.010V^{2.24}$
    WHERE V = MEAN CHANNEL VELOCITY IN FPS
12. THE RIPRAP SECTION SHALL CONSIST OF GEOFABRIC PLACED ON 12"OF COMPACTED SUBGRADE TO 90% RELATIVE DENSITY, 6"OF AGGREGATE BASE AND THE RIPRAP PLACED TO TWICE THE THICKNESS OF THE D50 STONE SIZE TO THE HIGHER EVEN INCH.
13. RIPRAP STONE SHALL COMPLY WITH THOSE PROVISIONS OF SUBSECTION 200–1.6 OF THE STANDARD SPECIFICATIONS.
14. AGGREGATE BASE SHALL CONFORM TO NUMBER 2 GRADATION AS PROVIDED IN SUBSECTION 4001.3.2 OF THE STANDARD SPECIFICATIONS.
15. ROCKS FOR GROUTED RIPRAP SHALL BE A GOOD QUALITY BROKEN AND/OR RIVER RUN ROCK. THE SMALLEST DIMENSIONS SHALL EXCEED 3 INCHES AND THE LARGEST DIMENSION SHALL NOT EXCEED 18 INCHES. THE LARGEST DIMENSION SHALL NOT EXCEED 4 TIMES THE SMALLEST DIMENSION.
16. THERE SHALL BE A GROUT BED OF AT LEAST 2 INCHES BENEATH THE FIRST LAYER OF ROCK. ALL THE VOIDS BETWEEN THE ROCKS SHALL BE FILLED WITH GROUT. MAXIMUM SPACING BETWEEN ROCKS SHALL BE 2 INCHES.
17. SURFACE ROCKS SHALL BE IMBEDDED FROM ½ TO 2/3 OF THEIR MAXIMUM DIMENSION.

COMPLETION OF WORK

1. A REGISTERED CIVIL ENGINEER SHALL SUBMIT TO THE CITY OF MENIFEE ENGINEERING DEPARTMENT WRITTEN ROUGH GRADING CERTIFICATION OF COMPLETION OF GRADING IN ACCORDANCE WITH THE APPROVED GRADING PLAN PRIOR TO REQUESTING INSPECTION AND ISSUANCE OF THE BUILDING PERMIT. CERTIFICATION SHALL INCLUDE LINE, GRADE, SURFACE DRAINAGE, ELEVATION, AND LOCATION OF PERMITTED GRADING ON THE LOT.
2. AFTER ALL WORK, INCLUDING THE INSTALLATION OF DRAINAGE STRUCTURES AND PROTECTIVE DEVICES, HAS BEEN COMPLETED AND REQUIRED REPORTS HAVE BEEN SUBMITTED, THE PERMITTEE SHALL REQUEST A ROUGH GRADING INSPECTION FROM THE CITY OF MENIFEE BUILDING INSPECTOR.
3. A REGISTERED CIVIL ENGINEER SHALL SUBMIT TO THE CITY OF MENIFEE ENGINEERING DEPARTMENT FOR APPROVAL WRITTEN FINAL GRADING CERTIFICATION OF COMPLETION IN ACCORDANCE WITH THE APPROVED PLANS. FINISH GRADING SHALL BE COMPLETED AND INSTALLED INCLUDING SLOPE PLANTING AND PERMANENT EROSION CONTROL AND IRRIGATION SYSTEMS PRIOR TO OCCUPANCY.

EROSION CONTROL NOTES

1. IN CASE OF EMERGENCY, CALL (RESPONSIBLE PERSON) AT (24 HOUR TELEPHONE).
2. ALL PUBLIC STREETS SHALL BE MAINTAINED FREE OF DUST AND SEDIMENT CAUSED BY GRADING OPERATIONS
3. A STANDBY CREW FOR EMERGENCY WORK SHALL BE AVAILABLE AT ALL TIMES. NECESSARY MATERIALS SHALL BE AVAILABLE ON–SITE AND STOCKPILED AT CONVENIENT LOCATIONS TO FACILITATE RAPID CONSTRUCTION OF EMERGENCY DEVICES WHEN RAIN IS IMMINENT.
4. EROSION CONTROL DEVICES SHOWN ON THIS PLAN MAY BE REMOVED WHEN APPROVED BY THE BUILDING AND SAFETY/PUBLIC WORKS INSPECTOR IF THE GRADING OPERATION HAS PROGRESSED TO THE POINT WHERE THEY ARE NO LONGER REQUIRED.
5. GRADED AREAS ADJACENT TO FILL SLOPES LOCATED AT THE SITE PERIMETER MUST DRAIN AWAY FROM THE TOP OF SLOPE AT THE CONCLUSION OF EACH WORKING DAY.
6. ALL SILT AND DEBRIS SHALL BE REMOVED FROM ALL DEVICES WITHIN 24 HOURS AFTER EACH RAINSTORM.
7. A GUARD SHALL BE POSTED ON THE SITE WHENEVER THE DEPTH OF WATER IN ANY DEVICE EXCEEDS 2 FEET. THE DEVICE SHALL BE DRAINED OR PUMPED DRY WITHIN 24 HOURS AFTER EACH RAINSTORM.
8. EXCEPT AS OTHERWISE APPROVED BY THE BUILDING AND SAFETY INSPECTOR, ALL REMOVABLE PROTECTIVE DEVICES SHOWN SHALL BE IN PLACE AT THE END OF EACH WORKING DAY OR WEEKENDS WHEN THE 5–DAY RAIN PROBABILITY FORECAST EXCEEDS 40%.
9. ALL LOOSE SOIL AND DEBRIS WHICH MAY CREATE A POTENTIAL HAZARD TO OFF–SITE PROPERTY SHALL BE REMOVED FROM THE SITE AS DIRECTED BY THE PUBLIC WORKS INSPECTOR.
10. THE PLACEMENT OF ADDITIONAL DEVICES TO REDUCE EROSION DAMAGE WITHIN THE SITE SHALL BE AT THE DISCRETION OF THE CITY ENGINEER.
11. DESILTING BASINS MAY NOT BE REMOVED OR MADE INOPERABLE BETWEEN OCTOBER 1 AND MAY 1 WITHOUT THE APPROVAL OF THE CITY INSPECTOR.
12. EROSION CONTROL DEVICES SHALL NOT BE MODIFIED WITHOUT THE APPROVAL OF THE CITY ENGINEER.
13. REVISED PLANS SHALL BE SUBMITTED TO THE CITY FOR APPROVAL.
14. THE CONTRACTOR SHALL SUPERVISE EROSION CONTROL WORK IN ACCORDANCE WITH THE APPROVED PLANS. THE WORK ALSO INCLUDES, BUT IS NOT LIMITED TO, INSPECTION OF EROSION CONTROL MEASURES BEFORE RAINSTORM AND 5–DAY PROBABILITY RAIN FORECAST.
15. DURING ROUGH GRADING OPERATIONS AND PRIOR TO CONSTRUCTION OF PERMANENT DRAINAGE STRUCTURES, TEMPORARY DRAINAGE CONTROL (BEST MANAGEMENT PRACTICES, BMPS) SHALL BE PROVIDED TO PREVENT PONDING WATER AND DAMAGE TO ADJACENT PROPERTIES.
16. IMPLEMENT FUGITIVE DUST CONTROL MEASURES DUST BY WATERING OR OTHER APPROVED METHODS IN COMPLIANCE WITH SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT (SCAQMD) RULE 403.
17. FOR SLOPES 3:1 (H:V) OR STEEPER: SLOPES EQUAL TO OR GREATER THAN 3 FEET IN VERTICAL HEIGHT SHALL BE PLANTED WITH DROUGHT TOLERANT GRASS OR GROUND COVER AT A MAXIMUM SPACING OF 12 INCH ON CENTER. SLOPES EXCEEDING 15 FEET IN VERTICAL HEIGHT SHALL BE PLANTED WITH APPROVED SHRUBS NOT TO EXCEED 10 FEET ON CENTER, OR TREES SPACED NOT TO EXCEED 20 FEET ON CENTER OR SHRUBS NOT TO EXCEED 10 FEET, OR A COMBINATION OF SHRUBS AND TREES NOT TO EXCEED 15 FEET IN ADDITION TO THE GRASS OR GROUND COVER. SLOPES THAT REQUIRE PLANTING SHALL BE PROVIDED WITH AN IN–GROUND IRRIGATION SYSTEM EQUIPPED WITH AN APPROPRIATE BACKFLOW DEVICE PER CALIFORNIA PLUMBING CODE, CHAPTER 6. THE SLOPE PLANTING AND IRRIGATION SYSTEM SHALL BE INSTALLED PRIOR TO PRECISE GRADING FINAL INSPECTION.

NPDES NOTES

1. DEVELOPER/CONTRACTOR IS RESPONSIBLE FOR THE IMPLEMENTATION OF THE REQUIREMENTS OF THE ONSITE STORM WATER POLLUTION PREVENTION PLAN (SWPPP) (TITLE) BY (NAME) DATED (DATE); AND THE REQUIREMENTS OF THIS DOCUMENT: WDID # _____. THE DEVELOPER/CONTRACTOR SHALL BE RESPONSIBLE TO INSTALL AND MAINTAIN ALL TEMPORARY BEST MANAGEMENT PRACTICES (BMPS), SHOWN IN THE APPROVED EROSION CONTROL PLANS, THROUGHOUT THE TIME OF CONSTRUCTION. A COPY OF THE SWPPP AND THE APPROVED EROSION CONTROL PLANS SHALL BE KEPT AT THE JOB SITE AT ALL TIMES. THE IMPLEMENTATION AND MAINTENANCE OF SITE BMPS IS REQUIRED TO MINIMIZE JOBSITE EROSION AND SEDIMENTATION. BMPS SHALL BE REQUIRED TO REMAIN IN PLACE THROUGHOUT THE YEAR TO MINIMIZE EROSION AND SEDIMENTATION.
2. IMPLEMENT AND MAINTAIN EROSION CONTROL BMPS TO MINIMIZE THE ENTRAINMENT OF SOIL IN RUNOFF FROM DISTURBED SOIL AREAS ON CONSTRUCTION SITES.
3. IMPLEMENT AND MAINTAIN YEAR ROUND SEDIMENT CONTROL BMPS TO MINIMIZE THE TRANSPORT OF SOIL FROM THE CONSTRUCTION SITE.
4. PHASE GRADING TO LIMIT THE AMOUNT OF DISTURBED AREAS EXPOSED TO THE EXTENT FEASIBLE.
5. LIMIT AREAS THAT ARE CLEARED AND GRADED TO ONLY THE PORTION OF THE SITE THAT IS NECESSARY FOR CONSTRUCTION. MANAGE THE CONSTRUCTION SITE TO MINIMIZE THE EXPOSURE TIME OF DISTURBED SOIL AREAS THROUGH PHASING AND SCHEDULING OF GRADING AND THE USE OF TEMPORARY AND PERMANENT SOIL STABILIZATION.
6. AT ANY TIME DURING THE YEAR, STABILIZE SLOPES PRIOR TO A PREDICTED STORM EVENT. ONCE DISTURBED, STABILIZE SLOPES (TEMPORARY OR PERMANENT) IF THEY WILL NOT BE WORKED WITHIN 14 DAYS. RE–VEGETATE CONSTRUCTION SITES AS EARLY AS FEASIBLE AFTER SOIL DISTURBANCE.
7. CONTAIN STOCKPILES OF SOIL TO ELIMINATE OR REDUCE SEDIMENT TRANSPORT FROM THE SITE VIA RUNOFF, VEHICLE TRACKING, OR WIND.
8. MAINTAIN CONSTRUCTION SITES TO ENSURE THAT A STORM DOES NOT CARRY WASTES OR POLLUTANTS OFF THE SITE. DISCHARGES OTHER THAN STORMWATER (NON–STORMWATER DISCHARGES) ARE PROHIBITED, EXCEPT AS AUTHORIZED BY AN INDIVIDUAL NPDES PERMIT, THE STATEWIDE GENERAL PERMIT–CONSTRUCTION ACTIVITY.
9. CONTAIN RUNOFF FROM EQUIPMENT AND VEHICLE WASHING AT CONSTRUCTION SITE TO PREVENT DISCHARGING TO RECEIVING WATERS OR THE LOCAL STORM DRAIN SYSTEM.
10. IMPLEMENT BMPS FOR CONSTRUCTION–RELATED MATERIALS, WASTES, SPILLS OR RESIDUES TO ELIMINATE OR REDUCE TRANSPORT FROM THE SITE TO STREETS, DRAINAGE FACILITIES, OR ADJOINING PROPERTIES BY WIND OR RUNOFF.
11. ENSURE CONSTRUCTION CONTRACTORS AND SUBCONTRACTOR PERSONNEL ARE AWARE OF THE REQUIRED BMPS, MAINTENANCE, AND GOOD HOUSEKEEPING MEASURES FOR THE PROJECT SITE AND ANY ASSOCIATED CONSTRUCTION STAGING AREAS.
12. MAINTAIN BMPS AT ALL TIMES. INSPECT BMPS PRIOR TO PREDICTED STORM EVENTS, DURING AND FOLLOWING STORM EVENTS.
13. COLLECT AND PROPERLY DISPOSE OF IN TRASH OR RECYCLE BINS AT THE END OF EACH DAY OF CONSTRUCTION ACTIVITY, CONSTRUCTION DEBRIS AND WASTE MATERIALS.
14. 24 HOUR EMERGENCY NPDES CONTACT: FOR THE PERSON RESPONSIBLE FOR IMPLEMENTING, INSPECTING, AND MAINTAINING THE SITE'S EROSION CONTROL BMP'S.

    NAME: _____
    ADDRESS: _____
    PHONE: _____

    CHANGE OF SUCH PERSON, ADDRESS OR PHONE NUMBER SHALL BE FILED WITHIN 24 HOURS WITH THE CITY OF MENIFEE ENGINEERING DEPARTMENT AND THE PROJECT INSPECTOR, AND SHALL INCLUDE THE GRADING PERMIT NUMBER.

LEGEND OF ABBREVIATIONS & SYMBOLS

T.C.	TOP OF CURB	(100)	EXIST. CONTOUR
F.L.	FLOWLINE ELEV.	100	PROP. CONTOUR
T.G.	TOP OF GRATE		PROPERTY LINE
R/W	RIGHT OF WAY		TRACT BOUNDARY LINE
G.B.	GRADE BREAK		DAYLIGHT LINE
F.G.	FINISH GRADE	2%	SHEET FLOW RATE
R.G.	ROUGH GRADE		GRADED SWALE
F.S.	FINISH SURFACE		CENTERLINE
INV.	INVERT OF DRAIN		SWALE HIGH POINT
P.	PAD ELEVATION		FLOWLINE
F.F.	FINISH FLOOR ELEV.		SUBDRAIN
G.F.F.	GARAGE FINISH FLOOR		AREA DRAIN
B.V.C.	BEGIN VERTICAL CURVE		TOP OF SLOPE
E.V.C.	END VERTICAL CURVE		TOE OF SLOPE
P.I.	POINT OF INTERSECTION		RETAINING WALL (PER SEPARATE PERMIT)
E.P.	EDGE OF PAVEMENT		FIRE HYDRANT
T.W.	TOP OF WALL ELEV.		STREET LIGHT
T.F.	TOP OF FOOTING ELEV.		SOUND OR SCREEN WALL
D.F.	DEEPENED FOOTING		DEEPENED FOOTING
L.	LENGTH		WATER METER
DWY.	DRIVEWAY		CATCH BASIN & LOCAL DEPRESSION
N.T.S.	NOT TO SCALE		DEPTH OF REQ'D OVER EXCAVATION
P.U.E.	PUBLIC UTILITY EASEMENT		

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

WDID # :_____

811 Know what's below. Call 811 before you dig.

REVISIONS

SHT.	DESCRIPTION	DATE	BY	APRD

HUNSAKER & ASSOCIATES IRVINE, INC
INLAND EMPIRE REGION
2900 ADAMS STREET, SUITE A–15
RIVERSIDE CA 92504 (951)352–7200
PLANNING/ENGINEERING/SURVEYING/GOVERNMENT RELATIONS

PREPARED BY: R.C.E. NO. 58020
PAUL R. HUDDLESTON, JR. — Apr 01, 2021 DATE

ENGINEER SEAL
REGISTERED PROFESSIONAL ENGINEER PAUL R. HUDDLESTON No. 58020 CIVIL STATE OF CALIFORNIA

SCALE: 1" = XX'
DESIGN: XXX
DRAWN: XXX
CHECKED: XXX
APPROVED: XXX
DATE: XXXX XX, 201X

CITY OF MENIFEE
ENGINEERING DEPARTMENT

JONATHAN G. SMITH — RCE 61253 — DATE
DIRECTOR OF PUBLIC WORKS/ CITY ENGINEER — EXP. 6/30/19

RECOMMENDED BY: — DATE

SEAL: CITY OF MENIFEE — OCTOBER 1, 2008

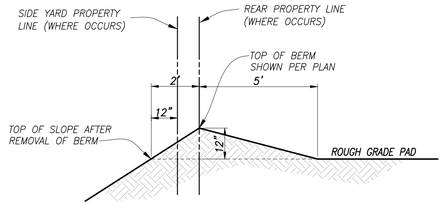
CITY OF MENIFEE ENGINEERING DEPARTMENT

ROUGH GRADING PLAN
TRACT 31194
GENERAL NOTES

SHEET NO. 2
2 of 20

PROJECT NO: GPXX–XXX

PLOTTED BY: Danielle Fregoso DATE: Apr. 01, 2021 10:18:30 AM FILE: H:\00546\Engineering\Rough\R031194-02.dwg



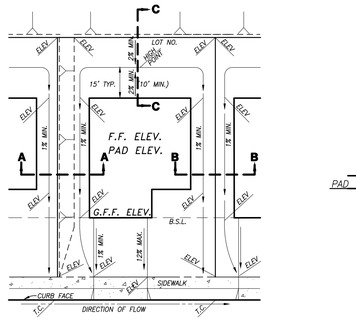
1. BERM DETAIL TO BE USED ON ALL SLOPES OVER 5' HIGH

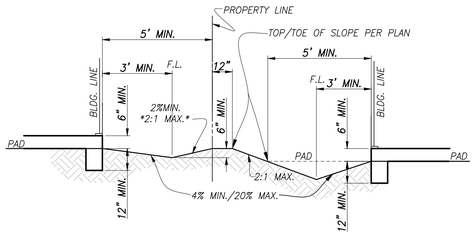
2. BERM TO BE REMOVED PRIOR TO CONSTRUCTION OF WALLS AND FENCES

TYPICAL BERM DETAIL

NO SCALE

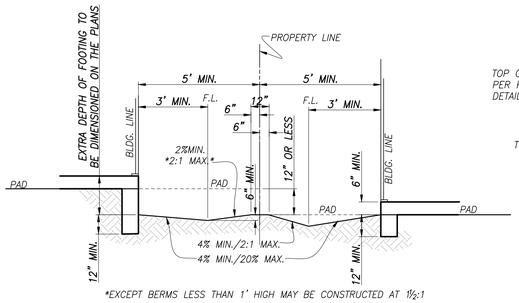
1. SECTION A–A APPLIES WHEN THE DIFFERENCE IN PAD ELEVATIONS EXCEEDS 12".
2. SECTION B–B APPLIES WHEN THE DIFFERENCE IN PAD ELEVATIONS IS 12" OR LESS & THE EXTRA DEPTH FOOTING IS SHOWN ON THE GRADING & STRUCTURAL PLANS.
3. IN NO CASE SHALL THE SWALE FLOWLINE BE LOWER THAN THE BOTTOM OF THE FOOTING WITHIN 5' FROM BUILDING.
4. PROVIDE 5' WIDE BY 1' HIGH BERM OR EQUIVALENT ALONG THE TOP OF ALL FILL SLOPES OVER 5' HIGH.
5. SWALES TO BE CUT IN AT 1% MIN. AT ROUGH GRADE AND PRIOR TO BUILDING CONSTRUCTION.
6. A PAVED DRAINAGE SWALE, CATCH BASIN & PIPE OR OTHER SIMIALR DRAINAGE DEVICE IS REQUIRED WHEN A STOOP, FIREPLACE OR PORTION OF THE BUILDING EXTENDS WITHIN ESTABLISHED DRAINAGE SETBACKS.
7. SEE STD. PLAN 206 FOR DRIVEWAY APPROACHES.
8. PAD DRAINAGE TOWARD SWALES AT 2% MIN.





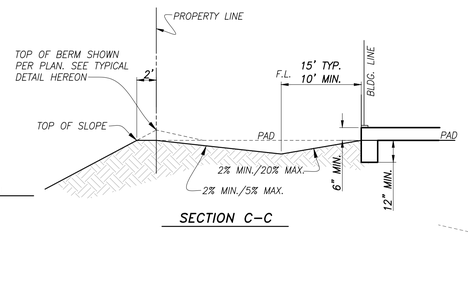
*EXCEPT BERMS LESS THAN 1' HIGH MAY BE CONSTRUCTED AT 1½:1

SECTION A–A



*EXCEPT BERMS LESS THAN 1' HIGH MAY BE CONSTRUCTED AT 1½:1

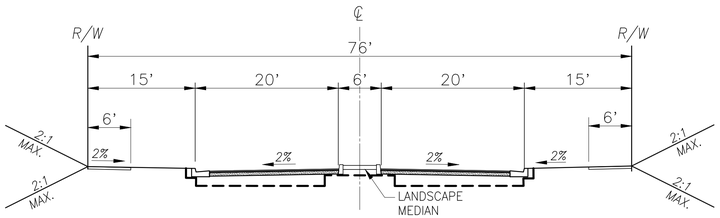
SECTION B–B



SECTION C–C

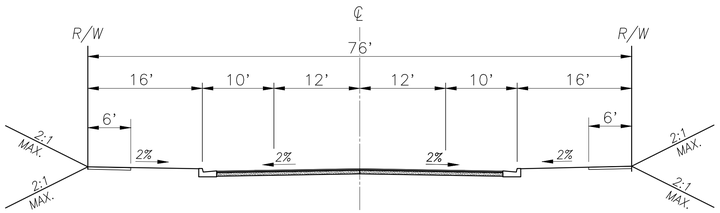
TYPICAL LOT FINISH GRADING

NO SCALE



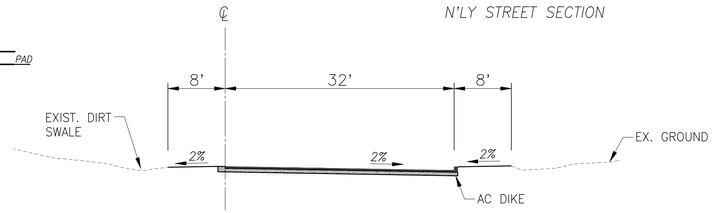
"AA" STREET (ENTRY)

MODIFIED STANDARD NO. 113 (MODIFIED WITH 6' MEDIAN)
DESIGN SPEED = 35 MPH
N.T.S.
T.I. = 8.0
MIN. 5" AC OVER 6" AB CL II



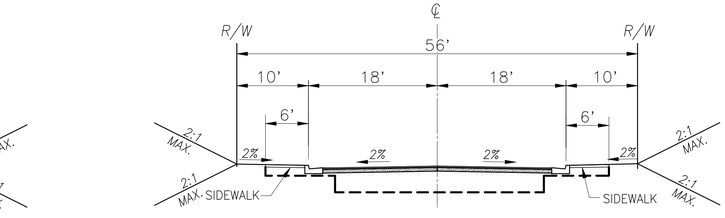
"AA" STREET (SOUTHERLY BOUNDARY)

MODIFIED STANDARD NO. 113 (MODIFIED WITH 76' R/W)
DESIGN SPEED = 35 MPH
N.T.S.
T.I. = 8.0
MIN. 5" AC OVER 6" AB CL II



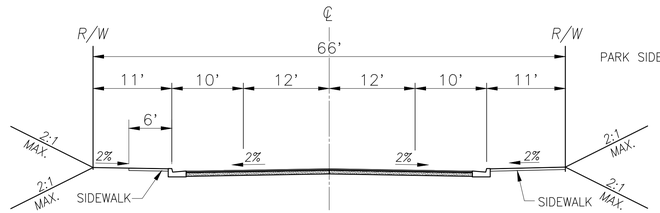
ROAD (FROM EASTERLY BOUNDARY TO 900' WEST OF HAUN ROAD)

COUNTY STANDARD NO. 106
DESIGN SPEED = 45 MPH
N.T.S.
T.I. = 10.0
MIN. 6" AC OVER 8" AB CL II



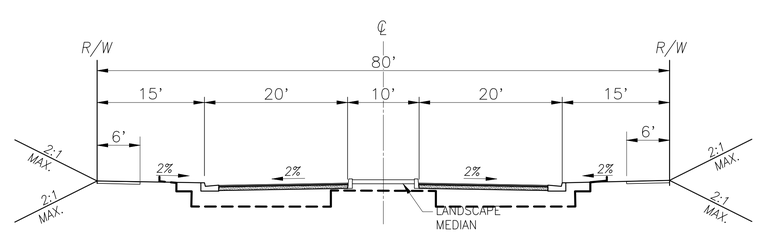
INTERIOR STREETS

MODIFIED STANDARD NO. 115 SECTION A (MODIFIED WITH 56' R/W)
DESIGN SPEED = 30 MPH
N.T.S.
T.I. = 5.5
MIN. 4" AC OVER 6" AB CL II



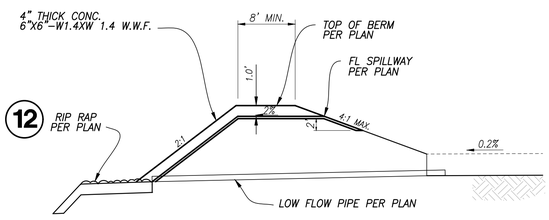
PORTION "K" STREET (PARK FRONTAGE)

STANDARD NO. 114
DESIGN SPEED = 35 MPH
N.T.S.
T.I. = 8.0
MIN. 5" AC OVER 6" AB CL II



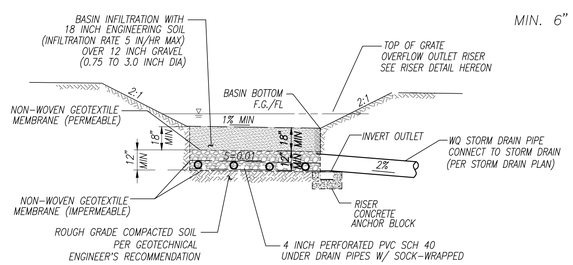
"W", "Y" & "Z" STREET (ENTRY)

MODIFIED STANDARD NO. 113 (MODIFIED WITH 10' MEDIAN)
DESIGN SPEED = 35 MPH
N.T.S.
T.I. = 8.0
MIN. 5" AC OVER 6" AB CL II



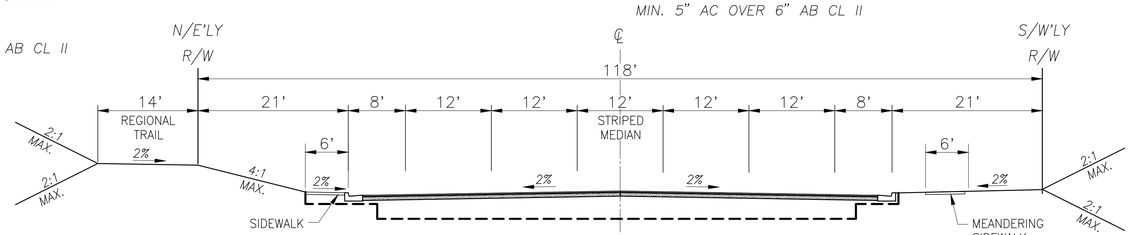
13 CONC. SPILLWAY

NOT TO SCALE



TYPICAL SANDFILTER WATER QUALITY BASIN AT BASINS a1,a2 & a3 SECTION DETAIL

N.T.S.



WICKERD ROAD (MODIFIED WITH REGIONAL TRAIL AND 4:1 SLOPE)

STANDARD NO. 110
DESIGN SPEED = 50 MPH
N.T.S.
T.I. = 10.0
MIN. 6" AC OVER 8" AB CL II

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

WDID # :_____

811 Know what's below. Call 811 before you dig.

REVISIONS				
⚠ SHT.	DESCRIPTION	DATE	BY	APRD

H&A HUNSAKER & ASSOCIATES IRVINE, INC
INLAND EMPIRE REGION
2900 ADAMS STREET, SUITE A–15
RIVERSIDE CA 92504 (951)352–7200
PLANNING/ENGINEERING/SURVEYING/GOVERNMENT RELATIONS

PREPARED BY: R.C.E. NO. 58020
PAUL R. HUDDLESTON, JR. Oct 23, 2018 DATE

ENGINEER SEAL: REGISTERED PROFESSIONAL ENGINEER PAUL R. HUDDLESTON JR. NO. 58020 CIVIL STATE OF CALIFORNIA

SCALE: 1" = XX'
DESIGN: XXX
DRAWN: XXX
CHECKED: XXX
APPROVED: XXX
DATE: XXXX XX, 201X

CITY OF MENIFEE
ENGINEERING DEPARTMENT

JONATHAN G. SMITH RCE 61253 DATE
DIRECTOR OF PUBLIC WORKS/ EXP. 6/30/19
CITY ENGINEER

RECOMMENDED BY: DATE

SEAL: CITY OF MENIFEE OCTOBER 1, 2008

CITY OF MENIFEE ENGINEERING DEPARTMENT

ROUGH GRADING PLAN
TRACT 31194
SECTIONS & DETAILS

SHEET NO. 3 3 of 20

PROJECT NO: GPXX–XXX

PLOTTED BY: Teresa Cohen DATE: Oct. 23, 2018 05:22:24 PM FILE: H:\00546\Engineering\Rough\RG31194-03.dwg

CONSTRUCTION NOTES FOR PAVED DRAINAGE DEVICES:

1. APPROVED MATERIAL FOR CONSTRUCTION OF DEVICE IS EITHER 3" CONC. W/ NO. 4 BARS LONGITUDINAL 24" O.C. WITH NO. 4 TIE BARS 48" O.C. OR 3" GUNITE W/ 6"X 6"– W 1.4 X W 1.4 W.W.F. (WELDED WIRE FABRIC) OR APP'D EQUAL.

2. INSPECTION OF GRADED SWALE IS REQUIRED PRIOR TO INSTALLATION OF PAVING.

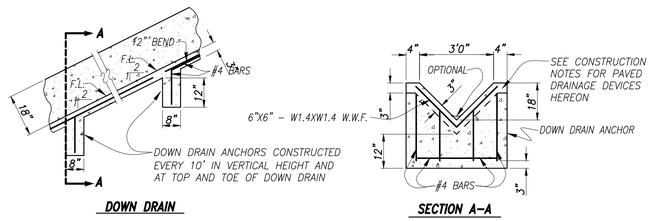
3. GROUND SHALL BE PRE–WET TO THE SATISFACTION OF THE BUILDING OFFICIAL OR ENGINEER PRIOR TO PLACEMENT OF CONCRETE.

4. PAVED DEVICE SHALL BE CURED WITH A MOISTURE LOSS RETARDANT.

5. PUMPCRETE IS AN ACCEPTABLE SUBSTITUTE FOR GUNITE & MAY BE INSTALLED WITH 6"X 6" W 1.4 X W 1.4 WELDED WIRE MESH (W.W.M.).

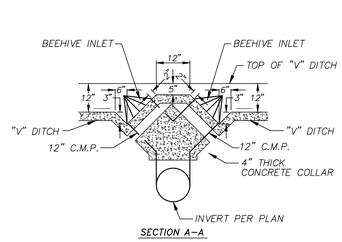
6. CONCRETE SHALL HAVE A MINIMUM ULTIMATE COMPRESSION STRENGTH AT 28 DAYS OF 2500 P.S.I. CONCRETE MAY BE PNEUMATICALLY PLACED AND SHALL CONFORM TO SECTION 2621 OF THE UNIFORM BUILDING CODE.

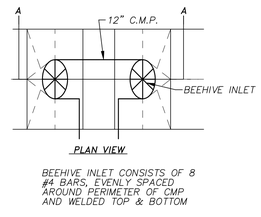
7. ANCHORS SHALL BE CONSTRUCTED IN ACCORDANCE WITH STANDARD PLAN 1321 (SHEET 2) WHEN SLOPE EQUALS OR EXCEEDS 2:1.

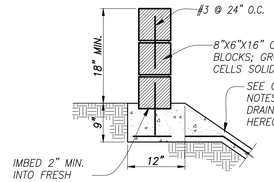


1 DOWN DRAIN

NOT TO SCALE

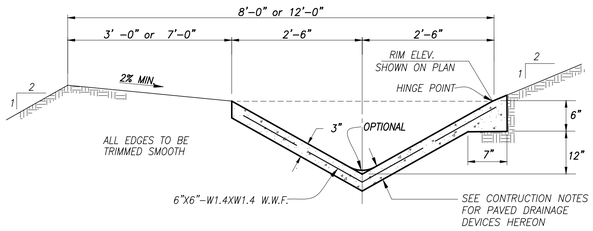






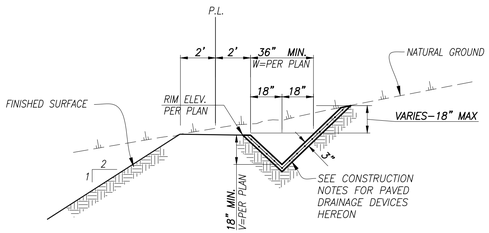
4 SPLASH WALL

NOT TO SCALE



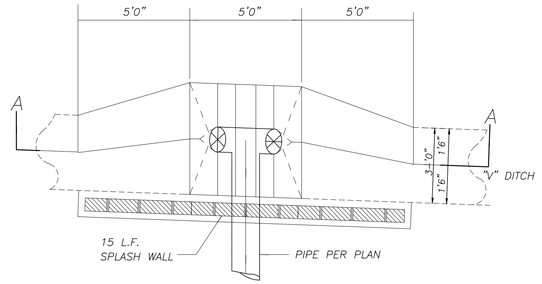
2 3 8' BENCH WITH TERRACE DRAIN

NOT TO SCALE



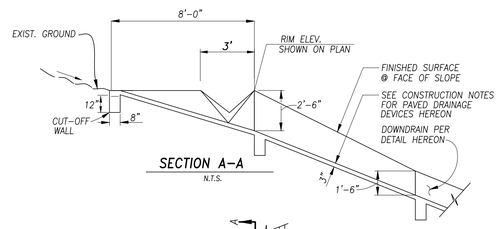
6 SECTION A"–"A" INTERCEPTOR DRAIN

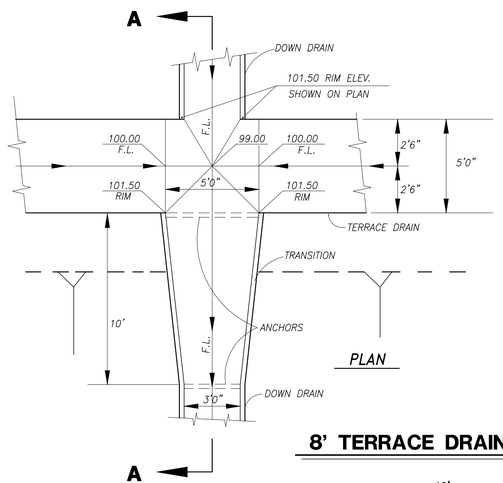
NOT TO SCALE

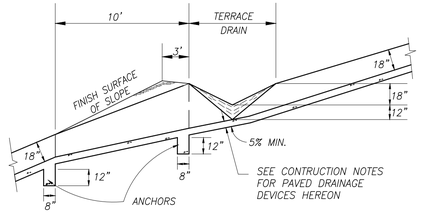


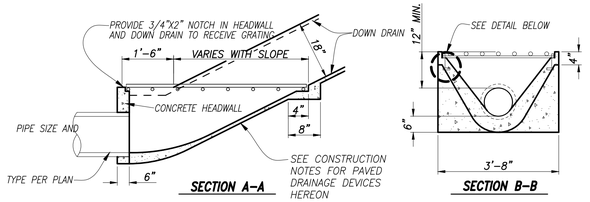
7 CONCRETE DRAIN TO PIPE INLET DETAIL

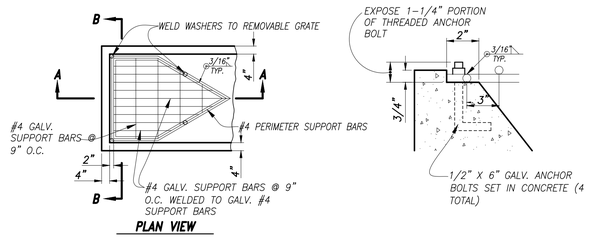
NOT TO SCALE





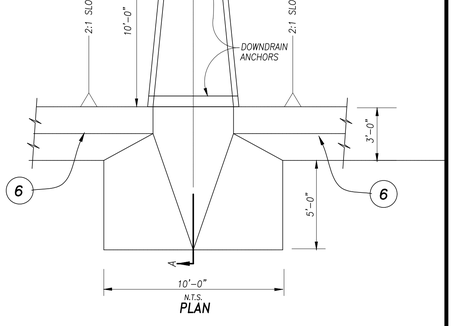






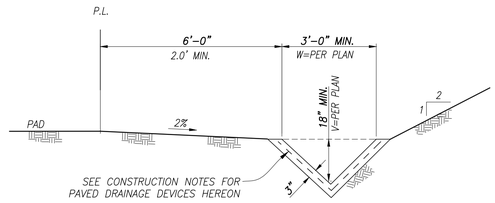
9 DOWN DRAIN TO PIPE TRANSITION

NOT TO SCALE



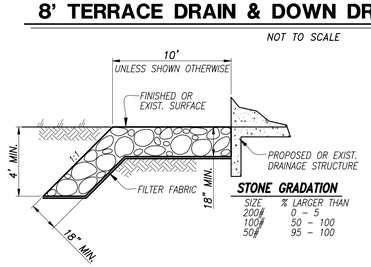
14 DOWNDRAIN INLET

NOT TO SCALE



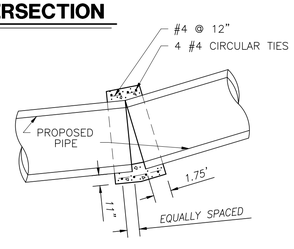
5 36" P.C.C. TOE DITCH

NOT TO SCALE



12 RIP-RAP DETAIL

NOT TO SCALE



8 SPECIAL CONCRETE COLLAR DETAIL

NOT TO SCALE

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

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REVISIONS

SHT.	DESCRIPTION	DATE	BY	APRD

HUNSAKER & ASSOCIATES
IRVINE, INC
INLAND EMPIRE REGION
2900 ADAMS STREET, SUITE A–15
RIVERSIDE CA 92504 (951)352–7200
PLANNING/ENGINEERING/SURVEYING/GOVERNMENT RELATIONS

PREPARED BY: R.C.E. NO. 58020

PAUL R. HUDDLESTON, JR. — Oct 23, 2018 — DATE

ENGINEER SEAL: REGISTERED PROFESSIONAL ENGINEER — PAUL R. HUDDLESTON JR. — NO. 58020 — CIVIL — STATE OF CALIFORNIA

SCALE:	1" = XX'
DESIGN:	XXX
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CHECKED:	XXX
APPROVED:	XXX
DATE:	XXXX XX, 201X

CITY OF MENIFEE
ENGINEERING DEPARTMENT

JONATHAN G. SMITH — RCE 61253 — DATE
DIRECTOR OF PUBLIC WORKS/ CITY ENGINEER — EXP. 6/30/19

RECOMMENDED BY: — DATE

SEAL: CITY OF MENIFEE — INCORPORATED OCTOBER 1, 2008

CITY OF MENIFEE ENGINEERING DEPARTMENT

ROUGH GRADING PLAN
TRACT 31194
SECTIONS & DETAILS

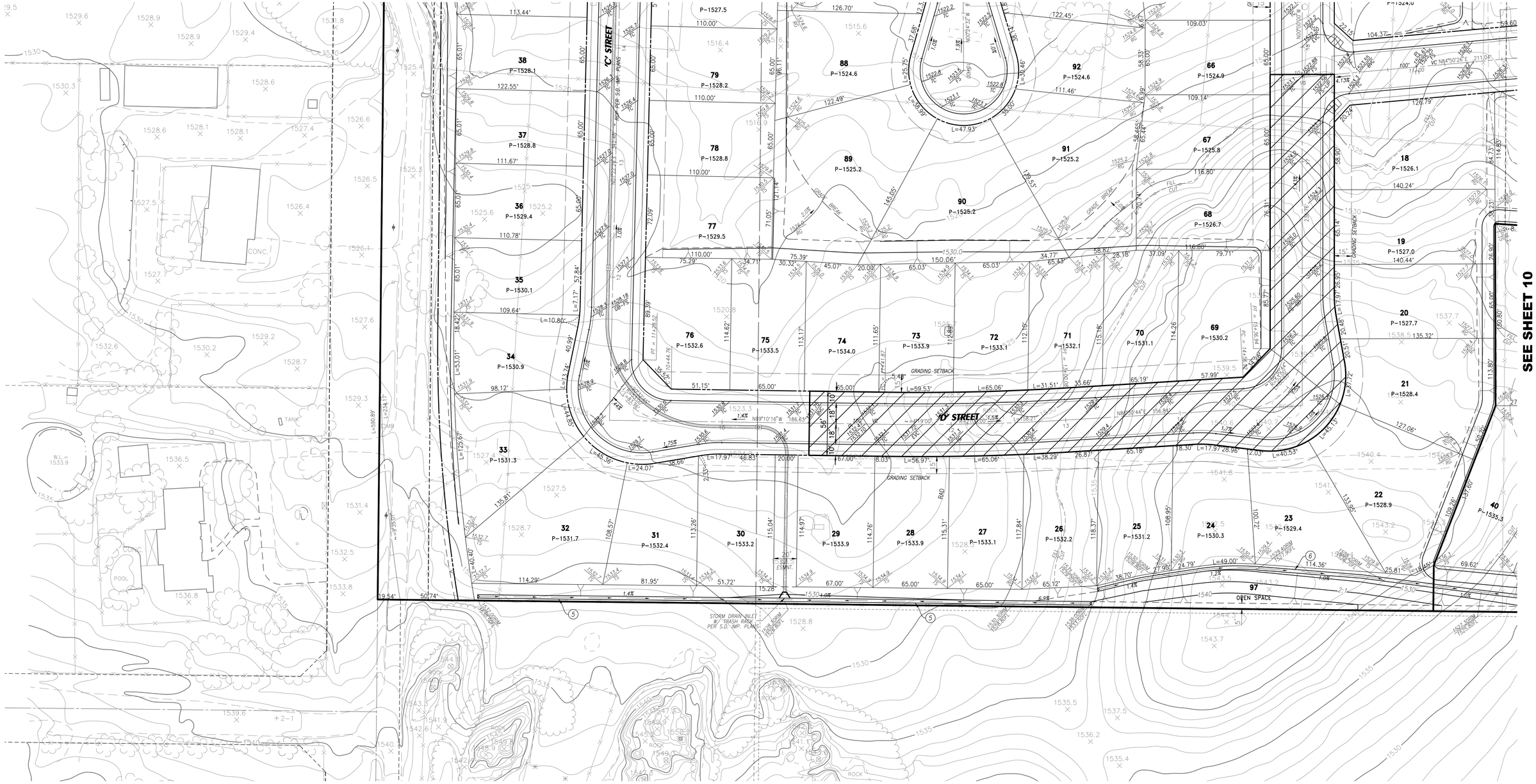
SHEET NO. 4 of 20

PROJECT NO: GPXX–XXX

PLOTTED BY: Teresa Cohen DATE: Oct. 23, 2018 05:22:26 PM FILE: H:\00546\Engineering\Rough\RG31194–04.dwg

SEE SHEET 6

SEE SHEET 10



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N
W HUNSAKER E
S

0 20 40 80 120 160
SCALE: 1" = 40'

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IRVINE, INC
INLAND EMPIRE REGION
2900 ADAMS STREET, SUITE A-15
RIVERSIDE CA 92504 (951)352-7200
PLANNING/ENGINEERING/SURVEYING/GOVERNMENT RELATIONS

PREPARED BY: _____ R.C.E. NO. 58020
PAUL R. HUDDLESTON, JR. — Oct 23, 2018 DATE

ENGINEER SEAL
REGISTERED PROFESSIONAL ENGINEER — PAUL R. HUDDLESTON JR. — NO. 58020 — CIVIL — STATE OF CALIFORNIA

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APPROVED:	XXX
DATE:	XXXX XX, 201X

CITY OF MENIFEE
ENGINEERING DEPARTMENT

JONATHAN G. SMITH — RCE 61253 — DATE
DIRECTOR OF PUBLIC WORKS/ CITY ENGINEER — EXP. 6/30/19

RECOMMENDED BY: _____ DATE

SEAL: CITY OF MENIFEE — OCTOBER 1, 2008

CITY OF MENIFEE ENGINEERING DEPARTMENT

ROUGH GRADING PLAN
TRACT 31194
PLAN SHEET

SHEET NO. 5 of 20

PROJECT NO: GPXX-XXX

PLOTTED BY: Teresa Cohen DATE: Oct. 23, 2018 05:19:15 PM FILE: H:\00546\Engineering\Rough\RG31194-05.dwg



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IRVINE, INC
INLAND EMPIRE REGION
2900 ADAMS STREET, SUITE A-15
RIVERSIDE CA 92504 (951)352-7200
PLANNING/ENGINEERING/SURVEYING/GOVERNMENT RELATIONS

PREPARED BY:
R.C.E. NO. 58020
Oct 23, 2018
PAUL R. HUDDLESTON, JR. DATE

ENGINEER SEAL
REGISTERED PROFESSIONAL ENGINEER PAUL R. HUDDLESTON JR. NO. 58020 CIVIL STATE OF CALIFORNIA

SCALE:	1" = XX'
DESIGN:	XXX
DRAWN:	XXX
CHECKED:	XXX
APPROVED:	XXX
DATE:	XXXX XX, 201X

CITY OF MENIFEE
ENGINEERING DEPARTMENT

JONATHAN G. SMITH
DIRECTOR OF PUBLIC WORKS/
CITY ENGINEER
RCE 61253
EXP. 6/30/19
DATE

RECOMMENDED BY:
DATE

SEAL
CITY OF MENIFEE OCTOBER 1, 2008

CITY OF MENIFEE ENGINEERING DEPARTMENT

ROUGH GRADING PLAN
TRACT 31194
PLAN SHEET

SHEET NO.
6
6 of 20

PROJECT NO: GPXX-XXX

PLOTTED BY: Teresa Cohen DATE: Oct. 23, 2018 05:19:20 PM FILE: H:\00546\Engineering\Rough\RG31194-05.dwg



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N W E S HUNSAKER

0 20 40 80 120 160
SCALE: 1" = 40'

WDID # :

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PAUL R. HUDDLESTON, JR. Oct 23, 2018
DATE

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DRAWN: XXX
CHECKED: XXX
APPROVED: XXX
DATE: XXXX XX, 201X

CITY OF MENIFEE
ENGINEERING DEPARTMENT

JONATHAN G. SMITH RCE 61253 DATE
DIRECTOR OF PUBLIC WORKS/ EXP. 6/30/19
CITY ENGINEER

RECOMMENDED BY: DATE

SEAL
CITY OF MENIFEE OCTOBER 1, 2008

CITY OF MENIFEE ENGINEERING DEPARTMENT

ROUGH GRADING PLAN
TRACT 31194
PLAN SHEET

SHEET NO. 7
7 of 20
PROJECT NO: GPXX–XXX

PLOTTED BY: Teresa Cohen DATE: Oct. 23, 2018 05:19:25 PM FILE: H:\00546\Engineering\Rough\RG31194–05.dwg

SEE SHEET 7

SEE SHEET 15

SEE SHEET 14

SEE SHEET 9

N
W HUNSAKER E
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0 20 40 80 120 160

SCALE: 1" = 40'

WDID # :

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REVISIONS					
NO.	SHT.	DESCRIPTION	DATE	BY	APRD

HUNSAKER & ASSOCIATES
IRVINE, INC
INLAND EMPIRE REGION
2900 ADAMS STREET, SUITE A–15
RIVERSIDE CA 92504 (951)352–7200
PLANNING/ENGINEERING/SURVEYING/GOVERNMENT RELATIONS

PREPARED BY: R.C.E. NO. 58020

PAUL R. HUDDLESTON, JR. Oct 23, 2018 DATE

ENGINEER SEAL
REGISTERED PROFESSIONAL ENGINEER PAUL R. HUDDLESTON JR. NO. 58020 CIVIL STATE OF CALIFORNIA

SCALE: 1" = XX'
DESIGN: XXX
DRAWN: XXX
CHECKED: XXX
APPROVED: XXX
DATE: XXXX XX, 201X

CITY OF MENIFEE
ENGINEERING DEPARTMENT

JONATHAN G. SMITH RCE 61253 DATE
DIRECTOR OF PUBLIC WORKS/ EXP. 6/30/19
CITY ENGINEER

RECOMMENDED BY: DATE

SEAL
CITY OF MENIFEE OCTOBER 1, 2008

CITY OF MENIFEE
ENGINEERING DEPARTMENT

ROUGH GRADING PLAN
TRACT 31194
PLAN SHEET

SHEET NO.
8
8 OF 20

PROJECT NO: GPXX–XXX

PLOTTED BY: Teresa Cohen DATE: Oct. 23, 2018 05:19:29 PM FILE: H:\00546\Engineering\Rough\RG31194-05.dwg

SEE SHEET 8

SEE SHEET 6

SEE SHEET 14

SEE SHEET 13

SEE SHEET 10



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N W E S HUNSAKER

0 20 40 80 120 160
SCALE: 1" = 40'

WDID # :

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SHT.	DESCRIPTION	DATE	BY	APRD

HUNSAKER & ASSOCIATES IRVINE, INC
INLAND EMPIRE REGION
2900 ADAMS STREET, SUITE A-15
RIVERSIDE CA 92504 (951)352-7200
PLANNING/ENGINEERING/SURVEYING/GOVERNMENT RELATIONS

PREPARED BY: R.C.E. NO. 58020
PAUL R. HUDDLESTON, JR. — Oct 23, 2018 DATE

ENGINEER SEAL
REGISTERED PROFESSIONAL ENGINEER PAUL R. HUDDLESTON JR. NO. 58020 CIVIL STATE OF CALIFORNIA

SCALE:	1" = XX'
DESIGN:	XXX
DRAWN:	XXX
CHECKED:	XXX
APPROVED:	XXX
DATE:	XXXX XX, 201X

CITY OF MENIFEE
ENGINEERING DEPARTMENT

JONATHAN G. SMITH — RCE 61253 — DATE
DIRECTOR OF PUBLIC WORKS/ CITY ENGINEER — EXP. 6/30/19

RECOMMENDED BY: — DATE

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CITY OF MENIFEE ENGINEERING DEPARTMENT

ROUGH GRADING PLAN
TRACT 31194
PLAN SHEET

SHEET NO. 9
9 of 20

PROJECT NO: GPXX-XXX

PLOTTED BY: Teresa Cohen DATE: Oct. 23, 2018 05:19:34 PM FILE: H:\00546\Engineering Rough\RG31194-05.dwg

SEE SHEET 9

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RIVERSIDE CA 92504 (951)352-7200
PLANNING/ENGINEERING/SURVEYING/GOVERNMENT RELATIONS

PREPARED BY:
R.C.E. NO. 58020
PAUL R. HUDDLESTON, JR.
Oct 23, 2018
DATE

ENGINEER SEAL
REGISTERED PROFESSIONAL ENGINEER
PAUL R. HUDDLESTON JR.
NO. 58020
CIVIL
STATE OF CALIFORNIA

SCALE: 1" = XX'
DESIGN: XXX
DRAWN: XXX
CHECKED: XXX
APPROVED: XXX
DATE: XXXX XX, 201X

CITY OF MENIFEE
ENGINEERING DEPARTMENT

JONATHAN G. SMITH
DIRECTOR OF PUBLIC WORKS/
CITY ENGINEER
RCE 61253
EXP. 6/30/19
DATE

RECOMMENDED BY:
DATE

SEAL
CITY OF MENIFEE
OCTOBER 1, 2008

CITY OF MENIFEE
ENGINEERING DEPARTMENT

ROUGH GRADING PLAN
TRACT 31194
PLAN SHEET

SHEET NO.
10
10 OF 20

PROJECT NO: GPXX-XXX

PLOTTED BY: Teresa Cohen DATE: Oct. 23, 2018 05:19:39 PM FILE: H:\00546\Engineering\Rough\R31194-05.dwg

SEE SHEET 12

SEE SHEET 20

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W HUNSAKER E

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0 20 40 80 120 160

SCALE: 1" = 40'

WDID # :_____

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SHT.	DESCRIPTION	DATE	BY	APRD

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2900 ADAMS STREET, SUITE A-15
RIVERSIDE CA 92504 (951)352-7200
PLANNING/ENGINEERING/SURVEYING/GOVERNMENT RELATIONS

PREPARED BY: R.C.E. NO. 58020

PAUL R. HUDDLESTON, JR. Oct 23, 2018 DATE

ENGINEER SEAL

REGISTERED PROFESSIONAL ENGINEER PAUL R. HUDDLESTON JR. NO. 58020 CIVIL STATE OF CALIFORNIA

SCALE:	1" = XX'
DESIGN:	XXX
DRAWN:	XXX
CHECKED:	XXX
APPROVED:	XXX
DATE:	XXXX XX, 201X

CITY OF MENIFEE
ENGINEERING DEPARTMENT

JONATHAN G. SMITH RCE 61253 DATE
DIRECTOR OF PUBLIC WORKS/ EXP. 6/30/19
CITY ENGINEER

RECOMMENDED BY: DATE

SEAL

CITY OF MENIFEE
ENGINEERING DEPARTMENT

ROUGH GRADING PLAN
TRACT 31194
PLAN SHEET

SHEET NO. 11 of 20

PROJECT NO: GPXX-XXX

PLOTTED BY: Teresa Cohen DATE: Oct. 23, 2018 05:19:44 PM FILE: H:\00546\Engineering\Rough\RG31194-05.dwg

SEE SHEET 13

SEE SHEET 10

SEE SHEET 19

SEE SHEET 11

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W HUNSAKER E
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0 20 40 80 120 160
SCALE: 1" = 40'

WDID # :

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RIVERSIDE CA 92504 (951)352-7200
PLANNING/ENGINEERING/SURVEYING/GOVERNMENT RELATIONS

PREPARED BY: R.C.E. NO. 58020

Oct 23, 2018
PAUL R. HUDDLESTON, JR. DATE

ENGINEER SEAL
REGISTERED PROFESSIONAL ENGINEER PAUL R. HUDDLESTON NO. 58020 CIVIL STATE OF CALIFORNIA

SCALE: 1" = XX'
DESIGN: XXX
DRAWN: XXX
CHECKED: XXX
APPROVED: XXX
DATE: XXXX XX, 201X

CITY OF MENIFEE
ENGINEERING DEPARTMENT

JONATHAN G. SMITH RCE 61253 DATE
DIRECTOR OF PUBLIC WORKS/ EXP. 6/30/19
CITY ENGINEER

RECOMMENDED BY: DATE

SEAL: CITY OF MENIFEE OCTOBER 1, 2008

CITY OF MENIFEE ENGINEERING DEPARTMENT

ROUGH GRADING PLAN
TRACT 31194
PLAN SHEET

SHEET NO. 12
12 or 20

PROJECT NO: GPXX-XXX

PLOTTED BY: Teresa Cohen DATE: Oct. 23, 2018 05:19:47 PM FILE: H:\00546\Engineering\Rough\RG31194-05.dwg

SEE SHEET 14

SEE SHEET 9

SEE SHEET 18

SEE SHEET 12

SECTION "B" -"B"
LOW FLOW TRENCH
N.T.S.

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INLAND EMPIRE REGION
2900 ADAMS STREET, SUITE A-15
RIVERSIDE CA 92504 (951)352-7200
PLANNING/ENGINEERING/SURVEYING/GOVERNMENT RELATIONS

PREPARED BY:
R.C.E. NO. 58020
Oct 23, 2018
PAUL R. HUDDLESTON, JR. DATE

ENGINEER SEAL
REGISTERED PROFESSIONAL ENGINEER
PAUL R. HUDDLESTON JR.
NO. 58020
CIVIL
STATE OF CALIFORNIA

SCALE: 1" = XX'
DESIGN: XXX
DRAWN: XXX
CHECKED: XXX
APPROVED: XXX
DATE: XXXX XX, 201X

CITY OF MENIFEE
ENGINEERING DEPARTMENT

JONATHAN G. SMITH
DIRECTOR OF PUBLIC WORKS/
CITY ENGINEER
RCE 61253
EXP. 6/30/19
DATE

RECOMMENDED BY:
DATE

SEAL
CITY OF MENIFEE
INCORPORATED 1.1.2008

CITY OF MENIFEE
ENGINEERING DEPARTMENT

ROUGH GRADING PLAN
TRACT 31194
PLAN SHEET

SHEET NO.
13
13 OF 20

PROJECT NO: GPXX-XXX

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SEE SHEET 15

SEE SHEET 8

SEE SHEET 17



SEE SHEET 13

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W HUNSAKER E
S

0 20 40 80 120 160
SCALE: 1" = 40'

WDID # :

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REVISIONS

SHT.	DESCRIPTION	DATE	BY	APRD

HUNSAKER & ASSOCIATES
IRVINE, INC
INLAND EMPIRE REGION
2900 ADAMS STREET, SUITE A-15
RIVERSIDE CA 92504 (951)352-7200
PLANNING/ENGINEERING/SURVEYING/GOVERNMENT RELATIONS

PREPARED BY:
R.C.E. NO. 58020
Oct 23, 2018
PAUL R. HUDDLESTON, JR. DATE

ENGINEER SEAL
REGISTERED PROFESSIONAL ENGINEER PAUL R. HUDDLESTON JR. NO. 58020 CIVIL STATE OF CALIFORNIA

SCALE: 1" = XX'
DESIGN: XXX
DRAWN: XXX
CHECKED: XXX
APPROVED: XXX
DATE: XXXX XX, 201X

CITY OF MENIFEE
ENGINEERING DEPARTMENT

JONATHAN G. SMITH — RCE 61253 — DATE
DIRECTOR OF PUBLIC WORKS/ CITY ENGINEER — EXP. 6/30/19

RECOMMENDED BY: DATE

SEAL

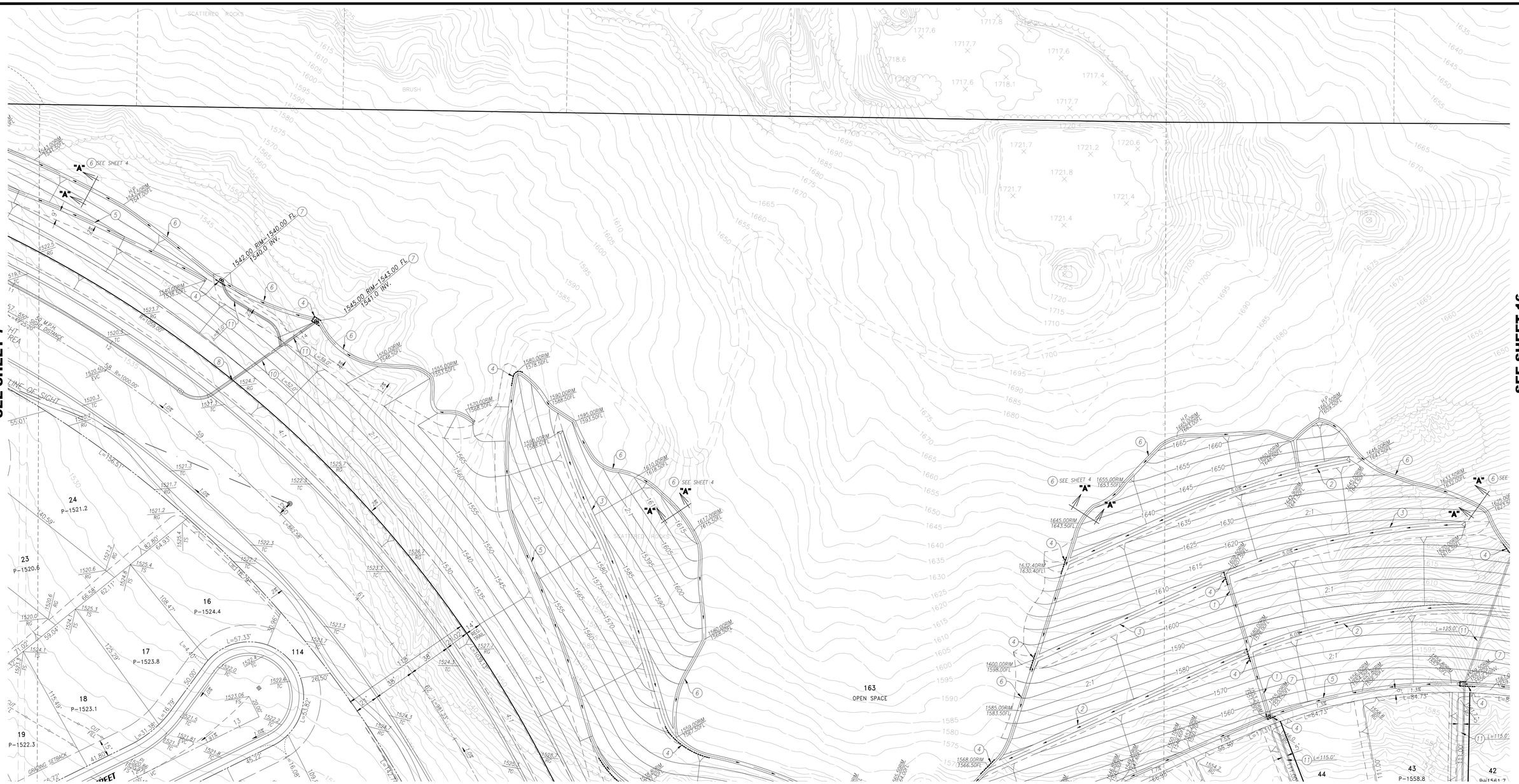
CITY OF MENIFEE
ENGINEERING DEPARTMENT

ROUGH GRADING PLAN
TRACT 31194
PLAN SHEET

SHEET NO. 14
14 OF 20

PROJECT NO: GPXX-XXX

PLOTTED BY: Teresa Cohen DATE: Oct 23, 2018 05:19:58 PM FILE: H:\00546\Engineering\Rough\RG31194-05.dwg



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0 20 40 80 120 160
SCALE: 1" = 40'

WDID # :

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IRVINE, INC
INLAND EMPIRE REGION
2900 ADAMS STREET, SUITE A-15
RIVERSIDE CA 92504 (951)352-7200
PLANNING/ENGINEERING/SURVEYING/GOVERNMENT RELATIONS

PREPARED BY:
R.C.E. NO. 58020
PAUL R. HUDDLESTON, JR.
Oct 23, 2018
DATE

ENGINEER SEAL
REGISTERED PROFESSIONAL ENGINEER
PAUL R. HUDDLESTON JR.
NO. 58020
CIVIL
STATE OF CALIFORNIA

SCALE:	1" = XX'
DESIGN:	XXX
DRAWN:	XXX
CHECKED:	XXX
APPROVED:	XXX
DATE:	XXXX XX, 201X

CITY OF MENIFEE
ENGINEERING DEPARTMENT

JONATHAN G. SMITH
DIRECTOR OF PUBLIC WORKS/
CITY ENGINEER
RCE 61253
EXP. 6/30/19
DATE

RECOMMENDED BY:
DATE

SEAL
CITY OF MENIFEE
OCTOBER 1, 2008

CITY OF MENIFEE
ENGINEERING DEPARTMENT

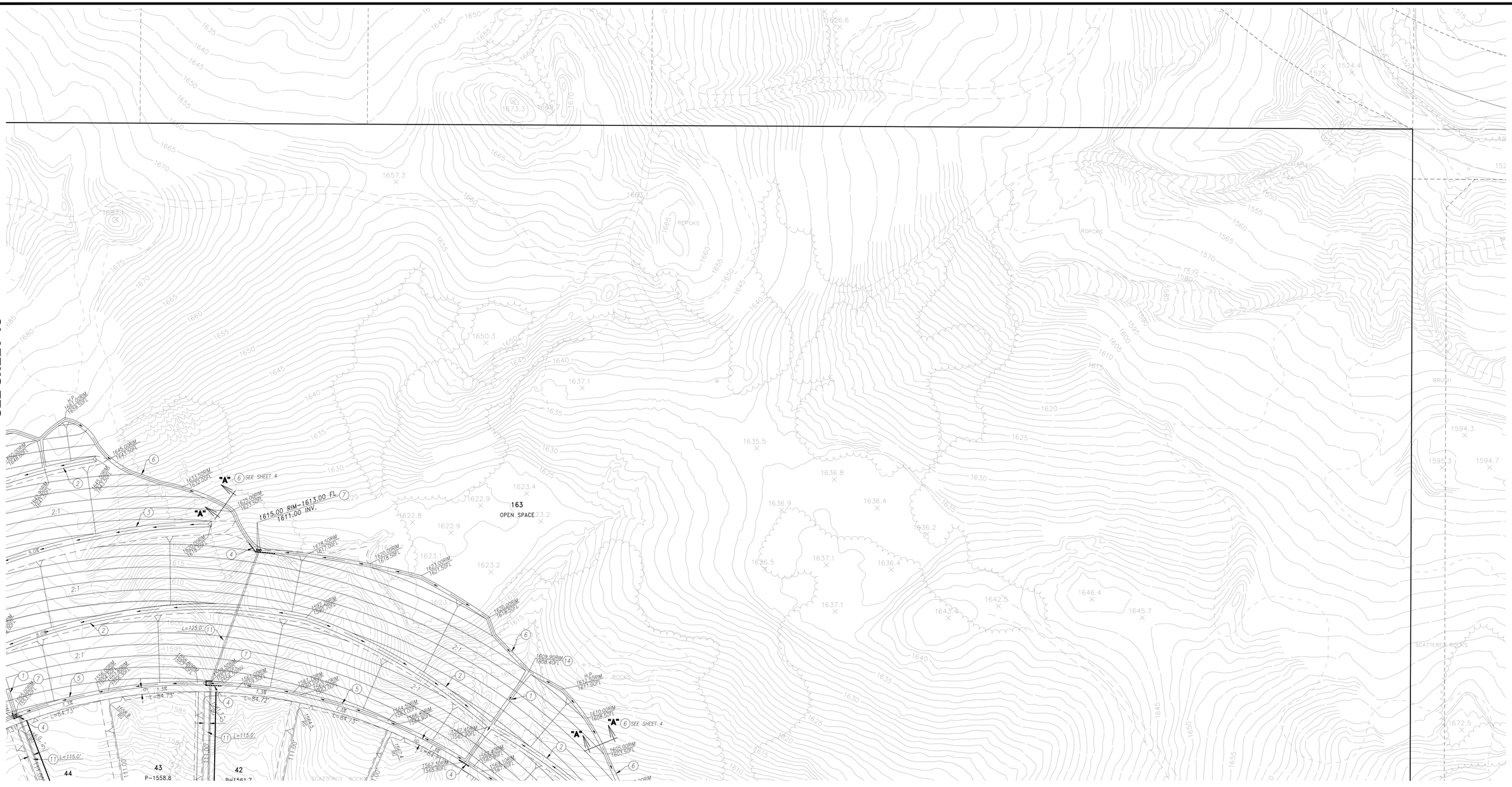
ROUGH GRADING PLAN
TRACT 31194
PLAN SHEET

SHEET NO.
15
15 of 20

PROJECT NO: GPXX-XXX

PLOTTED BY: Teresa Cohen DATE: Oct. 23, 2018 05:20:01 PM FILE: H:\00546\Engineering\Rough\RG31194-05.dwg

SEE SHEET 15



SEE SHEET 17

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N W HUNSAKER E S

0 20 40 80 120 160
SCALE: 1" = 40'

WDID # :

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INLAND EMPIRE REGION
2900 ADAMS STREET, SUITE A-15
RIVERSIDE CA 92504 (951)352-7200
PLANNING/ENGINEERING/SURVEYING/GOVERNMENT RELATIONS

PREPARED BY: R.C.E. NO. 58020
Oct 23, 2018
PAUL R. HUDDLESTON, JR. DATE

ENGINEER SEAL
REGISTERED PROFESSIONAL ENGINEER PAUL R. HUDDLESTON JR. NO. 58020 CIVIL STATE OF CALIFORNIA

SCALE:	1" = XX'
DESIGN:	XXX
DRAWN:	XXX
CHECKED:	XXX
APPROVED:	XXX
DATE:	XXXX XX, 201X

CITY OF MENIFEE
ENGINEERING DEPARTMENT

JONATHAN G. SMITH RCE 61253 DATE
DIRECTOR OF PUBLIC WORKS/ EXP. 6/30/19
CITY ENGINEER

RECOMMENDED BY: DATE

SEAL: CITY OF MENIFEE OCTOBER 1, 2008

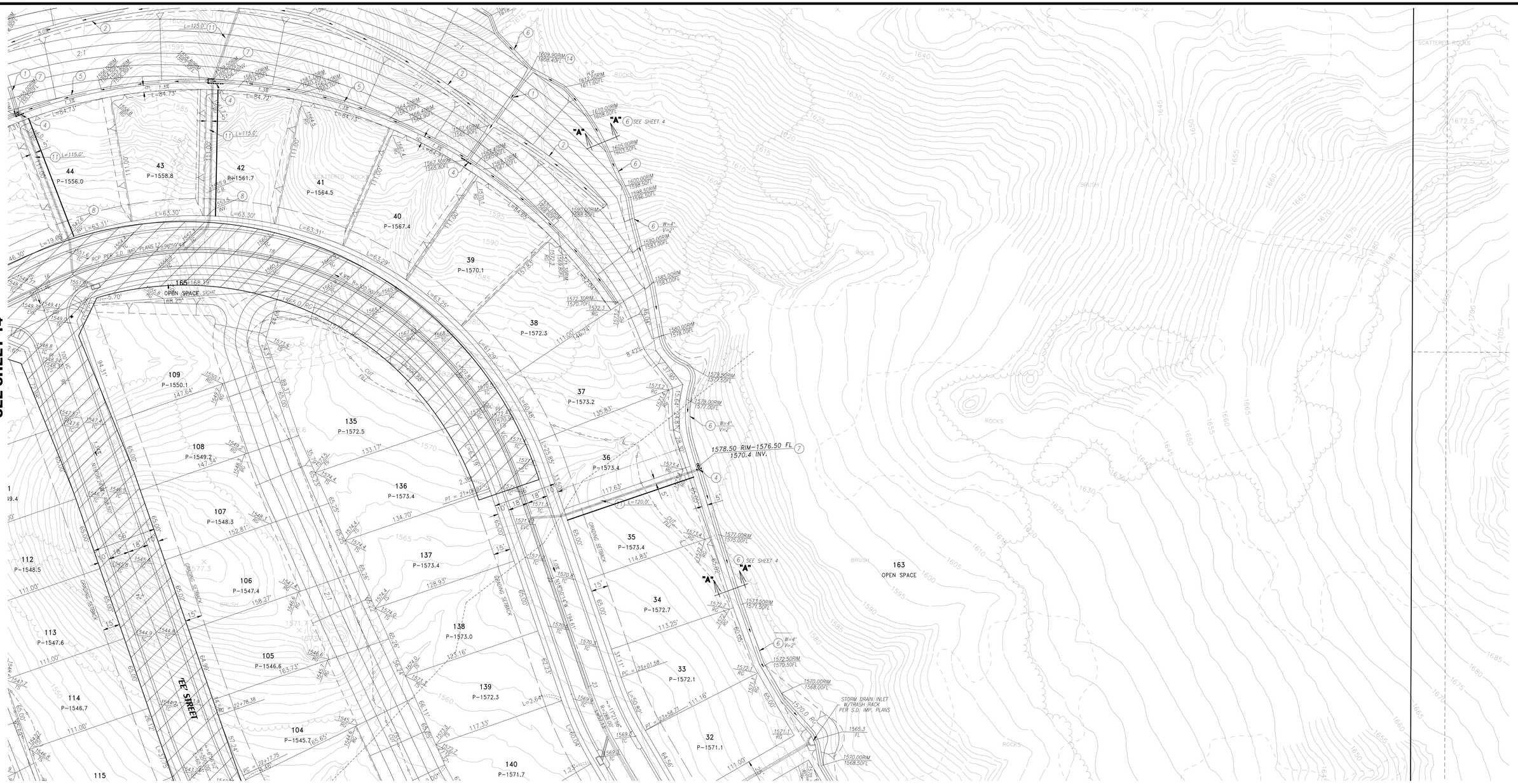
CITY OF MENIFEE
ENGINEERING DEPARTMENT

ROUGH GRADING PLAN
TRACT 31194
PLAN SHEET

SHEET NO. 16
16 of 20

PROJECT NO: GPXX-XXX

PLOTTED BY: Teresa Cohen DATE: Oct. 23, 2018 05:20:06 PM FILE: H:\00546\Engineering\Rough\RG31194-05.dwg



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N W E S HUNSAKER

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SCALE: 1" = 40'

WDID # :

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HUNSAKER & ASSOCIATES IRVINE, INC
INLAND EMPIRE REGION
2900 ADAMS STREET, SUITE A-15
RIVERSIDE CA 92504 (951)352-7200
PLANNING/ENGINEERING/SURVEYING/GOVERNMENT RELATIONS

PREPARED BY:
R.C.E. NO. 58020
PAUL R. HUDDLESTON, JR.
Oct 23, 2018
DATE

ENGINEER SEAL
REGISTERED PROFESSIONAL ENGINEER PAUL R. HUDDLESTON JR. NO. 58020 CIVIL STATE OF CALIFORNIA

SCALE: 1" = XX'
DESIGN: XXX
DRAWN: XXX
CHECKED: XXX
APPROVED: XXX
DATE: XXXX XX, 201X

CITY OF MENIFEE
ENGINEERING DEPARTMENT

JONATHAN G. SMITH
DIRECTOR OF PUBLIC WORKS/
CITY ENGINEER
RCE 61253
EXP. 6/30/19
DATE

RECOMMENDED BY:
DATE

SEAL
CITY OF MENIFEE

CITY OF MENIFEE ENGINEERING DEPARTMENT

ROUGH GRADING PLAN
TRACT 31194
PLAN SHEET

SHEET NO. 17
17 of 20

PROJECT NO: GPXX-XXX

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SEE SHEET 17

SEE SHEET 13

SEE SHEET 19

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N
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0 20 40 80 120 160
SCALE: 1" = 40'

WDID # :

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REVISIONS				
SHT.	DESCRIPTION	DATE	BY	APRD

HUNSAKER & ASSOCIATES
IRVINE, INC
INLAND EMPIRE REGION
2900 ADAMS STREET, SUITE A-15
RIVERSIDE CA 92504 (951)352-7200
PLANNING/ENGINEERING/SURVEYING/GOVERNMENT RELATIONS

PREPARED BY: R.C.E. NO. 58020
Oct 23, 2018
PAUL R. HUDDLESTON, JR. DATE

ENGINEER SEAL
REGISTERED PROFESSIONAL ENGINEER PAUL R. HUDDLESTON JR. NO. 58020 CIVIL STATE OF CALIFORNIA

SCALE:	1" = XX'
DESIGN:	XXX
DRAWN:	XXX
CHECKED:	XXX
APPROVED:	XXX
DATE:	XXXX XX, 201X

CITY OF MENIFEE
ENGINEERING DEPARTMENT

JONATHAN G. SMITH RCE 61253 DATE
DIRECTOR OF PUBLIC WORKS/ EXP. 6/30/19
CITY ENGINEER

RECOMMENDED BY: DATE

SEAL

CITY OF MENIFEE
ENGINEERING DEPARTMENT

ROUGH GRADING PLAN
TRACT 31194
PLAN SHEET

SHEET NO. 18
18 of 20

PROJECT NO: GPXX-XXX

PLOTTED BY: Teresa Cohen DATE: Oct. 23, 2018 05:20:16 PM FILE: H:\00546\Engineering\Rough\RG31194-05.dwg

SEE SHEET 18

SEE SHEET 12

SEE SHEET 20

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SCALE: 1" = 40'

WDID # :

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REVISIONS

SHT.	DESCRIPTION	DATE	BY	APRD

HUNSAKER & ASSOCIATES
IRVINE, INC
INLAND EMPIRE REGION
2900 ADAMS STREET, SUITE A-15
RIVERSIDE CA 92504 (951)352-7200
PLANNING/ENGINEERING/SURVEYING/GOVERNMENT RELATIONS

PREPARED BY: R.C.E. NO. 58020

PAUL R. HUDDLESTON, JR. Oct 23, 2018 DATE

ENGINEER SEAL

REGISTERED PROFESSIONAL ENGINEER PAUL R. HUDDLESTON JR. NO. 58020 CIVIL STATE OF CALIFORNIA

SCALE:	1" = XX'
DESIGN:	XXX
DRAWN:	XXX
CHECKED:	XXX
APPROVED:	XXX
DATE:	XXXX XX, 201X

CITY OF MENIFEE
ENGINEERING DEPARTMENT

JONATHAN G. SMITH RCE 61253 DATE
DIRECTOR OF PUBLIC WORKS/ EXP. 6/30/19
CITY ENGINEER

RECOMMENDED BY: DATE

SEAL

CITY OF MENIFEE
ENGINEERING DEPARTMENT

ROUGH GRADING PLAN
TRACT 31194
PLAN SHEET

SHEET NO. 19 19 of 20

PROJECT NO: GPXX-XXX

PLOTTED BY: Teresa Cohen DATE: Oct. 23, 2018 05:20:21 PM FILE: H:\00546\Engineering\Rough\RG31194-05.dwg

SEE SHEET 19

SEE SHEET 11



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RIVERSIDE CA 92504 (951)352-7200
PLANNING/ENGINEERING/SURVEYING/GOVERNMENT RELATIONS

PREPARED BY: R.C.E. NO. 58020

PAUL R. HUDDLESTON, JR. Oct 23, 2018 DATE

ENGINEER SEAL

REGISTERED PROFESSIONAL ENGINEER — PAUL R. HUDDLESTON JR. — NO. 58020 — CIVIL — STATE OF CALIFORNIA

SCALE:	1" = XX'
DESIGN:	XXX
DRAWN:	XXX
CHECKED:	XXX
APPROVED:	XXX
DATE:	XXXX XX, 201X

CITY OF MENIFEE
ENGINEERING DEPARTMENT

JONATHAN G. SMITH — RCE 61253 — DATE
DIRECTOR OF PUBLIC WORKS/ CITY ENGINEER — EXP. 6/30/19

RECOMMENDED BY: DATE

SEAL

CITY OF MENIFEE
ENGINEERING DEPARTMENT

ROUGH GRADING PLAN
TRACT 31194
PLAN SHEET

SHEET NO. 20 20 or 20

PROJECT NO: GPXX-XXX

PLOTTED BY: Teresa Cohen DATE: Oct. 23, 2018 05:20:26 PM FILE: H:\00546\Engineering\Rough\RG31194-05.dwg

SEE SHEET 11

/W PER 7-22

67/22
13717

BY DURING

EXIST. R/W PER PM 13717 PMB 67/22

STORM DRAIN INLET PER S.D. IMP. PLANS

EDGE OF PAVEMENT/℄

EXIST. PP PROTECT IN PLACE

STORM DRAIN OUTLET PER S.D. IMP. PLANS

EXIST. PP PROTECT IN PLACE

EXIST. PP PROTECT IN PLACE

STORM DRAIN INLET PER S.D. IMP. PLANS

5 CELL 5' W X 3' H BOX PER S.D. IMP. PLANS

4PN 380-380-009

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N W E S HUNSAKER

0 20 40 80 120 160
SCALE: 1" = 40'

WDID # :

811 Know what's below. Call 811 before you dig.

REVISIONS

SHT.	DESCRIPTION	DATE	BY	APRD

HUNSAKER & ASSOCIATES
IRVINE, INC
INLAND EMPIRE REGION
2900 ADAMS STREET, SUITE A-15
RIVERSIDE CA 92504 (951)352-7200
PLANNING/ENGINEERING/SURVEYING/GOVERNMENT RELATIONS

PREPARED BY: R.C.E. NO. 58020

PAUL R. HUDDLESTON, JR. Jul 01, 2020 DATE

ENGINEER SEAL

REGISTERED PROFESSIONAL ENGINEER PAUL R. HUDDLESTON JR. NO. 58020 CIVIL STATE OF CALIFORNIA

SCALE:	1" = XX'
DESIGN:	XXX
DRAWN:	XXX
CHECKED:	XXX
APPROVED:	XXX
DATE:	XXXX XX, 201X

CITY OF MENIFEE
ENGINEERING DEPARTMENT

JONATHAN G. SMITH — RCE 61253 — DATE
DIRECTOR OF PUBLIC WORKS/ CITY ENGINEER — EXP. 6/30/19

RECOMMENDED BY: DATE

SEAL

CITY OF MENIFEE ENGINEERING DEPARTMENT

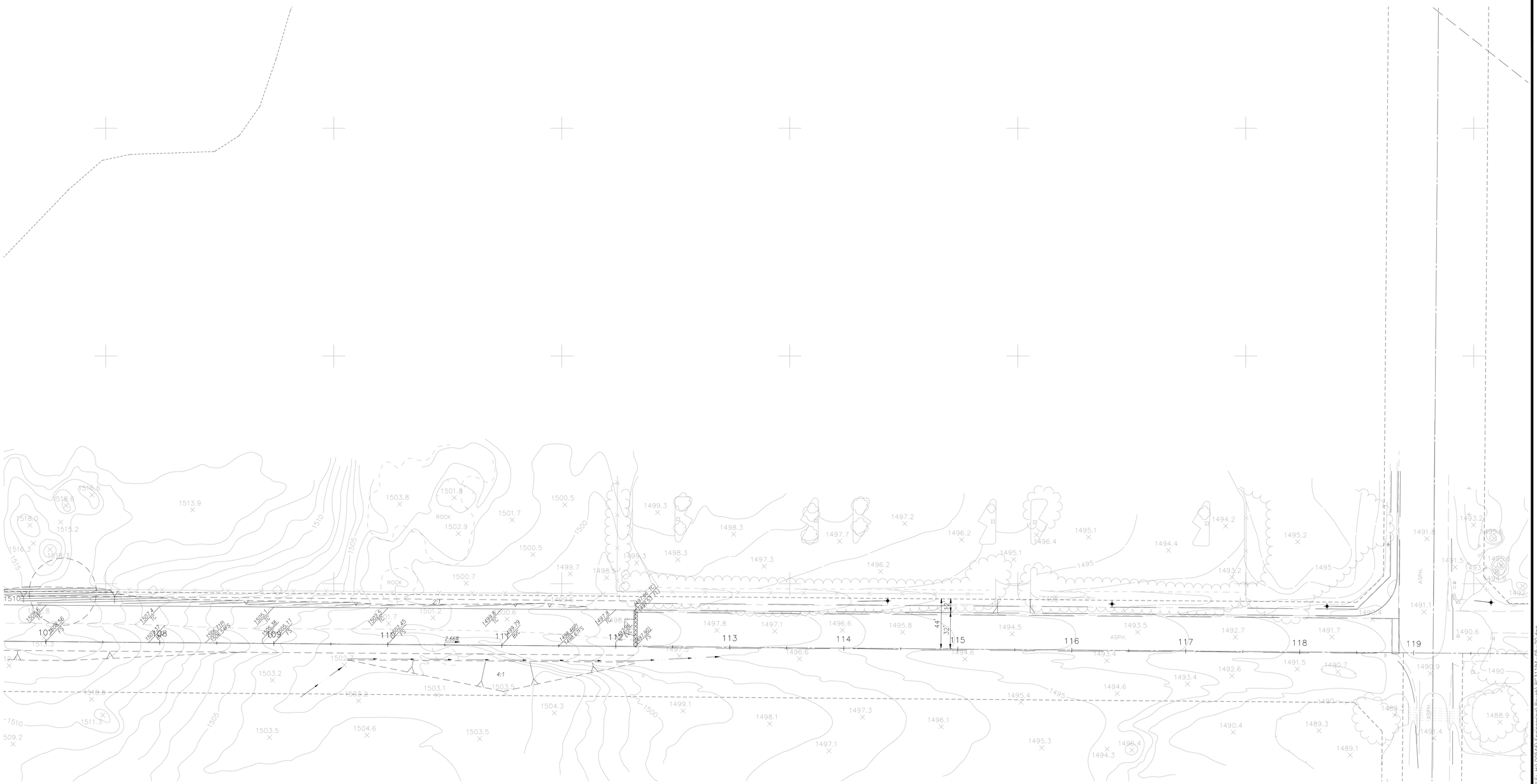
ROUGH GRADING PLAN
TRACT 31194
PLAN SHEET

SHEET NO. 20 of 20

PROJECT NO: GPXX-XXX

PLOTTED BY: Danielle Fregoso DATE: Jul 01, 2020 08:49:18 PM FILE: H:\00546\Engineering\Rough\RG31194-05-20.dwg

SEE SHEET 11



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

N
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0 20 40 80 120 160
SCALE: 1" = 40'

WDID # :

811 Know what's below. Call 811 before you dig.

REVISIONS				
SHT.	DESCRIPTION	DATE	BY	APRD

HUNSAKER & ASSOCIATES
IRVINE, INC
INLAND EMPIRE REGION
2900 ADAMS STREET, SUITE A-15
RIVERSIDE CA 92504 (951)352-7200
PLANNING/ENGINEERING/SURVEYING/GOVERNMENT RELATIONS

PREPARED BY: R.C.E. NO. 58020
PAUL R. HUDDLESTON, JR. — Jul 01, 2020 DATE

ENGINEER SEAL
REGISTERED PROFESSIONAL ENGINEER PAUL R. HUDDLESTON JR. NO. 58020 CIVIL STATE OF CALIFORNIA

SCALE:	1" = XX'
DESIGN:	XXX
DRAWN:	XXX
CHECKED:	XXX
APPROVED:	XXX
DATE:	XXXX XX, 201X

CITY OF MENIFEE
ENGINEERING DEPARTMENT

JONATHAN G. SMITH — RCE 61253 — DATE
DIRECTOR OF PUBLIC WORKS/ CITY ENGINEER — EXP. 6/30/19

RECOMMENDED BY: — DATE

SEAL: CITY OF MENIFEE OCTOBER 1, 2008

CITY OF MENIFEE
ENGINEERING DEPARTMENT

ROUGH GRADING PLAN
TRACT 31194
PLAN SHEET

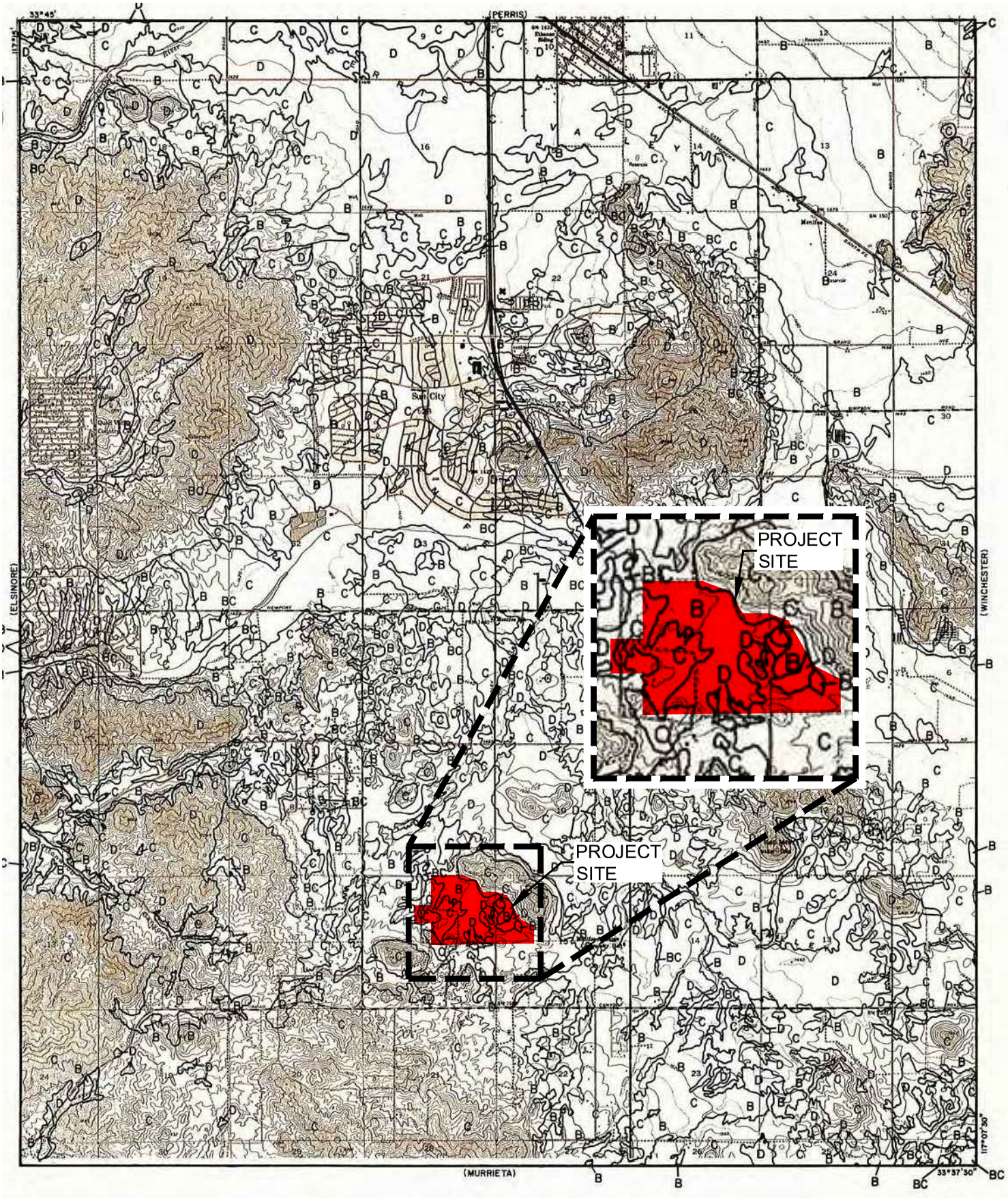
SHEET NO. 20 OF 20

PROJECT NO: GPXX-XXX

PLOTTED BY: Danielle Fregoso DATE: Jul. 01, 2020 08:49:58 PM FILE: H:\00546\Engineering\Rough\RG31194-05-20.dwg

Appendix 3: Soils Information

Geotechnical Study and Other Infiltration Testing Data



LEGEND

—— SOILS GROUP BOUNDARY

A SOILS GROUP DESIGNATION

RCFC & WCD

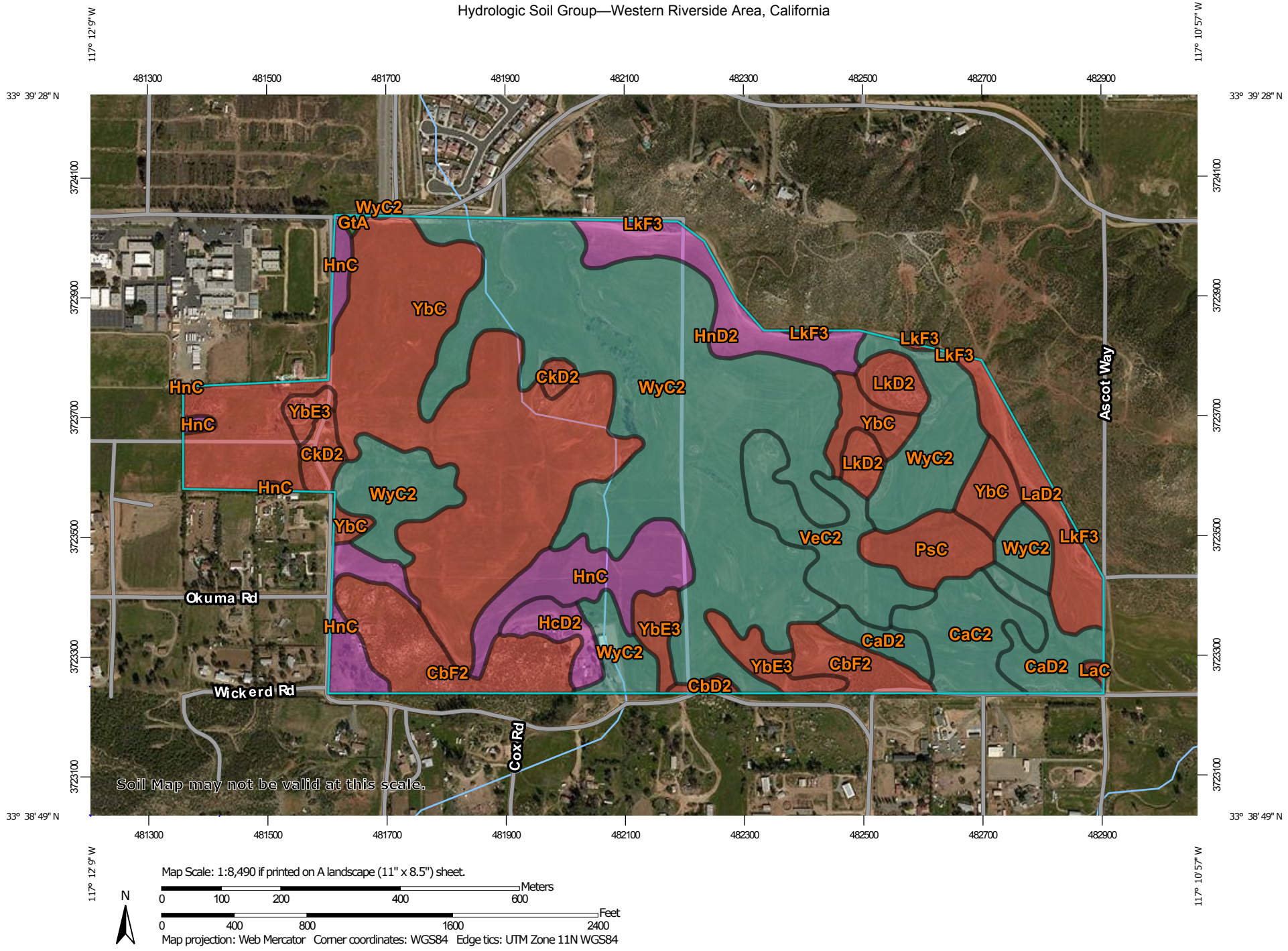
HYDROLOGY MANUAL

N

0 FEET 5000

HYDROLOGIC SOILS GROUP MAP FOR ROMOLAND

PLATE C-I.42



Map Scale: 1:8,490 if printed on A landscape (11" x 8.5") sheet.

N

Meters: 0 100 200 400 600

Feet: 0 400 800 1600 2400

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 11N WGS84

MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Rating Polygons

A

A/D

B

B/D

C

C/D

D

Not rated or not available

Soil Rating Lines

A

A/D

B

B/D

C

C/D

D

Not rated or not available

Soil Rating Points

A

A/D

B

B/D

C

C/D

D

Not rated or not available

Water Features

Streams and Canals

Transportation

Rails

Interstate Highways

US Routes

Major Roads

Local Roads

Background

Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:15,800.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Western Riverside Area, California
Survey Area Data: Version 11, Sep 12, 2018

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Feb 24, 2015—Feb 26, 2015

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
CaC2	Cajalco fine sandy loam, 2 to 8 percent slopes, eroded	C	7.5	3.3%
CaD2	Cajalco fine sandy loam, 8 to 15 percent slopes, eroded	C	7.3	3.3%
CbD2	Cajalco rocky fine sandy loam, 5 to 15 percent slopes, eroded	D	0.6	0.3%
CbF2	Cajalco rocky fine sandy loam, 15 to 50 percent slopes, eroded	D	13.6	6.1%
CkD2	Cieneba rocky sandy loam, 8 to 15 percent slopes, eroded	D	2.5	1.1%
GtA	Grangeville fine sandy loam, drained, 0 to 2 percent sl opes	A/D	0.2	0.1%
HcD2	Hanford coarse sandy loam, 8 to 15 percent slopes, eroded	A	2.8	1.2%
HnC	Honcut sandy loam, 2 to 8 percent slopes	A	13.6	6.1%
HnD2	Honcut sandy loam, 8 to 15 percent slopes, eroded	A	7.6	3.4%
LaC	Las Posas loam, 2 to 8 percent slopes	D	0.2	0.1%
LaD2	Las Posas loam, 8 to 15 percent slopes, eroded	D	6.7	3.0%
LkD2	Las Posas rocky loam, 8 to 15 percent slopes, eroded	D	3.8	1.7%
LkF3	Las Posas rocky loam, 15 to 50 percent slopes, severely eroded	D	0.4	0.2%
PsC	Porterville clay, moderately deep, 2 to 8 percent slopes	D	4.8	2.2%
VeC2	Vallecitos loam, thick solum variant, 2 to 8 percent slopes, eroded	C	9.1	4.1%

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
WyC2	Wyman loam, 2 to 8 percent slopes, eroded	C	79.8	35.7%
YbC	Yokohl loam, 2 to 8 percent slopes	D	57.0	25.5%
YbE3	Yokohl loam, 8 to 25 percent slopes, severely eroded	D	5.9	2.6%
Totals for Area of Interest			**223.4**	**100.0%**

Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

GEOTECHNICAL EXPLORATION
PROPOSED WATER TANK, GOLDEN MEADOWS – TRACT 31194, MENIFEE AREA, RIVERSIDE COUNTY, CALIFORNIA

DRAFT

Prepared for

RICHLAND COMMUNITIES, INC.

4100 Newport Place Drive
Newport Beach, California 92672

Project No. 11813.002

April 2, 2021

April 2, 2021

Project No. 11813.002

Richland Communities, Inc.
4100 Newport Place Drive
Newport Beach, California 92672

Attention: Mr. Brian Hardy, Vice President – Land Entitlement

Subject: Geotechnical Exploration
Proposed Water Tank, Golden Meadows – Tract 31194
Menifee Area, Riverside County, California

In accordance with our February 11, 2021, Leighton and Associates, Inc. (Leighton) is pleased to present this geotechnical exploration report for the proposed welded steel water tank to be constructed on the north side of the proposed Golden Meadows residential development, Tract 31194, located in the Menifee Area of Riverside County, California. This report presents our findings and conclusions, and geotechnical recommendations for design and construction of this proposed water tank.

Based on the results of this geotechnical exploration, the site of the proposed tank is generally a ridge top with moderate to steep surrounding slopes underlain by Cretaceous-Aged granitic rock (Gabbro). The site is not located within a currently designated Alquist-Priolo Special Studies Zone or a Riverside County fault zone.

We appreciate the opportunity to be of additional service. If you have any questions or if we can be of further assistance, please contact us at your convenience.

Respectfully Submitted,
LEIGHTON AND ASSOCIATES, INC.





Simon I. Saiid, GE 2641
Principal Engineer

Robert F. Riha, CEG 1921
Senior Principal Geologist

Distribution: (1) addressee (PDF via email)

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Appendix C – Site-Specific Seismic Coefficients
Appendix D - General Earthwork Grading Guidelines
Appendix E – GBA - Important Information About This Geotechnical-Engineering Report

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1.0 INTRODUCTION

1.1 Site Location and Description

The proposed water tank is located on a ridge top along the northern portion of Tract 31194, east of the intersection of Garbani Road and Evans Road in the Menifee Area of Riverside County, California *(see Site Location Map, Figure 1)*. This site is currently a vacant/undeveloped hilltop/ridgeline that slopes moderately to steeply in southerly and westerly directions. Site access is by a steep dirt road located to the south side of the site.

1.2 Proposed Water Tank

We understand that an approximately 103-foot diameter by 40-foot high welded steel water tank is proposed to be constructed at the Site as depicted on the provided conceptual grading plan (see Figure 3) with expansion pad for a potential future tank. Based on this plan, a desired pad elevation of 1,660 feet and cut slopes of up to approximately 60 feet in height may be constructed to create the required pad (future tank). Site access is expected to extend from an extension of Grabani Road and will also require cut slopes up to approximately 20 feet in height and fill slopes of up to approximately 40 feet in height. For the purpose of bearing capacity evaluation and slope stability analyses, a static pressure of 2,500 pound-per-square-foot (PSF) is assumed to be exerted by the proposed tank.

1.3 Purpose and Scope of Work

The purpose of our geotechnical study is to explore subsurface conditions at this proposed tank site and provide geotechnical recommendations for design and construction. In accordance with our proposal, the scope of this exploration has included the following tasks:

- **Desktop Review**: We reviewed relevant geotechnical literature, reports and aerial photographs for this tank site. These documents are referenced at the end of this report.
- **Geologic Mapping**: On February 17, 2021, we performed a site reconnaissance to observe site conditions and map any pertinent geologic features (i.e. bedding, joints, foliation, etc.) in existing/exposed cut slopes or

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natural bedrock exposures. We also collected surface samples for the purpose of laboratory testing and evaluation.

- **Geophysical Survey**: Four (4) seismic refraction lines were performed by our sub-consultant Atlas Technical Consultants, LLC. The purpose of this survey is to obtain readings/points for both vertical and lateral velocities so "tomography models" can be provided. Tomography is an enhanced seismic refraction method that allows changes in layer velocity to be revealed as gradients rather than discrete contacts. The seismic refraction survey report is presented in whole in Appendix B. The approximate locations of the survey transects are shown on Figure 3, Geotechnical Map. Three survey lines were conducted at the tank site and one survey line was conducted along the cut area for the planned access road.

- **Geotechnical Laboratory Testing**: Geotechnical laboratory tests were performed on surficial earth material collected during our site reconnaissance. Tests performed are included in Appendix A.

- **Geotechnical Analyses**: Data obtained from our background review, field exploration and geotechnical laboratory testing was evaluated to develop geotechnical conclusions and recommendations presented in this report.

- **Report Preparation**: Results of our geotechnical exploration have been summarized in this report to address geotechnical conditions encountered at the site, including our geotechnical findings, conclusions and recommendations for tank design and construction.

Important information about limitations of geotechnical reports is presented in Appendix E, *GBA Important Information About This Geotechnical Engineering Report*.

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2.0 FINDINGS

2.1 Regional Geology/Settings

The subject property is located within a prominent natural geomorphic province in southwestern California known as the Peninsular Ranges. This province is characterized by steep, elongated ranges and valleys that generally trend northwestward. Tectonic activity along the numerous faults in the region has created the geomorphology present today. Specifically, the property is situated in the southern portion of the Perris Block, a stable, eroded mass of Cretaceous and older crystalline and metamorphic rock. Thin sedimentary, metamorphic and volcanic units locally mantle the bedrock with alluvial deposits filling in the lower valley and drainage areas. The Perris Block is bounded by the San Jacinto Fault Zone to the northeast, the Elsinore Fault Zone to the southwest, the Cucamonga Fault Zone to the northwest and the poorly-defined northern boundary of the Temecula Basin to the southeast. The Temecula segment of the active Lake Elsinore Fault Zone is located approximately 6.4 miles to the southwest.

2.2 Site Geology

As regionally mapped on Figure 2, the site is underlain by gabbroic bedrock. Our field exploration indicates that this bedrock is generally covered with a relatively thin layer of surficial soils as further described below.

2.2.1 Surficial Soils: Surficial soils including topsoil and localized artificial fill should be expected within the site. These soils are expected to be relatively shallow (<3 feet), but they may be deeper in localized areas such as current access road. Expansion Index (EI) testing was performed on a representative soil sample indicate that these materials (silty sand) possess a very low expansion potential (EI=0). Test results are included in Appendix A.

2.2.2 Cretaceous-Aged Gabbroic Bedrock: Bedrock is exposed on outcrops and on steeper hillsides throughout the site. This granular granitic-type bedrock is generally dark gray in color, massive and jointed. Where exposed on the surface, the bedrock is moderately weathered and creates boulders along the hillsides up to 10 feet in diameter. The elevated portion of the site (north of future tank) has been cut into a relatively flat pad with bedrock exposed at the surface. The bedrock breaks down into granular silty to well-graded sand with gravel.

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Jointing is common within this bedrock unit, limited exposures of undisturbed in-place bedrock were encountered throughout the site. Jointing typically dips to the south or southwest. Bedrock cut slopes will need to be geologically mapped as they are excavated to confirm the anticipated structural pattern and long-term stability.

2.3 Rippability and Excavation Characteristics

Review of provided conceptual site design indicates cuts (excavation below existing ground surface) up to 60 feet may be required to create the proposed pad for future tank and up to 20 feet for the proposed access road.

Based on our seismic refraction survey data performed by Atlas Technical Consultants, LLC. (Appendix B), rippable bedrock using Caterpillar D-9 dozer with a single shank should be anticipated to a depth of 10 to 20 feet BGS or may vary depending on location. However, very difficult ripping or blasting (or other rock reducing techniques) should be anticipated for deeper excavations or where measured shear wave velocities exceed 4,000 foot-per-second (fps) as shown on the “Tomograpgy Models” included in Appendix B. The relatively shallow and hard rock zones (green to red color) are likely due to buried corestones/remnant boulders, dikes, and/or less weathered rock.

A summary of the seismic refraction survey including rippability criteria based a Caterpillar D-9 dozer with a single shank is further provided in Appendix B. Trench excavation characteristics using conventional excavators may vary based on the specific equipment used. It is important that a contractor with excavation experience in similar conditions be consulted for the proper excavation methodology, equipment, and production rate based on the findings of this report.

2.4 Surface and Groundwater

Surface water was not encountered on this site during our field exploration. Groundwater is not expected to be encountered within the depth of excavation. However, localized seeps may occur at Formation contacts or in fractured zones immediately after rain events.

2.5 Faulting and Seismicity

Seismic hazards in Southern California could include strong ground shaking and fault rupture. No currently-known active surface faults cross or trend towards this

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project site. The subject site is not included within an Earthquake Fault Zone as created by the Alquist-Priolo Earthquake Fault Zoning Act (Bryant and Hart, 2007). The nearest zoned active faults are the Temecula Segment of the Elsinore Fault Zone, approximately 6.4 miles southwest of the site and the Glen Ivy Segment of the Elsinore Fault Zone is located approximately 15.6 miles northwest of the site

A detailed review of vertical, sequential, stereo aerial photograph pairs was conducted to identify possible geomorphic evidence of faulting and landsliding. Various photos taken between 1949 and 1999 were reviewed (see references). Our review of aerial photographs and subsequent field observations do not provide geomorphic evidence supporting the existence of faulting or reveal any photo-lineaments that are typically associated with faulting in this region. The recent (<11,000 years) geologic history of this area reflects that this site is undergoing a regressive, erosional sequence. As observed in the aerial photographs, there are several deeply cut active, drainage channels that do not show any horizontal displacement that may be associated with active faulting.

2.6 Secondary Seismic Hazards

In general, secondary seismic hazards for sites in the region could include soil liquefaction, earthquake-induced settlement, lateral displacement and landsliding. The potential for secondary seismic hazards at the site is discussed below.

2.6.1 Seismically Induced Settlement: Seismically induced settlement consists of dry dynamic settlement (above groundwater) and liquefaction-induced settlement (below groundwater). During a strong seismic event, seismically induced settlement can occur within loose to moderately dense sandy soil due to reduction in volume during and shortly after a large, long-duration local earthquake. Settlement caused by ground shaking is often non-uniformly distributed, which can result in differential settlement. Based on the results of our exploration, seismic settlement is not considered a geotechnical constraint for this tank.

2.6.2 Seismically Induced Landslides: Based on the underlying bedrock formation and our review of aerial photographs and field observations, the site is not susceptible to seismically induced landslides.

2.7 Slope Stability

Proposed cut slopes up to 60 feet in height at 2:1 (horizontal:vertical) gradients are considered grossly stable for static and pseudo-static conditions. Compacted fill

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slopes up to 20 feet in height at 2:1 gradients are also considered grossly stable for static and pseudo-static conditions. Cut slopes, should be observed by an engineering geologist during grading to verify jointing or fracture patterns and recommend remedial measures, if needed.

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3.0 CONCLUSIONS AND RECOMMENDATIONS

Based on results of this geotechnical exploration, the proposed tank site pad is underlain by granitic rock/Gabbro. The site is not located within a currently designated Alquist-Priolo Special Studies Zone or a Riverside County fault zone. However, as is the case for most of Southern California, strong ground shaking has and will occur at this site. Our geotechnical recommendations for design and construction of this proposed water tank are presented in the following sections.

3.1 Tank Foundation Location

Based on proposed pad elevations, the tank pad will be entirely cut into the granitic rock. Due to potentially weathered bedrock material along the shallow cut (daylight) areas we recommend a setback of 15 feet horizontally from daylight to ring foundation.

3.2 Earthwork

Earthwork is expected to generally consist of cut pad and access road excavation, pad surface preparation, and footing and pipeline construction. In addition, minor filling (~15 feet) may be required on the downhill side for access road. Specific earthwork recommendations are provided in the following subsections:

3.2.1 Site Preparation: Based on proposed grading concept, the tank pad is expected to expose dense gabbroic rock. If highly weathered bedrock/loose rocks or any undesirable geologic features are exposed within portions of the tank pad and/or subgrade for the access road, then such conditions should be addressed by the project geotechnical engineer or geologist prior to foundation construction.

3.2.2 Fill Placement and Compaction: Onsite very low expansive (EI<21) soils free of organics, debris, and oversized material less than (≤) 3-inches in largest dimension are suitable for use as structural fill on this site. Soils to be placed as fill, whether onsite or import material, should be reviewed by Leighton and tested if and as necessary.

To provide uniform subgrade and fill any potential voids created from removal of loose rock/materials, we recommend that a minimum of 6-inch layer consisting of granular base (Caltrans Class 2 or equivalent) be placed prior to construction of concrete floor slab. However, if removal of rock or loose material creates voids larger than 2 feet in depth, such areas should be subject to further evaluation as potentially needing additional filling procedures.

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Where fill is being placed at slopes steeper-than (>) 5:1 (horizontal:vertical), proper surface preparations and benching should be implemented in accordance with latest edition of the "Greenbook", and approved by Leighton during construction. A 15-foot wide minimum fill slope keyway should be prepared to support the tank pad slope and access road fill slope (see Figure 5). As such, all areas to receive fill, including processed areas, fill slope, and benches, should be observed, mapped, and approved or tested by Leighton prior to proceeding with placement of fill.

3.2.3 Utility Trench Backfill: Utility trenches should be backfilled with compacted fill in accordance with Sections 306-1.2 and 306-1.3 of the "Greenbook". Utility trenches can be backfilled with on-site soils free of debris, organic and oversized material up to (≤) 3-inches in largest dimension. Prior to backfilling trenches, pipes should be bedded in and covered with either:

- **Sand**: A uniform, granular material that has a Sand Equivalent (SE) of (≥) 30 or greater and a maximum particle size of ¾-inches (or as specified by the pipe manufacturer), water densified in place, or
- **CLSM**: One sack cement slurry/Controlled Low Strength Material (CLSM) conforming to Section 201-6 of the "Greenbook".

Pipe bedding should extend at least 4-inches below any pipeline invert and at least 12 inches over the top of the pipeline. Native soils can be used as backfill over the pipe bedding zone, and should be placed in thin lifts, moisture conditioned above optimum, and mechanically compacted to at least 90 percent relative compaction, relative to the ASTM D 1557 laboratory maximum density.

3.3 Seismic Design Parameters

It is our understanding that the proposed water tank will be constructed of steel and the structural design of the tank will follow ANSI/AWWA D100-11. Therefore, the purpose of the seismic hazard evaluation is to identify and assess potential seismic hazards at the site in general accordance with the requirements of ANSI/AWWA D100, which generally follows the requirements of ASCE 7-16. Our seismic hazard evaluation includes development of peak ground acceleration (PGA) and design response spectra by using a seismic source model based on proximity of the site to active faults, major historical earthquakes, regional seismicity, and subsurface soil conditions at the site. Specifically, our scope includes estimation of peak horizontal ground acceleration and the response spectra at the site for the Maximum Considered Earthquake (MCE) and the Design

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Earthquake (DE) Site-specific ground motion parameters derived based on the requirements of ASCE 7-16, Chapters 11 and 21. These seismic coefficients were calculated utilizing an interactive program on current United States Geological Survey (USGS) website (referred to as USGS General Procedure). Based on our site-specific seismic refraction survey, this site is classified as a Class **B** site:

Table 1. 2019 CBC Site-Specific Seismic Parameters

2013 CBC Site-Specific Seismic Design Parameters	Value
Site Longitude (decimal degrees)	-117.18905
Site Latitude (decimal degrees)	33.6555
Site Class Definition	**B**
Mapped Spectral Response Acceleration at 0.2s Period, S_S	1.41
Mapped Spectral Response Acceleration at 1s Period, S_1	0.52
Short Period Site Coefficient at 0.2s Period, F_a	*0.9*
Long Period Site Coefficient at 1s Period, F_v	*0.8*
Adjusted Spectral Response Acceleration at 0.2s Period, S_{MS}	1.26
Adjusted Spectral Response Acceleration at 1s Period, S_{M1}	0.42
Design Spectral Response Acceleration at 0.2s Period, S_{DS}	**0.84**
Design Spectral Response Acceleration at 1s Period, S_{D1}	**0.28**
Long-Period Transitions, T_L	**8 sec**

The results of this analysis also indicate that the adjusted Peak Ground Acceleration (PGA_m) for the MCE_G is 0.54g.

3.4 Tank Spread/Ring Footing Foundations

The proposed foundations and slabs should be designed in accordance with the structural consultants' design, the minimum geotechnical recommendations presented herein, and applicable ANSI/AWWA D100-11 requirements.

3.4.1 Minimum Embedment and Width: Conventional shallow spread/ring footings may be used to support the proposed tank, bearing solely on an undisturbed granitic rock approved by the geotechnical consultant. Tank footings should be embedded at least 12-inch below lowest adjacent grade, with a minimum width of 12-inch. These footings should have a minimum of 15 feet setback from adjacent descending slope/daylight.

3.4.2 Allowable Bearing Pressure: An allowable bearing pressure of 5,000 pounds-per-square-foot (psf) may be used for static and sustained live loads, based on minimum embedment depth and widths recommended above. The bearing pressure value may be increased by 250 psf for each additional foot of

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embedment or each additional foot of width to a maximum vertical bearing value of 6,000 psf. These allowable bearing pressures are for total dead loads and frequently applied live loads, and can be increased by one-third for short duration wind and seismic loads. Where applicable, a modulus of subgrade reaction of 450 pci may be used for design of footings/pads or any structures founded on this Formation.

All continuous footings should be reinforced with top and bottom reinforcing steel to provide structural continuity and to permit spanning of local irregularities. It is essential that we observe tank pad and footing excavations before reinforcing steel is placed.

3.4.3 Lateral Load Resistance: Lateral (horizontal) loads on foundations may be resisted by both frictional resistance along the base of the footing and passive resistance in properly compacted fill adjacent to the sides of footings. Frictional resistance between the base of footings poured (cast) directly on native rock or aggregate base may be computed using a coefficient of friction of 0.35, or 35-percent of sustained dead loads. Passive resistance may be computed using an equivalent fluid pressure of 300 pounds-per-cubic-foot (pcf) for undisturbed Pauba and/or new properly compacted fill. Passive pressure should not exceed 3,000 psf. These values may be increased by one-third when considering wind and seismic forces. Both friction and passive values have already been reduced by a factor-of-safety of 1.5, and can be used in combination.

3.4.4 Settlement Estimates: Based on the tank hydrostatic pressures presented in Section 1.2 (< 2,500 psf) and bearing on native rock, the settlement is expected to be less-than (<) ½-inch at the center of the tank and on the order of ¼-inch to negligible at the edge/perimeter.

3.5 Lateral Pressures for Retaining Structures

The lateral earth pressures below are provided for the design permanent retaining structures/walls. Earth pressures provided are ultimate values and a safety factor should be applied as appropriate.

Table 2. Static Lateral Earth Pressures

Conditions	Equivalent Fluid Weight (pcf)		
	Level Backfill[2]	2:1 Slope Backfill	1.5:1 Slope Backfill
Active (cantilever)	35	55	70
At-Rest (braced)	50	75	95
Passive[3]	250	-	-

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Notes:
(1) Assumes drained condition
(2) Assumes a level condition behind and in front of wall foundation of project.
(3) Maximum passive pressure = 3,500 psf, level conditions.

Determination of appropriate design conditions (active or at-rest) depends on wall flexibility. If a rotation of more than 0.001 radian (0.06 degrees) is allowed, active pressure conditions apply; otherwise, at-rest condition governs.

Surcharge due to above grade loads on the wall backfill, such as traffic, should be considered in design of retaining walls. Vertical surcharge loads behind the retaining wall on or in the backfill within a 1:1 (horizontal:vertical) plane projection up and out from the retaining wall toe, should be considered as lateral and vertical surcharge. Unrestrained (cantilever) retaining walls should be designed to resist one-third of these surcharge loads applied as a uniform horizontal pressure on the wall. Braced walls should also be designed to resist an additional uniform horizontal-pressure equivalent to one-half of uniform vertical surcharge-loads.

Additional lateral earth pressures due to seismic shaking should also be considered in the design. In accordance with current engineering practices and research, an increment of lateral earth pressure equal to $14H^2$ where H is the height of the wall, may be applied at a distance of 0.5H above the toe of the wall. If the wall is restrained, the above increment of lateral earth pressure should be doubled. Under the combined effects of static and earthquake loads on the wall, a factor of safety between 1.1 and 1.2 is acceptable when evaluating the stability (sliding, overturning) of the wall (NAVFAC DM 7.2).

Where applicable, a coefficient of friction of 0.35 may be considered between the concrete/shotcrete walls and the backfill surrounding the tank to estimate downward drag forces.

3.6 Asphalt Paving for Driveway / Access Road

Pavement construction associated with the proposed access road should conform to latest version of *Caltrans Standard Specifications* or the *Standard Specifications for Public Works Construction* (Greenbook), and applicable County Standards. Based on design procedures outlined in the current Caltrans *Highway Design Manual*, recommended flexible (asphalt) pavement section is tabulated below for an assumed Traffic Index (TI) of 4.0 and R-value of 40.

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Table 3. Preliminary Asphalt Pavement Section

Traffic Index	Thickness (inches)	
	Asphalt Concrete	Class 2 Aggregate Base
4.0	3.0	4.0

Representative samples of the actual subgrade materials for R-value testing, during subgrade preparation or prior to pavement construction, can be performed to refine this pavement design. An appropriate Traffic Index (TI) should be selected or verified by the project Civil Engineer prior to finalizing this pavement section design, based on anticipated truck traffic. This TI is based on only light auto and pickup-truck traffic.

Pavement subgrade soils should be prepared in accordance with Section 3.1 above. The Aggregate Base (AB) should be compacted to a minimum of 95 percent relative compaction (modified Proctor, ASTM D 1557). Aggregate base may be waived is asphalt concrete is placed directly on granitic rock.

3.7 Soil Corrosivity

3.7.1 Sulfate Attack: Sulfate ions in the soil can lower soil resistivity and can be highly aggressive to Portland cement concrete by combining chemically with certain constituents of the concrete, principally tricalcium aluminate. This reaction is accompanied by expansion and eventual disruption of the concrete matrix. Potentially high sulfate content could also cause corrosion of the reinforcing steel in concrete. The table below summarizes current standards for concrete exposed to sulfate-containing solutions:

Table 4. Sulfate Concentration and Sulfate Exposure

Sulfate In Water (parts-per-million)	Water-Soluble Sulfate (SO4) in soil (percentage by weight)	Sulfate Exposure
0-150	0.00 - 0.10	Negligible
150-1,500	0.10 - 0.20	Moderate (Seawater)
1,500-10,000	0.20 - 2.00	Severe
>10,000	Over 2.00	Very Severe

3.7.2 Ferrous Corrosivity: Many factors can affect corrosion potential of soil including soil moisture content, resistivity, permeability and pH, as well as chloride and sulfate concentration. In general, soil resistivity, which is a measure of how easily electrical current flows through soils, is the most influential factor. Based on the findings of studies presented in ASTM STP 1013 titled “Effects of Soil

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Characteristics on Corrosion" (February, 1989), the relationship between soil resistivity and soil corrosiveness was developed as tabulated below:

Table 5. Relationship between Soil Resistivity and Soil Corrosivity

Soil Resistivity (ohm-cm)	Classification of Soil Corrosiveness
0 to 900	Very Severely Corrosive
900 to 2,300	Severely Corrosive
2,300 to 5,000	Moderately Corrosive
5,000 to 10,000	Mildly Corrosive
10,000 to >100,000	Very Mildly Corrosive

Acidity is an important factor of soil corrosivity. The lower the pH (the more acidic the environment), the higher the soil corrosivity will be with respect to buried metallic structures and utilities. As soil pH increases above 7 (the neutral value), the soil is increasingly more alkaline and less corrosive to buried steel structures, due to protective surface films, which form on steel in high pH environments. Chloride and sulfate ion concentrations, and pH appear to play secondary roles in affecting corrosion potential. High chloride levels tend to reduce soil resistivity and break down otherwise protective surface deposits, which can result in corrosion of buried steel or reinforced concrete structures.

3.7.3 Soil Corrosivity Test Results Summary: As a preliminary screening process for sulfates in soils, we have performed laboratory tests on a representative surface soil-sample. As summarized in Table 6 (below), our laboratory test results indicated negligible concentration of soluble sulfates. No special measures to mitigate sulfate exposure are recommended based on the test results. Import soils (if any) should also be tested for sulfate content.

Based on minimum-resistivity laboratory test results, the onsite soil is generally considered very mildly-corrosive to ferrous metals. Ferrous pipe can be protected by polyethylene bags, tape or coatings, di-electric fittings, concrete encasement or other means to separate the pipe from wet onsite clayey soils. Further testing of import and possibly site soil corrosivity could be performed and specific recommendations for corrosion protection may need to be provided by a qualified corrosion engineer.

Table 6. Soil Corrosivity Test Results Summary

Boring Number	Sample Depth (feet)	Sulfate Content (ppm)	Chloride Content (ppm)	pH	Resistivity (ohm-cm)
S-1	0 to 1	**111**	**20**	6.7	13,000

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4.0 CONSTRUCTION CONSIDERATIONS

4.1 Trench Excavations

Based on our field observations, caving of cohesionless and sandy soils will likely be encountered in unshored trench excavations. To protect workers entering excavations, excavations should be performed in accordance with OSHA and Cal-OSHA requirements, and the current edition of the California Construction Safety Orders, see:

http://www.dir.ca.gov/title8/sb4a6.html

Contractors should be advised that fill and cohesionless alluvial/colluvial soils should be considered Type C soils as defined in the California Construction Safety Orders. As such, excavations less-than (<) 20 feet deep within Type C soils should be sloped back no steeper than 1½:1 (horizontal:vertical), where workers are to enter the excavation. Weathered rock within upper 10 feet BGS may be classified as OSHA soil Type A. Therefore, unshored temporary cut slopes should be no steeper than ¾:1 (horizontal:vertical), for a height no-greater-than (≤) 10 feet. These recommended temporary cut slopes assume a level ground surface for a distance equal to one-and-a-half (x1.5) the depth of excavation. However, unshored excavations may be impractical near adjacent existing utilities and structures; so shoring may still be required depending on trench locations.

During construction, soil conditions should be regularly evaluated to verify that conditions are as anticipated. The contractor is responsible for providing the "competent person" required by OSHA standards to evaluate soil conditions. Close coordination between the competent person and Leighton. should be maintained to facilitate construction while providing safe excavations.

4.2 Temporary Trench Shoring

Typical cantilever shoring can be designed based on the active equivalent fluid pressure of 33 pounds-per-cubic-foot (pcf) where there is no adverse bedding. If excavations are braced at the top and at specific depth intervals, then braced earth pressure may be approximated by a uniform rectangular soil pressure distribution. This uniform pressure expressed in pounds-per-square-foot (psf), may be assumed to be 20 multiplied by H for design, where H is equal to the depth of the

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excavation being shored, in feet. These recommendations are valid only for trenches not exceeding 10-feet in depth at this site.

4.3 Geotechnical Services during Construction

Our geotechnical recommendations presented in this report are based on subsurface conditions as interpreted from limited subsurface explorations and limited geotechnical laboratory testing. Our geotechnical recommendations provided in this report are based on information available at the time the report was prepared and may change as plans are developed. Additional geotechnical exploration, testing and/or analysis may be required based on final plans. Leighton and Associates, Inc. should review site grading, foundation and shoring (if any) plans when available, to comment further on geotechnical aspects of this project and check to see general conformance of final project plans to recommendations presented in this report.

Leighton and Associates, Inc. should be retained to provide geotechnical observation and testing during excavation and all phases of earthwork. Our conclusions and recommendations should be reviewed and verified by us during construction and revised accordingly if geotechnical conditions encountered vary from our findings and interpretations. Geotechnical observation and testing should be provided:

- During all cut excavation,
- During compaction of all fill materials,
- After excavation of all footings and prior to placement of concrete,
- During utility trench backfilling and compaction,
- During pavement subgrade and base preparation (if any), and/or
- If and when any unusual geotechnical/geologic conditions are encountered.

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5.0 LIMITATIONS

This report was necessarily based in part upon data obtained from a limited number of observances, site visits, soil samples, tests, analyses, histories of occurrences, spaced subsurface explorations and limited information on historical events and observations. Such information is necessarily incomplete. The nature of many sites is such that differing characteristics can be experienced within small distances and under various climatic conditions. Changes in subsurface conditions can and do occur over time. This exploration was performed with the understanding that this subject site is proposed for development as described in Section 1.2 of this report. Please refer to Appendix E, ASFE's *Important Information About Your Geotechnical Report*, prepared by the Associated Soil and Foundation Engineers (ASFE) presenting additional information and limitations regarding geotechnical engineering studies and reports.

This report was prepared for Richland Communities, Inc. based on their needs, directions and requirements at the time of our exploration. This report is not authorized for use by, and is not to be relied upon by any party except Richland Communities, Inc., and their successors and assigns, with whom Leighton has contracted for the work. Use of or reliance on this report by any other party is at that party's risk. Unauthorized use of or reliance on this report constitutes an agreement to defend and indemnify Leighton from and against any liability which may arise as a result of such use or reliance, regardless of any fault, negligence, or strict liability of Leighton.

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Aerial Photos Reviewed:

3-12-99 C135 – 39 – 135-136

9-11-97 C116 – 39 – 46-47

10-4-95 CAP – 125-127

1-30-95 C104 – 39 – 10

2-2-93 C86 – 39 – 13

10-12-90 90205 – 125-126

7-30-86 86084

6-14-83 83045 – 101

12-14-79 79274 – 161A

5-15-67 2HH – 191-192

5-15-67 3HH – 20

5-23-49 9F – 124-125

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APPENDIX A

Current Study Laboratory Test Results

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TESTS for SULFATE CONTENT
CHLORIDE CONTENT and pH of SOILS

Project Name: Golden Meadows TR31194 Tank Geo Tested By : M. Vinet Date: 02/22/21

Project No. : 11813.002 Data Input By: M. Vinet Date: 02/23/21

Boring No.	S-1			
Sample No.	S-1			
Sample Depth (ft)	0 - 1.0			
Soil Identification:	Poorly Graded Sand with Silt (SP-SM)			
Wet Weight of Soil + Container (g)	100.00			
Dry Weight of Soil + Container (g)	100.00			
Weight of Container (g)	0.00			
Moisture Content (%)	0.00			
Weight of Soaked Soil (g)	100.00			

SULFATE CONTENT, DOT California Test 417, Part II

Beaker No.	1			
Crucible No.	1			
Furnace Temperature (°C)	850			
Time In / Time Out	Timer			
Duration of Combustion (min)	45			
Wt. of Crucible + Residue (g)	25.1122			
Wt. of Crucible (g)	25.1095			
Wt. of Residue (g) (A)	0.0027			
PPM of Sulfate (A) x 41150	111.11			
PPM of Sulfate, Dry Weight Basis	**111**			

CHLORIDE CONTENT, DOT California Test 422

ml of Extract For Titration (B)	30			
ml of AgNO3 Soln. Used in Titration (C)	0.4			
PPM of Chloride (C -0.2) * 100 * 30 / B	20			
PPM of Chloride, Dry Wt. Basis	**20**			

pH TEST, DOT California Test 643

pH Value	**6.70**			
Temperature °C	21.0			

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SOIL RESISTIVITY TEST

DOT CA TEST 643

Project Name:	Golden Meadows TR31194 Tank Geo		Tested By :	M. Vinet	Date: 02/22/21
Project No. :	11813.002		Data Input By:	M. Vinet	Date: 02/23/21
Boring No.:	S-1		Depth (ft.) :	0 - 1.0	
Sample No. :	S-1				

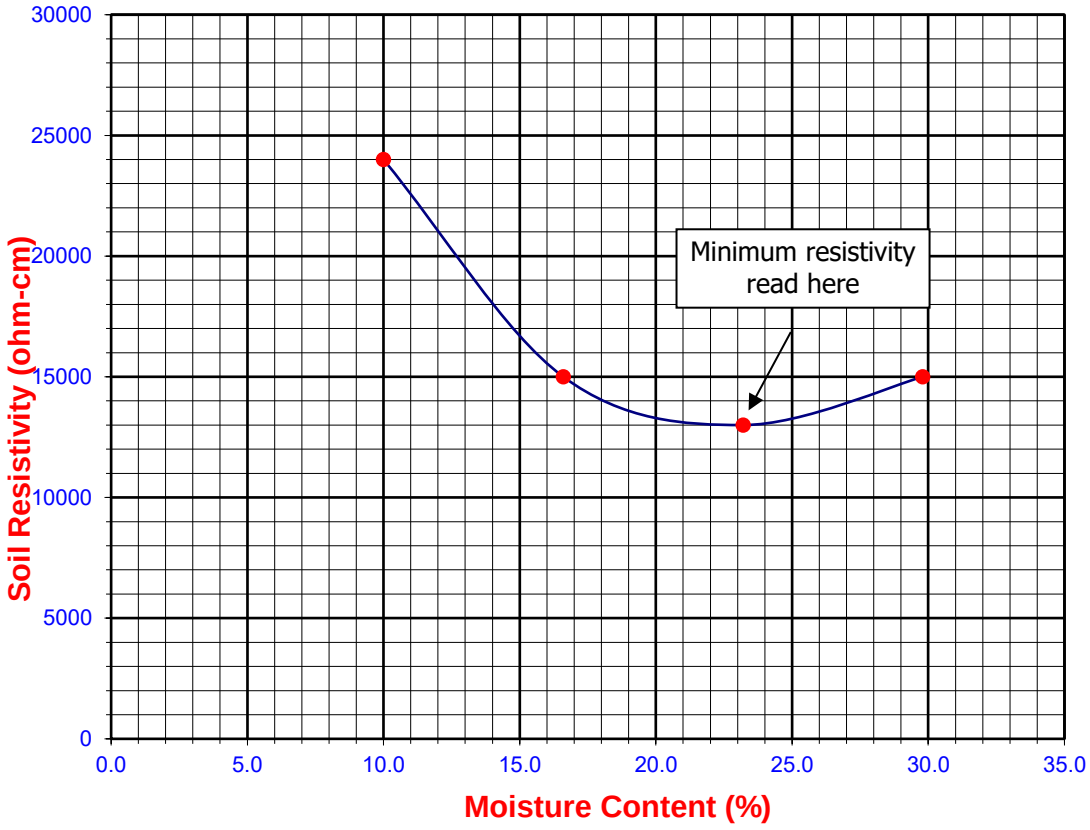
Soil Identification:* Poorly Graded Sand with Silt (SP-SM)

*California Test 643 requires soil specimens to consist only of portions of samples passing through the No. 8 US Standard Sieve before resistivity testing. Therefore, this test method may not be representative for coarser materials.

Specimen No.	Water Added (ml) (Wa)	Adjusted Moisture Content (MC)	Resistance Reading (ohm)	Soil Resistivity (ohm-cm)
1	50	10.00	24000	24000
2	83	16.60	15000	15000
3	116	23.20	13000	13000
4	149	29.80	15000	15000
5				

Moisture Content (%) (MCi)	0.00
Wet Wt. of Soil + Cont. (g)	100.00
Dry Wt. of Soil + Cont. (g)	100.00
Wt. of Container (g)	0.00
Container No.	A
Initial Soil Wt. (g) (Wt)	500.00
Box Constant	1.000
MC =(((1+Mci/100)x(Wa/Wt+1))-1)x100	

Min. Resistivity (ohm-cm)	Moisture Content (%)	Sulfate Content (ppm)	Chloride Content (ppm)	Soil pH	
				pH	Temp. (°C)
DOT CA Test 643		DOT CA Test 417 Part II	DOT CA Test 422	DOT CA Test 643	
13000	**23.2**	**111**	**20**	**6.70**	**21.0**



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EXPANSION INDEX of SOILS

ASTM D 4829

Project Name:	Golden Meadows TR31194 Tank Geo	Tested By:	M. Vinet	Date:	2/18/21
Project No. :	11813.002	Checked By:	M. Vinet	Date:	2/19/21
Boring No.:	S-1	Depth:	0 - 1.0		
Sample No. :	S-1	Location:	N/A		
Sample Description:	Poorly Graded Sand with Silt (SP-SM), Olive Brown.				

Dry Wt. of Soil + Cont. (gm.)	3350.7
Wt. of Container No. (gm.)	0.0
Dry Wt. of Soil (gm.)	3350.7
Weight Soil Retained on #4 Sieve	124.3
Percent Passing # 4	96.3

MOLDED SPECIMEN	Before Test	After Test
Specimen Diameter (in.)	4.01	4.01
Specimen Height (in.)	1.0000	0.9935
Wt. Comp. Soil + Mold (gm.)	590.0	619.8
Wt. of Mold (gm.)	200.0	200.0
Specific Gravity (Assumed)	2.70	2.70
Container No.	11	11
Wet Wt. of Soil + Cont. (gm.)	627.8	619.8
Dry Wt. of Soil + Cont. (gm.)	599.3	352.9
Wt. of Container (gm.)	327.8	200.0
Moisture Content (%)	10.5	18.9
Wet Density (pcf)	117.6	127.5
Dry Density (pcf)	106.5	107.2
Void Ratio	0.584	0.573
Total Porosity	0.368	0.364
Pore Volume (cc)	76.3	74.9
Degree of Saturation (%) [S meas]	**48.6**	**89.2**

SPECIMEN INUNDATION in distilled water for the period of 24 h or expansion rate < 0.0002 in./h.

Date	Time	Pressure (psi)	Elapsed Time (min.)	Dial Readings (in.)
2/18/21	11:30	1.0	0	0.5000
2/18/21	11:40	1.0	10	0.5000
	Add Distilled Water to the Specimen			
2/19/21	7:00	1.0	1160	0.4935
2/19/21	8:00	1.0	1220	0.4935

Expansion Index (EI meas) = ((Final Rdg - Initial Rdg) / Initial Thick.) x 1000	-6.5
Expansion Index (Report) = Nearest Whole Number or Zero (0) if Initial Height is > than Final Height	**0**

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APPENDIX B

Seismic Refraction Survey

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SEISMIC REFRACTION STUDY

GOLDEN MEADOWS TANK EXPLORATION

Menifee, California

PREPARED FOR:

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PREPARED BY:

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March 9, 2021

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March 9, 2021

Atlas No. 121058SWG
Report No. 1

MR. JEFFERY DELAND
LEIGHTON & ASSOCIATES, INC.
17781 COWAN
IRVINE, CA 92614

Subject: Seismic Refraction Study
Golden Meadows Tank Exploration
Menifee, California

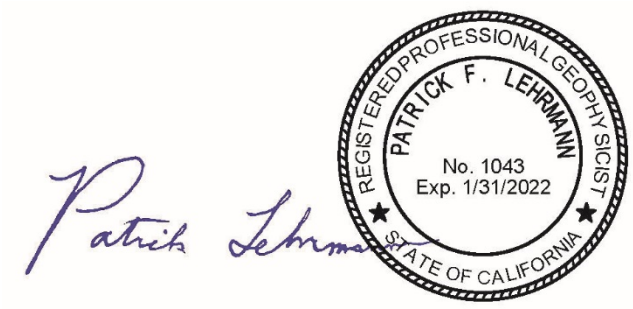
Dear Mr. Deland:

In accordance with your authorization, Atlas Technical Consultants has performed a seismic refraction study pertaining to the Golden Meadows Tank Exploration project located in Menifee, California. Specifically, our evaluation consisted of performing four seismic P-wave refraction traverses at the project site. The purpose of our evaluation was to develop subsurface velocity profiles of the study areas in order to assess the depth to bedrock and apparent rippability of the subsurface materials. Our field services were conducted on February 17th, 2021. This data report presents our methodology, equipment used, analysis, and results.

If you have any questions, please call us at 619.280.4321.

Respectfully submitted,
Atlas Technical Consultants LLC





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Senior Staff Geophysicist

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Principal Geologist/Geophysicist

ECA:PFL:ds

Distribution: Mr. Jeffery DeLand at @leightongroup.com

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6. RESULTS AND CONCLUSIONS 3
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Figure 4b P-Wave Profile (SL-2)
Figure 4c P-Wave Profile (SL-3)
Figure 4d P-Wave Profile (SL-4)

1. INTRODUCTION

In accordance with your authorization, Atlas Technical Consultants has performed an additional seismic refraction study pertaining to the Golden Meadows Tank Exploration project located in Menifee, California (Figure 1). Specifically, our evaluation consisted of performing four seismic P-wave refraction traverses at the project site. The purpose of our evaluation was to develop subsurface velocity profiles of the study areas in order to assess the depth to bedrock and apparent rippability of the subsurface materials. Our field services were conducted on February 17th, 2021. This data report presents our methodology, equipment used, analysis, and results.

2. SCOPE OF SERVICES

Our scope of services included:

- Performance of four seismic P-wave refraction traverses at the project site.
- Compilation and analysis of the data collected.
- Preparation of this data report presenting our results and conclusions.

3. SITE AND PROJECT DESCRIPTION

The project site is generally located west of State Route 215 and east of State Route 15 in Menifee, California (Figure 1). Specifically, the seismic traverses are located at the termination of Garbani Road along the southern slope of the adjacent hill. The seismic traverses were performed over slight to moderately steep terrain. Granite outcrops were present throughout the study areas. The study site was marked by dry, knee-high brush throughout. Figures 2 and 3 depict the general site conditions in the areas of the seismic traverses.

Based on our discussions with you, it is our understanding that new construction activities are proposed at the site and the results of our study may be used for the design and construction parameters pertaining to the project.

4. STUDY METHODOLOGY

A seismic P-wave (compression wave) refraction study was conducted at the project site to evaluate the rippability characteristics of the subsurface materials and to develop subsurface velocity profiles of the area studied. The seismic refraction method uses first-arrival times of refracted seismic waves to estimate the thicknesses and seismic velocities of subsurface layers. Seismic P-waves generated at the surface, using a hammer and plate, are refracted at boundaries separating materials of contrasting velocities. These refracted seismic waves are then detected by a series of surface vertical component 14.5-Hz geophones and recorded with a 24-channel Geometrics Geode seismograph. The travel times of the seismic P-waves are used in conjunction with the shot-to-geophone distances to obtain thickness and velocity information on the subsurface materials.

Four seismic traverses (SL-1 and SL-4) were conducted in the study area. The general locations and lengths of the lines were determined by surface conditions, site access, and depth of investigation. Shot points (signal generation locations) were conducted along the lines at the ends, midpoint, and intermediate points between the ends and the midpoint.

The seismic refraction theory requires that subsurface velocities increase with depth. A layer having a velocity lower than that of the layer above will not generally be detectable by the seismic refraction method and, therefore, could lead to errors in the depth calculations of subsequent layers. In addition, lateral variations in velocity, such as those caused by core stones, intrusions, or boulders can also result in the misinterpretation of the subsurface conditions. In general, the effective depth of evaluation for a seismic refraction traverse is approximately one-third to one-fifth of the length of the spread.

In general, the seismic P-wave velocity of a material can be correlated to rippability (see Table 1 below), or to some degree "hardness." Table 1 is based on published information from the Caterpillar Performance Handbook (Caterpillar, 2018), as well as our experience with similar materials, and assumes that a Caterpillar D-9 dozer ripping with a single shank is used. We emphasize that the cutoffs in this classification scheme are approximate and that rock characteristic, such as fracture spacing and orientation, play a significant role in determining rock quality or rippability. The rippability of a mass is also dependent on the excavation equipment used and the skill and experience of the equipment operator.

For trenching operations**,** the rippability values should be scaled downward. For example, velocities as low as 3,500 feet/second may indicate difficult ripping during trenching operations. In addition, the presence of boulders, which can be troublesome in narrow trenching operations, should be anticipated.

Table 1 – Rippability Classification

Seismic P-wave Velocity	Rippability
0 to 2,000 feet/second	Easy
2,000 to 4,000 feet/second	Moderate
4,000 to 5,500 feet/second	Difficult, Possible Blasting
5,500 to 7,000 feet/second	Very Difficult, Probable Blasting
Greater than 7,000 feet/second	Blasting Generally Required

It should be noted that the rippability cutoffs presented in Table 1 are slightly more conservative than those published in the Caterpillar Performance Handbook. Accordingly, the above classification scheme should be used with discretion, and contractors should not be relieved of making their own independent evaluation of the rippability of the on-site materials prior to submitting their bids.

5. DATA ANALYSIS

The collected data was processed using SIPwin (Rimrock Geophysics, 2003), a seismic interpretation program, and analyzed using SeisOpt Pro (Optim, 2008). SeisOpt Pro uses first arrival picks and elevation data to produce subsurface velocity models through a nonlinear optimization technique called adaptive simulated annealing. The resulting velocity model provides a tomography image of the estimated geologic conditions. Both vertical and lateral velocity information is contained in the tomography model. Changes in layer velocity are revealed as gradients rather than discrete contacts, which typically are more representative of actual conditions.

6. RESULTS AND CONCLUSIONS

As previously indicated, four seismic traverses were conducted as part of our study. Figures 4a, 4b, 4c, and 4d present the velocity models generated from our analysis. Based on the results, it appears the project site is underlain by moderately low-velocity materials in the very near-surface and higher velocity materials in the shallow surface. Distinct vertical and lateral velocity variations are evident in the models. Moreover, the degree of weathering and the depth to possible bedrock varies across the study area.

Based on the refraction results, variability in the excavatability (including depth of rippability) of the subsurface materials should be expected across the project areas. In addition, oversized materials should be expected. A contractor with excavation experience in similarly difficult conditions should be consulted for expert advice on excavation methodology, equipment, and production rate.

7. LIMITATIONS

The field evaluation and geophysical analyses presented in this report have been conducted in general accordance with current practice and the standard of care exercised by consultants performing similar tasks in the project area. No warranty, express or implied, is made regarding the conclusions, recommendations, and opinions presented in this report. There is no evaluation detailed enough to reveal every subsurface condition. Variations may exist and conditions not observed or described in this report may be present. Uncertainties relative to subsurface conditions can be reduced through additional subsurface exploration. Additional subsurface surveying will be performed upon request.

This document is intended to be used only in its entirety. No portion of the document, by itself, is designed to completely represent any aspect of the project described herein. Atlas should be contacted if the reader requires additional information or has questions regarding the content, interpretations presented, or completeness of this document. This report is intended exclusively for use by the client. Any use or reuse of the findings, conclusions, and/or recommendations of this report by parties other than the client is undertaken at said parties' sole risk.

8. SELECTED REFERENCES

Caterpillar, Inc., 2018, Caterpillar Performance Handbook, Edition 48, Caterpillar, Inc., Peoria, Illinois.

Mooney, H.M., 1976, Handbook of Engineering Geophysics, dated February.

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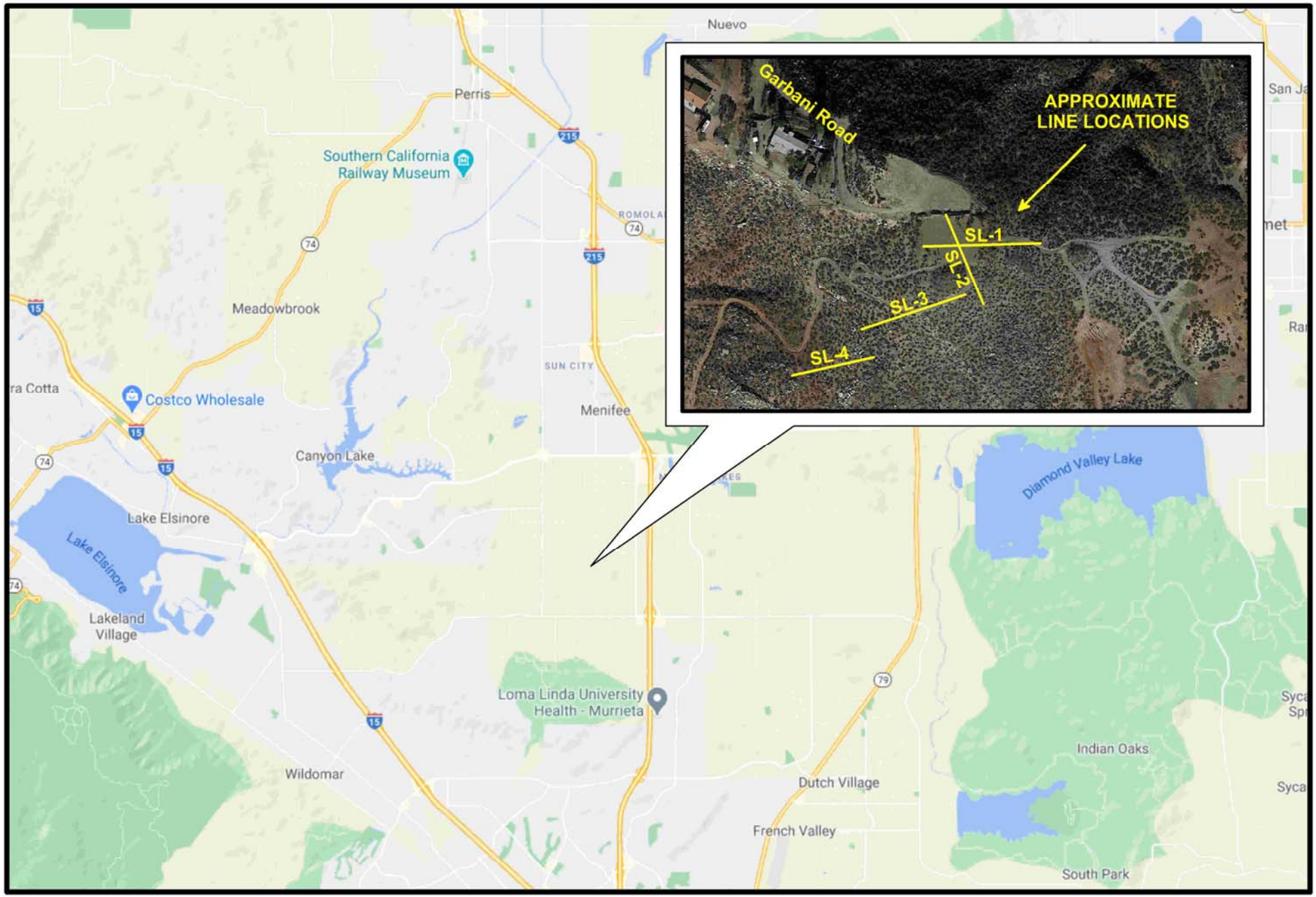
Telford, W.M., Geldart, L.P., Sheriff, R.E., and Keys, D.A., 1976, Applied Geophysics, Cambridge University Pres.



SITE LOCATION MAP

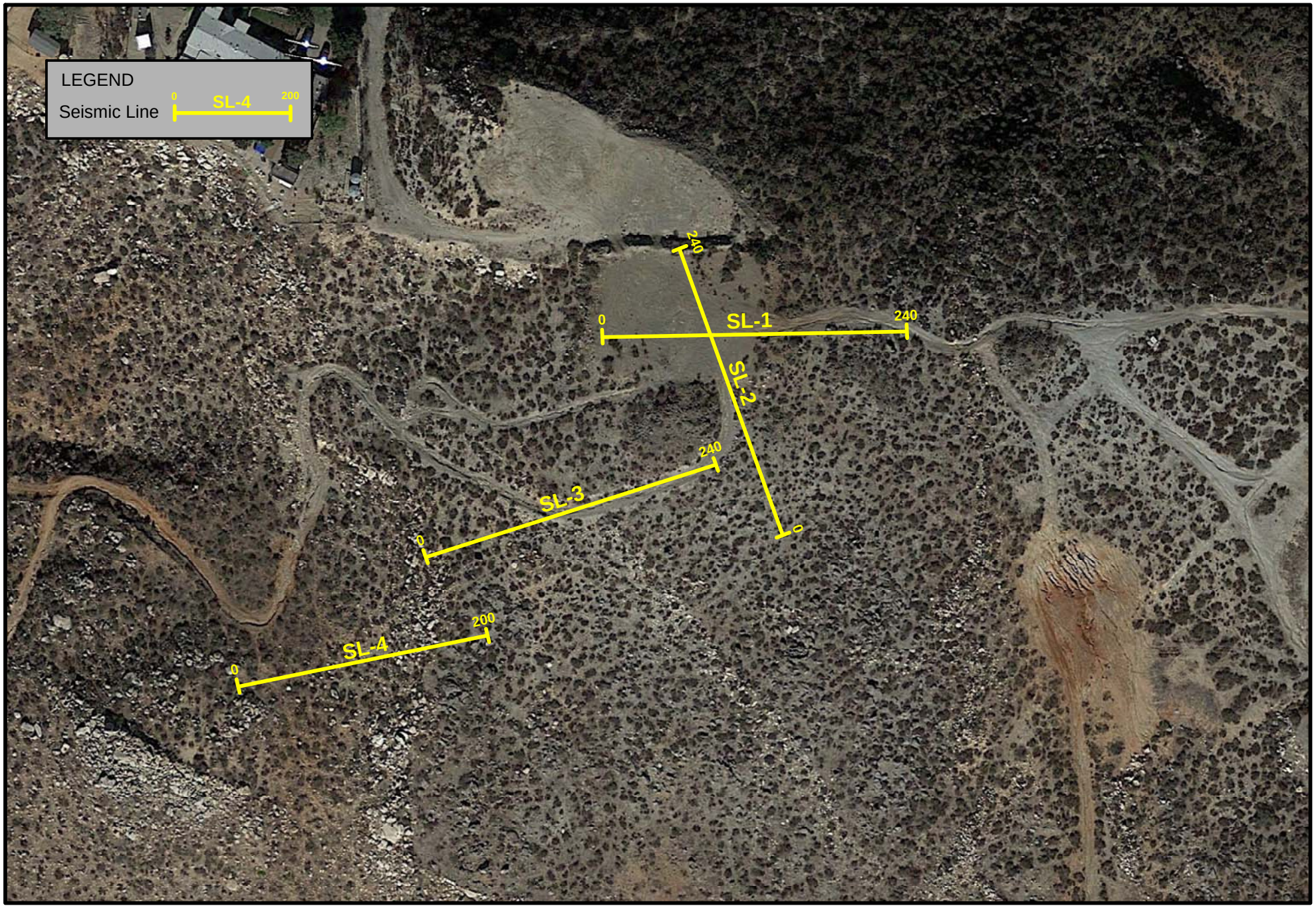
N

Golden Meadows Tank Exploration
Menifee, California

Project No.: 121058SWG | Date: 03/21

ATLAS

Figure 1



SEISMIC LINE LOCATION MAP

N

Golden Meadows Tank Exploration
Menifee, California

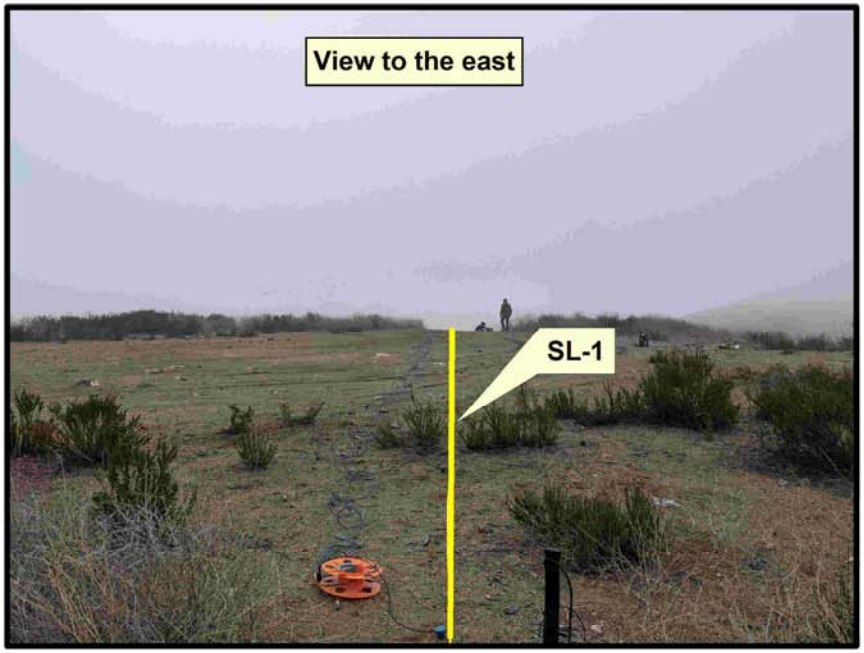
Project No.: 121058SWG | Date: 03/21

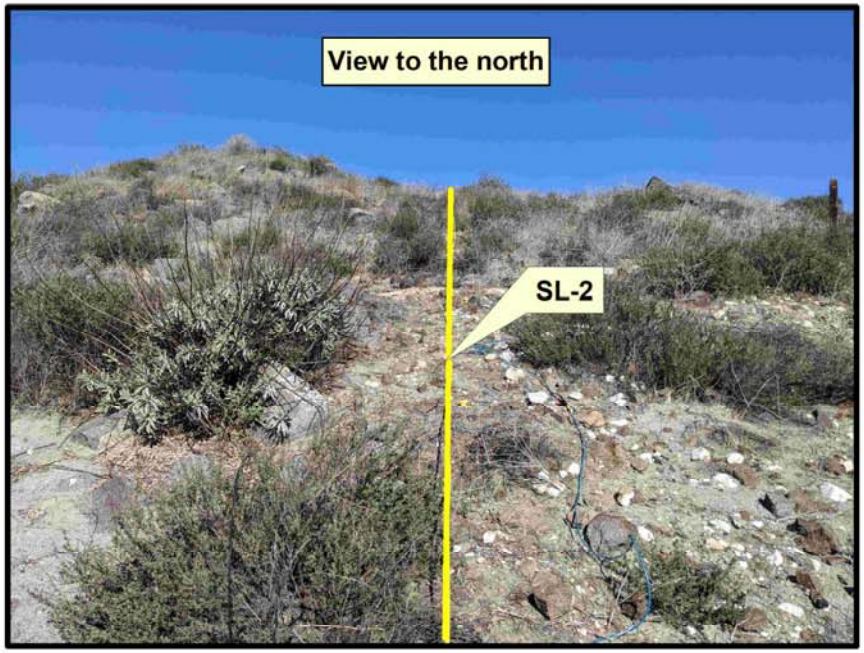
ATLAS

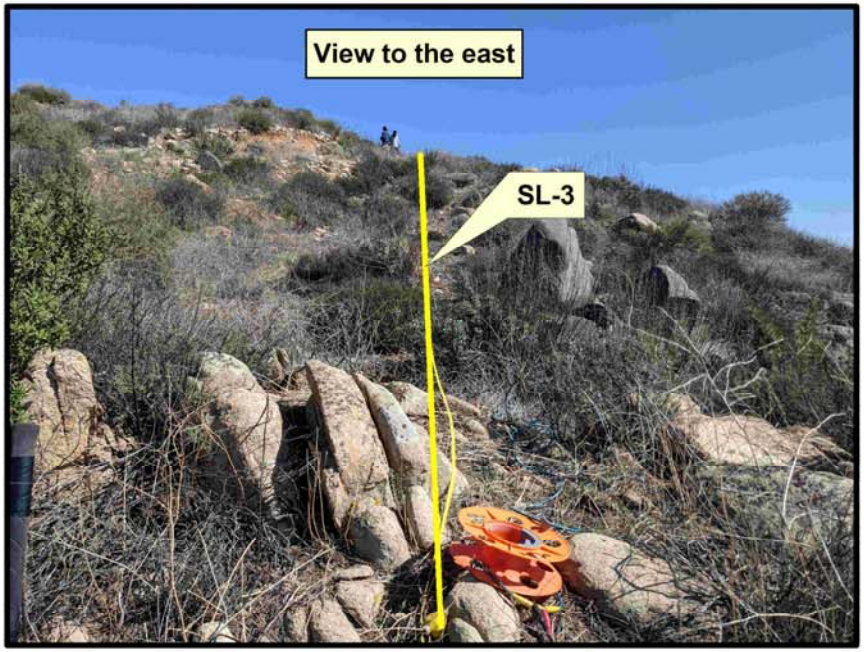
Figure 2

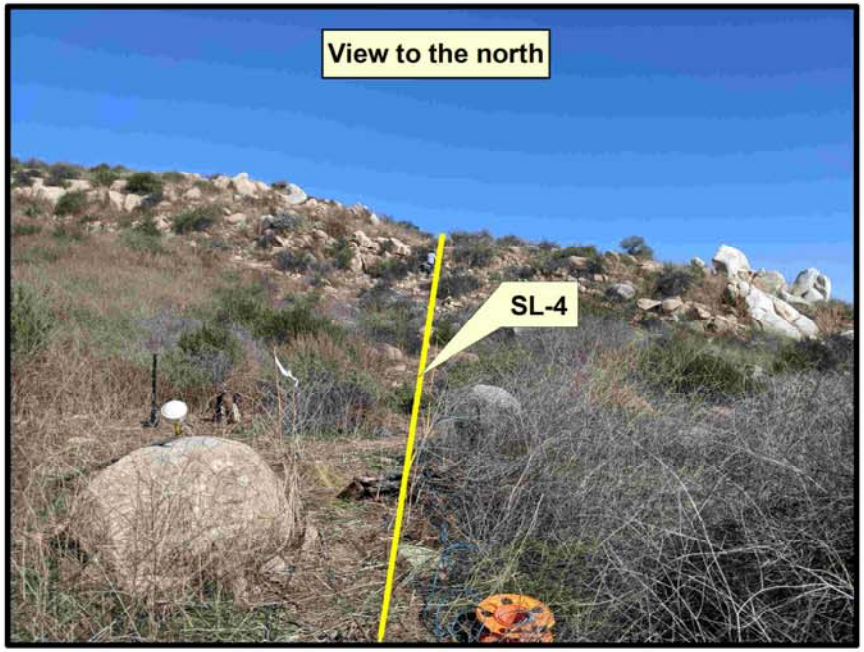
0 100 200

approximate scale in feet









SITE PHOTOGRAPHS

Golden Meadows Tank Exploration
Menifee, California

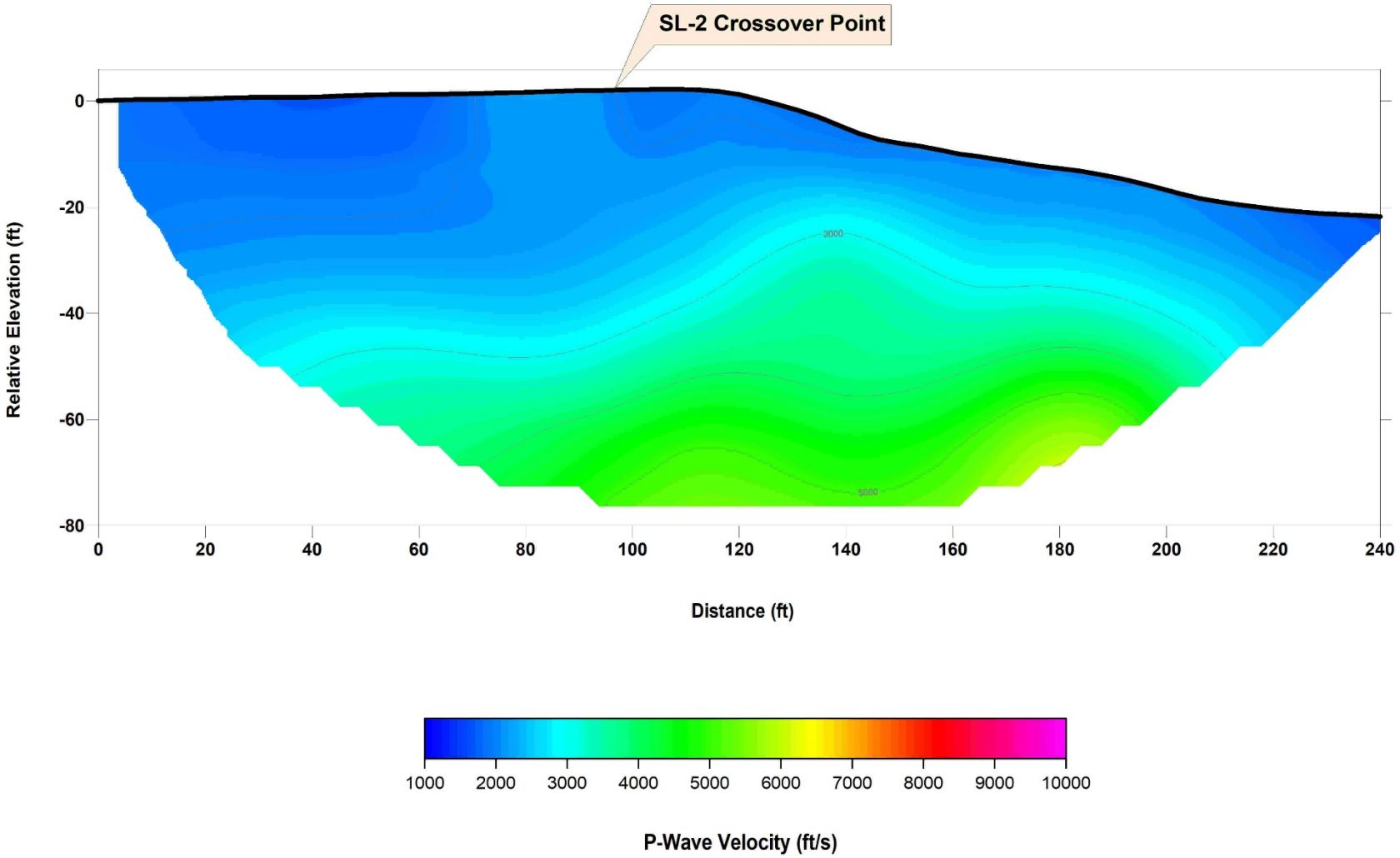
Project No.: 121058SWG | Date: 03/21

ATLAS

Figure 3

TOMOGRAPHY MODEL

SL-1

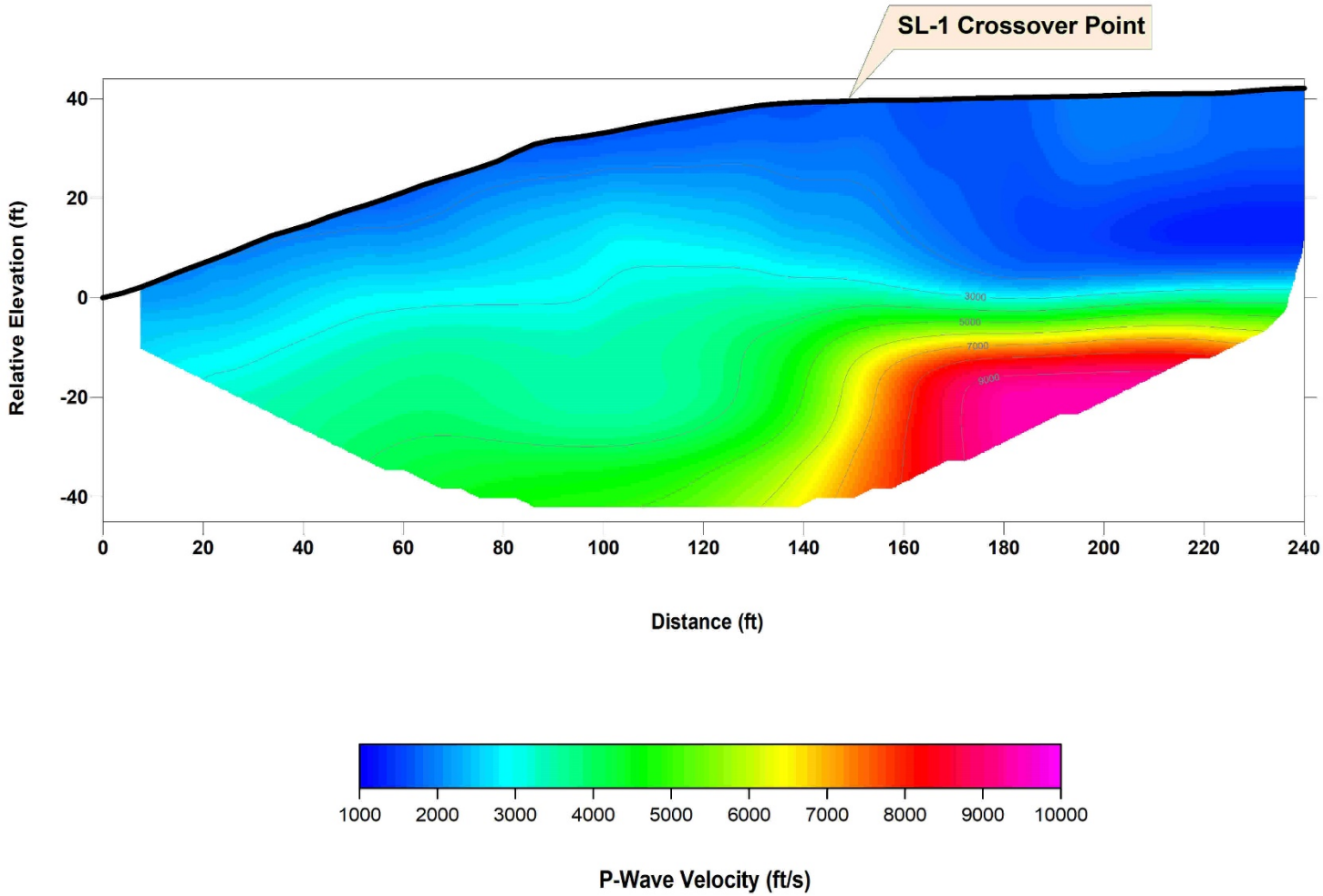


SEISMIC PROFILE SL-1	Golden Meadows Tank Exploration Menifee, California	ATLAS Figure 4a
	Project No.: 121058SWG | Date: 03/21	

Note: Contour Interval = 1,000 feet per second

TOMOGRAPHY MODEL

SL-2

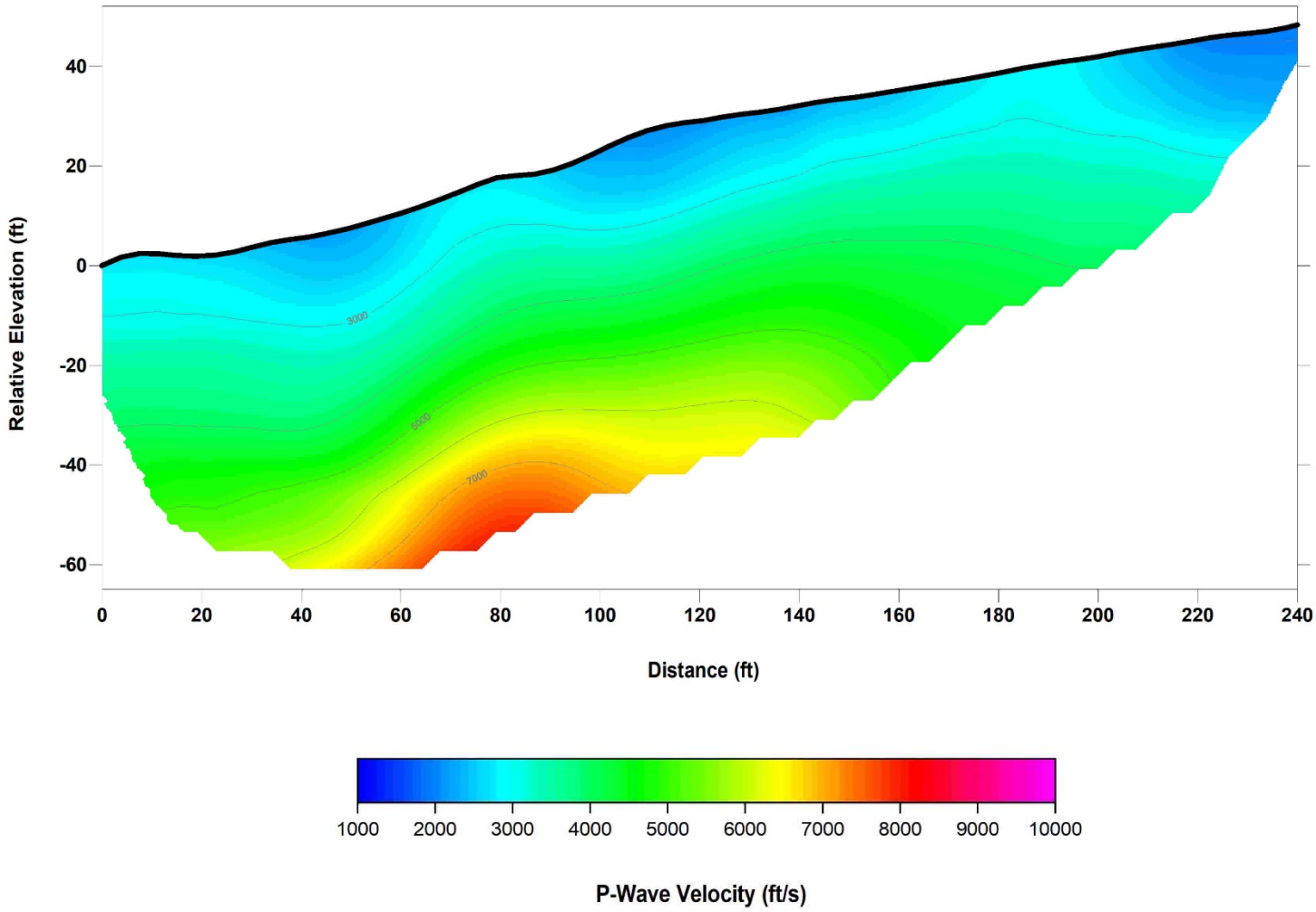


SEISMIC PROFILE SL-2	Golden Meadows Tank Exploration Menifee, California Project No.: 121058SWG | Date: 03/21	ATLAS Figure 4b

Note: Contour Interval = 1,000 feet per second

TOMOGRAPHY MODEL

SL-3

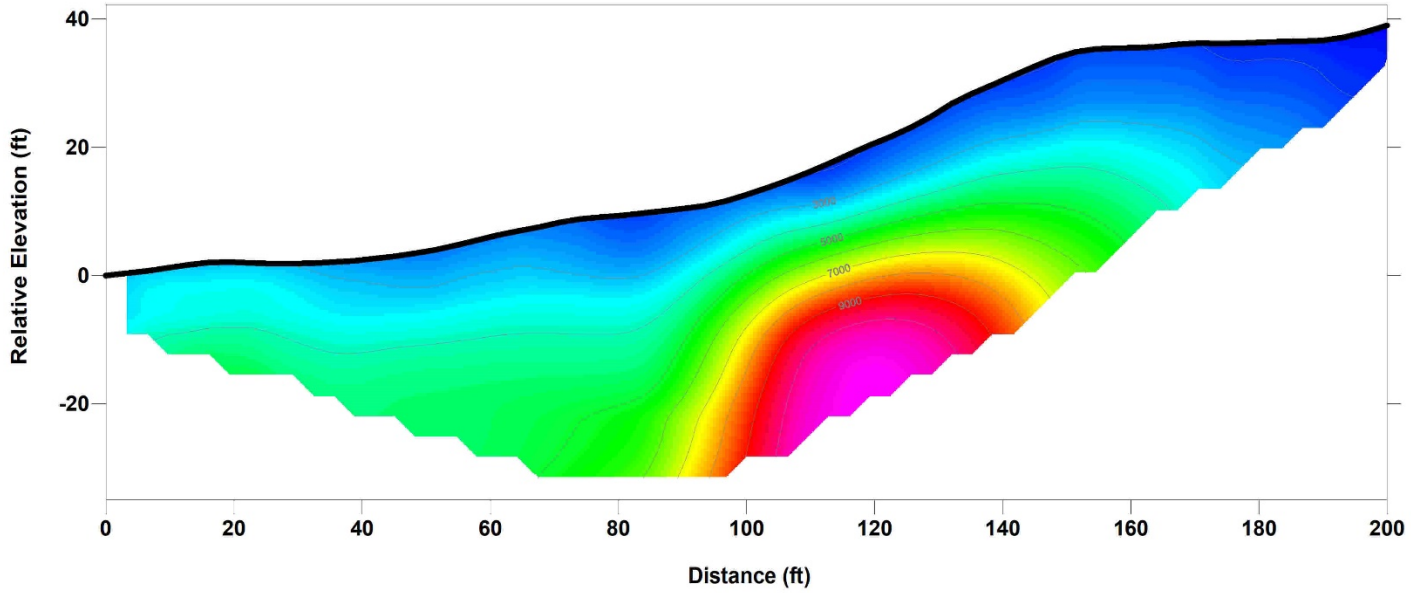


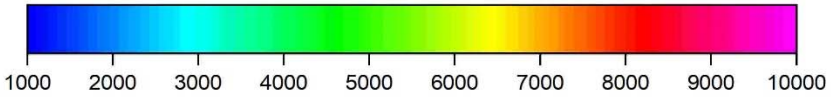
SEISMIC PROFILE SL-3	Golden Meadows Tank Exploration Menifee, California	ATLAS Figure 4c
	Project No.: 121058SWG | Date: 03/21	

Note: Contour Interval = 1,000 feet per second

TOMOGRAPHY MODEL

SL-4





SEISMIC PROFILE SL-4	Golden Meadows Tank Exploration Menifee, California	ATLAS Figure 4d
	Project No.: 121058SWG | Date: 03/21	

Note: Contour Interval = 1,000 feet per second

APPENDIX C

Site-Specific Seismic Coefficients

Leighton and Associates, Inc.
A LEIGHTON GROUP COMPANY

October 9, 2017

Project No. 11813.001

RICHLAND PLANNED COMMUNITIES, INC
3161 Michelson Drive, Suite 425
Irvine, California 92612

Attention: Mr. Brian Hardy

Subject: Results of Onsite Percolation/Infiltration Testing
Proposed Storm Water Infiltration Basins
Golden Meadows, Tract 31194-1, -2, &-3
City of Menifee, Riverside County, California

References: *Design Handbook for Low Impact Development Best Management Practices, Riverside County Flood Control and Water Conservation District (District), dated September 2011.*

Rough Grading Plan for TR. No. 31194-1, TR. No. 31194-2, TR. No. 31194-3, TR. No. 31194, Golden Meadows, Sheet 16, by Hunsaker and Associates, (undated).

Geotechnical Review of Rough Grading Plans, Tract 31194, Menifee, County of Riverside, California, by Leighton and Associates, Inc., PN. 110712-002, dated January 30, 2004.

In accordance with your request and authorization, we are pleased to provide this report presenting the results of field percolation testing for the proposed storm water infiltration basins associated with the subject Tract. The location of field tests was primarily dictated by Hunsaker and Associates, Inc.

PURPOSE AND SCOPE OF WORK

The purpose of our testing was to determine the infiltration rates of onsite soils with respect to the proposed storm water retention basins as depicted on the referenced rough grading plans. Services provided for this study consisted of the following:

- Drilling, sampling and logging of one exploratory boring within the proposed storm water basin area.

- Field percolation testing at 3 locations within the basin location in accordance with the procedures outlined in District's Design Handbook, referenced above. One test was performed at approximately 12 inches bgs and one at approximately 5 feet bgs in the cut area of the basin. One additional percolation/infiltration test was performed at a depth of 9 feet to verify permeability of underlying bedrock.
- Compilation of this report that presents the results of our field percolation/infiltration testing.

SITE DESCRIPTION

The proposed residential development (Tract 31194) is located southeast of Evans Road and Garbani Road in Menifee, California. The site is generally undeveloped and appeared to be used for agricultural purposes.

Topographically, the central and southeastern portions of the site are relatively flat lying while the northern region of the property is characterized by relatively steep hills. A small, northwest-trending drainage channel extends through the northwestern and central portion of the property. A rock knoll also exists near the southeast corner of the property. Site elevations range from approximately 1,720 feet above mean sea level (msl) in the northeastern corner of the site to approximately 1,500 feet (msl) at the northwestern portion of the site.

FIELD EXPLORATION

Our field exploration consisted of excavating one deep geotechnical boring and three percolation tests on October 4, 2017 utilizing a truck mounted CME 75 drill rig equipped with an 8-inch hollow-stem auger. The exploratory boring was logged and sampled to a minimum depth of 12 feet below existing surface (encountered refusal). Representative samples were collected for further field and laboratory classification. A staff geologist from our office logged and observed all excavations. The locations of the exploratory borings and percolation test holes are shown on Figure 1. The logs of the exploratory borings are included in Appendix A.

SOILS AND GROUNDWATER CONDITIONS

Based on the results of this exploration and review of our previous geotechnical investigation reports, the site is underlain by granitic bedrock which is in turn mantled with a variable thickness of alluvial deposits. Within the proposed storm water basin area,

granitic bedrock was encountered in our Boring LB-1 at depth of approximately 7 feet below ground surface. Based on this exploration and previous investigations it is our opinion that historic groundwater does not exist within 10 feet below bottom of basin.

TEST RESULTS

The percolation/infiltration tests were performed in accordance with the procedures of Section 2.3 of the Riverside County Flood Control and Water Conservation District Design Handbook (RCFC&WCD, 2011). Results reported below are the most conservative reading in minutes per inch drop. The infiltration rates were estimated using the "Porchet Method". Field test data are included in Appendix A.

Summary of Infiltration Test Results

Test Hole #	Ex. Ground Surface Elev. (ft)	Depth BGS (ft)	Infiltration Rate (in/hr)	Soil Description
P-1	1535	9.0	1.35	Well-graded Sand (SW)/ Decomposed Granitic Rock
P-2	1534.5	4.0	0.24	Silty sand (SM) Alluvium
P-3	1531.5	1.0	0.10	Silty sand (SM) / Alluvium

CONCLUSIONS AND RECOMMENDATIONS

Based on the above, we recommend that the proposed basins be sized/designed using an average infiltration rate of 0.12 in/hr if bottom of basin is at elevation 1530 to 1531. No factor of safety was applied to this recommended average infiltration rate.

LIMITATIONS

This report was based in part on data obtained from a limited number of observations, soil excavations, samples and tests. Such information is, by necessity, incomplete. The nature of many sites is such that differing soil or geologic conditions can be present within small distances and under varying climatic conditions. Changes in subsurface conditions can and do occur over time. Please notify the engineer if event conditions encountered during construction are different than those described or reflected in this report.

This report was prepared for the sole use of Client and their design team, for application to design of the proposed infiltration basins, in accordance with generally accepted geotechnical engineering practices at this time in California. In addition, since this is subject to review by Riverside County, we recommend that data in this report be only used in the design of this project after review and approval by County, where applicable. Any premature (before County approval) or unauthorized use of or reliance on this report constitutes an agreement to defend and indemnify Leighton from and against any liability which may arise as a result of such use or reliance, regardless of any fault, negligence, or strict liability of Leighton.

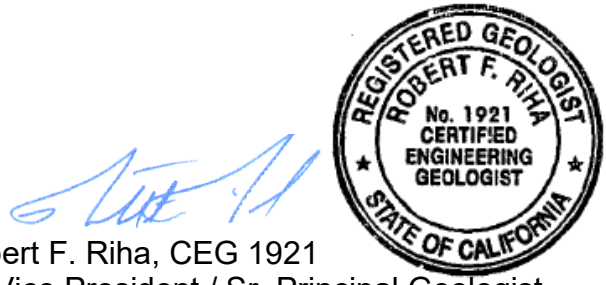
If you have any question, please do not hesitate to contact this office. We appreciate this opportunity to be of service.

Respectfully submitted,

LEIGHTON AND ASSOCIATES, INC.



Simon I. Saiid, GE 2641
Principal Engineer

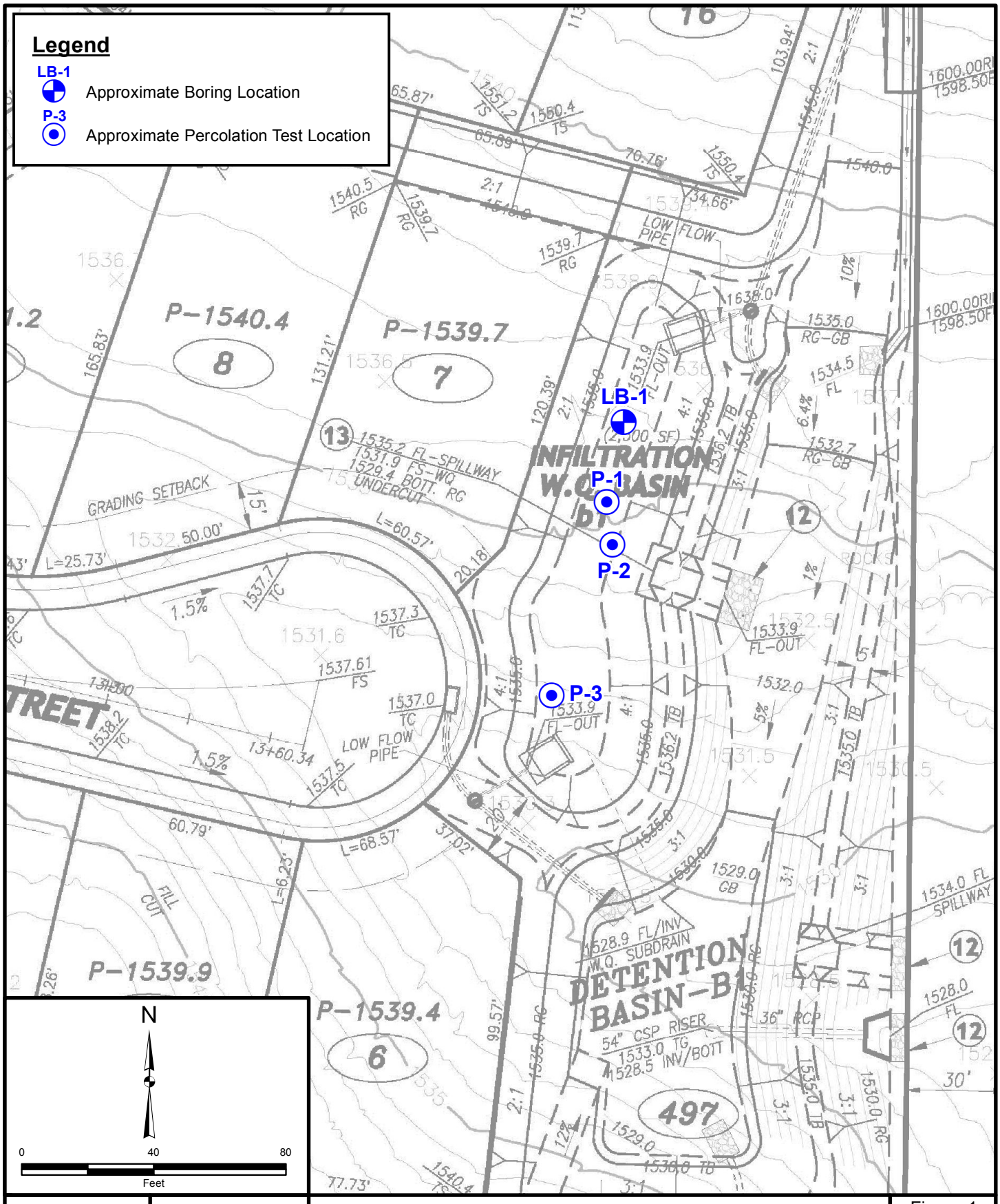


Robert F. Riha, CEG 1921
Sr. Vice President / Sr. Principal Geologist

Attachments: Figure 1 – Boring Location Plan
Appendix A – Perc Data Test Sheets & Log of Exploratory Borings

Distribution: (1) Addressee (one PDF copy via email)
(1) Hunsaker & Associates

Leighton



Project: 11813.001	Eng/Geol: SIS/RFR
Scale: 1 " = 40 '	Date: October 2017

Base Map: Bing Maps 2017
Thematic Information: Leighton
Author: (mmurphy)

BORING LOCATION MAP

Golden Meadows - Tract 31194
Richland Planned Communities
Menifee, California

Figure 1

Leighton

Map Saved as V:\Drafting\11813\001\Maps\11813-001_F02_BLM_2017-10-06.mxd on 10/9/2017 7:51:11 AM

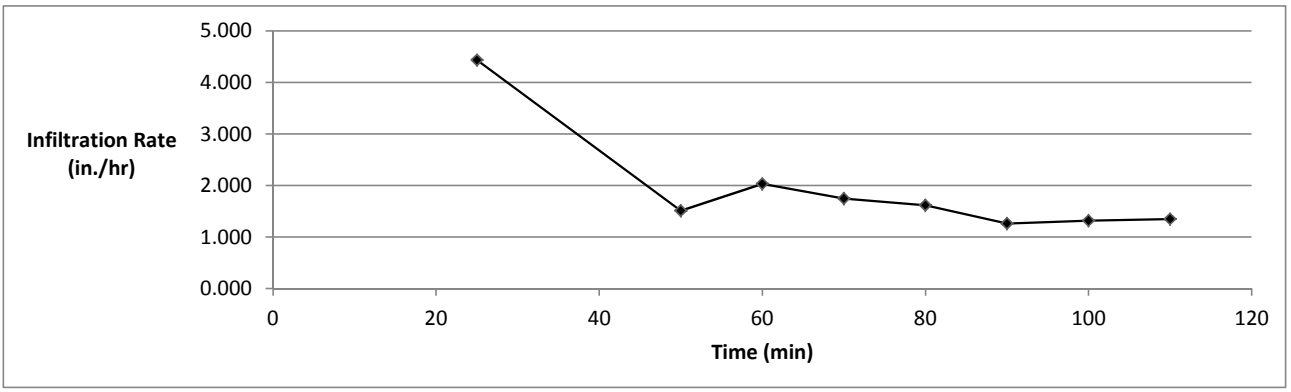
APPENDIX A

Percolation Data Sheets

Log of Exploratory Borings

Test Hole Number:	P-1	Project	Golden Meadows	
Date Excavated:	10/4/2017	Project Number	11813.001	
Tested by:	BSS	Date Tested	10/6/2017	
Soil Unit:	Granitic Bedrock (Kgr)	Depth of Test Hole (in.)	96	
USCS Soil Type:	Grayish Brown SAND with Silt	Diameter (in.)	8	Sunny ~90 °

Time	Δt (min)	Initial Water Depth (inches)	Final Water Depth (inches)	Change In Water Level (inches)	Infiltration/Percolation Rate	
					inches/hour*	minute/inch
8:18:00	25.00	69.50	87.50	18.00	4.431	1.389
8:48:00						
8:48:00	25.00	69.50	77.25	7.75	1.511	3.226
9:18:00						
9:18:00	10.00	74.00	77.75	3.75	2.034	2.667
9:48:00						
9:48:00	10.00	74.00	77.25	3.25	1.743	3.077
10:18:00						
10:18:00	10.00	74.25	77.25	3.00	1.618	3.333
10:48:00						
10:48:00	10.00	75.50	77.75	2.25	1.263	4.444
11:18:00						
11:18:00	10.00	74.00	76.50	2.50	1.319	4.000
11:48:00						
11:48:00	10.00	74.50	77.00	2.50	1.348	4.000
12:18:00						



* Based on Prochet Method

Percolation Test Data

P-1

Project Number: 11813.001

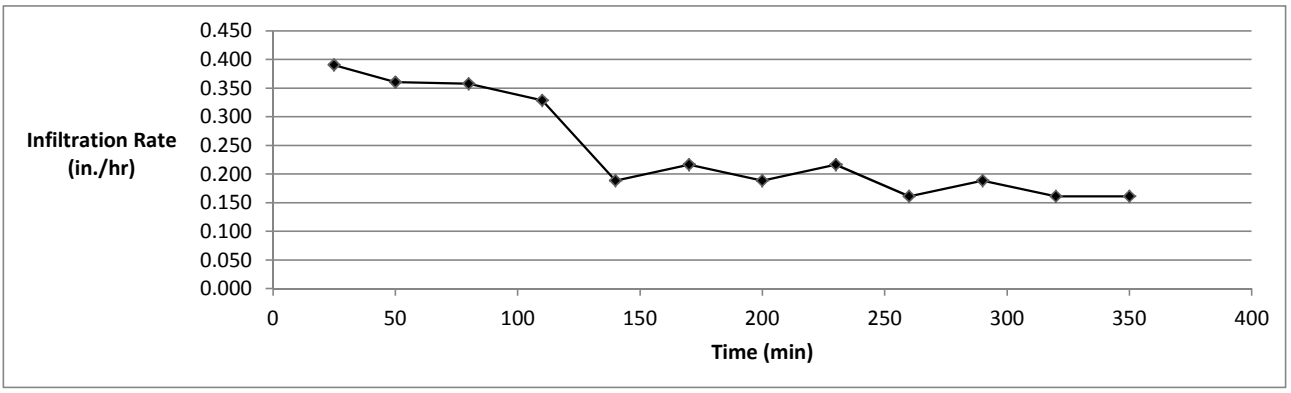
Project Name: *Golden Meadows*

Date: Oct-17

Leighton

Test Hole Number:	P-2	Project	Golden Meadows	
Date Excavated:	10/4/2017	Project Number	11813.001	
Tested by:	BSS	Date Tested	10/6/2017	
Soil Unit:	Alluvium (Qal)	Depth of Test Hole (in.)	48	
USCS Soil Type:	Brown Silty SAND	Diameter (in.)	8	Sunny ~90 °

Time	Δt (min)	Initial Water Depth (inches)	Final Water Depth (inches)	Change In Water Level (inches)	Infiltration/Percolation Rate	
					inches/hour*	minute/inch
9:22:00	25.00	18.00	20.50	2.50	0.390	10.000
9:47:00						
9:47:00	25.00	12.00	14.75	2.75	0.360	9.091
10:12:00						
10:12:00	30.00	12.00	15.25	3.25	0.357	9.231
10:42:00						
10:42:00	30.00	12.00	15.00	3.00	0.329	10.000
11:12:00						
11:12:00	30.00	12.00	13.75	1.75	0.189	17.143
11:42:00						
11:42:00	30.00	12.00	14.00	2.00	0.216	15.000
12:12:00						
12:12:00	30.00	12.00	13.75	1.75	0.189	17.143
12:42:00						
12:42:00	30.00	12.00	14.00	2.00	0.216	15.000
13:12:00						
13:12:00	30.00	12.00	13.50	1.50	0.161	20.000
13:42:00						
13:42:00	30.00	12.00	13.75	1.75	0.189	17.143
14:12:00						
14:12:00	30.00	12.00	13.50	1.50	0.161	20.000
14:42:00						
14:42:00	30.00	12.00	13.50	1.50	0.161	20.000
15:12:00						



* Based on Prochet Method

Percolation Test Data

P-2

Project Number: 11813.001

Project Name: *Golden Meadows*

Date: Oct-17

Leighton

Test Hole Number:	P-3	Project	Golden Meadows	
Date Excavated:	10/4/2017	Project Number	11813.001	
Tested by:	BSS	Date Tested	10/6/2017	
Soil Unit:	Alluvium (Qal)	Depth of Test Hole (in.)	12	
USCS Soil Type:	Brown Silty SAND	Diameter (in.)	8	Sunny ~90 °

Time	Δt (min)	Initial Water Depth (inches)	Final Water Depth (inches)	Change In Water Level (inches)	Infiltration/Percolation Rate	
					inches/hour*	minute/inch
9:24:00	25.00	0.00	1.00	1.00	0.356	25.000
9:49:00						
9:49:00	25.00	0.00	0.75	0.75	0.264	33.333
10:14:00						
10:14:00	30.00	0.00	0.75	0.75	0.220	40.000
10:44:00						
10:44:00	30.00	0.00	0.50	0.50	0.145	60.000
11:14:00						
11:14:00	30.00	0.00	0.50	0.50	0.145	60.000
11:44:00						
11:44:00	30.00	0.00	0.25	0.25	0.072	120.000
12:14:00						
12:14:00	30.00	0.00	0.25	0.25	0.072	120.000
12:44:00						
12:44:00	30.00	0.00	0.25	0.25	0.072	120.000
13:14:00						
13:14:00	30.00	0.00	0.00	0.00	0.000	N/A
13:44:00						
13:44:00	30.00	0.00	0.25	0.25	0.072	120.000
14:14:00						
14:14:00	30.00	0.00	0.00	0.00	0.000	N/A
14:44:00						
14:44:00	30.00	0.00	0.25	0.25	0.072	120.000
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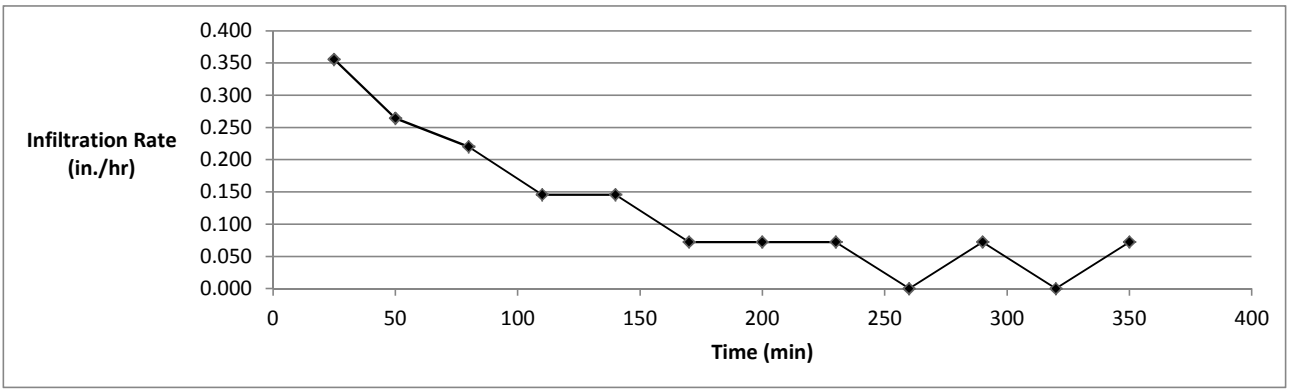


* Based on Prochet Method

Percolation Test Data

P-3

Project Number: 11813.001

Project Name: *Golden Meadows*

Date: Oct-17

Leighton

GEOTECHNICAL BORING LOG LB-1

Project No.	11813.001	**Date Drilled**	10-4-17
Project	Golden Meadows	**Logged By**	BSS
Drilling Co.	Martini Drilling	**Hole Diameter**	8"
Drilling Method	Hollow Stem Auger - 140lb - Automatic - 30" Drop	**Ground Elevation**	1535'
Location	See Figure 1	**Sampled By**	BSS

Elevation Feet	Depth Feet	Graphic Log (N / S)	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
1535	0			B-1				SM	**QUATERNARY ALLUVIUM (Qal)** SILTY SAND, medium dense, light brown, dry to moist, fine sand	
				R-1	16 50-6"				dense, reddish brown, moist, fine sand, porous	
1530	5			R-2	50-6"				SILTY SAND, very dense, olive brown, moist, fine to coarse sand, highly weathered rock	
									GRANITIC BEDROCK (Kgr) Difficult drilling	
1525	10			R-3	50-0.5"				Well-graded SAND with SILT, very dense, light olive brown, dry to moist, fine to coarse sand, (no recovery)	
									Drilled to 12' Sampled to 12' Groundwater not encountered Backfilled with soil cuttings (10/4/17)	
1520	15									
1515	20									
1510	25									
1505	30									

The Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.

SAMPLE TYPES:
- B BULK SAMPLE
- C CORE SAMPLE
- G GRAB SAMPLE
- R RING SAMPLE
- S SPLIT SPOON SAMPLE
- T TUBE SAMPLE

TYPE OF TESTS:

-200	% FINES PASSING	DS	DIRECT SHEAR	SA	SIEVE ANALYSIS
AL	ATTERBERG LIMITS	EI	EXPANSION INDEX	SE	SAND EQUIVALENT
CN	CONSOLIDATION	H	HYDROMETER	SG	SPECIFIC GRAVITY
CO	COLLAPSE	MD	MAXIMUM DENSITY	UC	UNCONFINED COMPRESSIVE STRENGTH
CR	CORROSION	PP	POCKET PENETROMETER		
CU	UNDRAINED TRIAXIAL	RV	R VALUE		



*** This log is a part of a report by Leighton and should not be used as a stand-alone document. ***

GEOTECHNICAL BORING LOG P-1

Project No.	11813.001	**Date Drilled**	10-4-17
Project	Golden Meadows	**Logged By**	BSS
Drilling Co.	Martini Drilling	**Hole Diameter**	8"
Drilling Method	Hollow Stem Auger - 140lb - Autohammer - 30" Drop	**Ground Elevation**	1535'
Location	See Figure 1	**Sampled By**	BSS

Elevation Feet	Depth Feet	Graphic Log (N S)	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
1535	0							SM	**QUATERNARY ALLUVIUM (Qal)** SILTY SAND, medium dense, reddish brown, dry to moist, fine to coarse grained sand	
1530	5							SP-SM	Poorly graded SAND with SILT, dense, light olive brown, dry to moist, fine to medium sand, formation	
									GRANITIC BEDROCK (Kgr) Hard drilling Well graded SAND, very dense, light brown, dry to moist, fine to coarse sand	
1525	10								Drilled to 9' Groundwater not encountered Backfilled with soil cuttings (10/4/17)	
1520	15									
1515	20									
1510	25									
1505	30									

SAMPLE TYPES:

B	BULK SAMPLE
C	CORE SAMPLE
G	GRAB SAMPLE
R	RING SAMPLE
S	SPLIT SPOON SAMPLE
T	TUBE SAMPLE

TYPE OF TESTS:

-200	% FINES PASSING	DS	DIRECT SHEAR	SA	SIEVE ANALYSIS
AL	ATTERBERG LIMITS	EI	EXPANSION INDEX	SE	SAND EQUIVALENT
CN	CONSOLIDATION	H	HYDROMETER	SG	SPECIFIC GRAVITY
CO	COLLAPSE	MD	MAXIMUM DENSITY	UC	UNCONFINED COMPRESSIVE STRENGTH
CR	CORROSION	PP	POCKET PENETROMETER		
CU	UNDRAINED TRIAXIAL	RV	R VALUE		

*** This log is a part of a report by Leighton and should not be used as a stand-alone document. ***

GEOTECHNICAL BORING LOG P-2

Project No.	11813.001	**Date Drilled**	10-4-17
Project	Golden Meadows	**Logged By**	BSS
Drilling Co.	Martini Drilling	**Hole Diameter**	8"
Drilling Method	Hollow Stem Auger - 140lb - Autohammer - 30" Drop	**Ground Elevation**	1534'
Location	See Figure 1	**Sampled By**	BSS

Elevation Feet	Depth Feet	Graphic Log	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
		N S							*This Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.*	
	0							SM	**QUATERNARY ALLUVIUM (Qal)** SILTY SAND, dense, brown, moist, fine sand	
1530										
	5								Drilled to 4' Groundwater not encountered Backfilled with soil cuttings (10/5/17)	
1525										
	10									
1520										
	15									
1515										
	20									
1510										
	25									
1505										
	30									

SAMPLE TYPES:

B	BULK SAMPLE
C	CORE SAMPLE
G	GRAB SAMPLE
R	RING SAMPLE
S	SPLIT SPOON SAMPLE
T	TUBE SAMPLE

TYPE OF TESTS:

-200	% FINES PASSING	DS	DIRECT SHEAR	SA	SIEVE ANALYSIS
AL	ATTERBERG LIMITS	EI	EXPANSION INDEX	SE	SAND EQUIVALENT
CN	CONSOLIDATION	H	HYDROMETER	SG	SPECIFIC GRAVITY
CO	COLLAPSE	MD	MAXIMUM DENSITY	UC	UNCONFINED COMPRESSIVE STRENGTH
CR	CORROSION	PP	POCKET PENETROMETER		
CU	UNDRAINED TRIAXIAL	RV	R VALUE		



*** This log is a part of a report by Leighton and should not be used as a stand-alone document. ***

GEOTECHNICAL BORING LOG P-3

Project No.	11813.001	**Date Drilled**	10-4-17
Project	Golden Meadows	**Logged By**	BSS
Drilling Co.	Martini Drilling	**Hole Diameter**	8"
Drilling Method	Hollow Stem Auger - 140lb - Autohammer - 30" Drop	**Ground Elevation**	1531'
Location	See Figure 1	**Sampled By**	BSS

Elevation Feet	Depth Feet	Graphic Log	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
		N S							*This Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.*	
1530	0							SM	**QUATERNARY ALLUVIUM (Qal)** SILTY SAND, loose, light brown, dry, fine sand	
									Total Depth 1' Groundwater not encountered Backfilled with soil cuttings (10/5/17)	
1525	5									
1520	10									
1515	15									
1510	20									
1505	25									
	30									

SAMPLE TYPES:

- B BULK SAMPLE
- C CORE SAMPLE
- G GRAB SAMPLE
- R RING SAMPLE
- S SPLIT SPOON SAMPLE
- T TUBE SAMPLE

TYPE OF TESTS:

- -200 % FINES PASSING
- AL ATTERBERG LIMITS
- CN CONSOLIDATION
- CO COLLAPSE
- CR CORROSION
- CU UNDRAINED TRIAXIAL
- DS DIRECT SHEAR
- EI EXPANSION INDEX
- H HYDROMETER
- MD MAXIMUM DENSITY
- PP POCKET PENETROMETER
- RV R VALUE
- SA SIEVE ANALYSIS
- SE SAND EQUIVALENT
- SG SPECIFIC GRAVITY
- UC UNCONFINED COMPRESSIVE STRENGTH



*** This log is a part of a report by Leighton and should not be used as a stand-alone document. ***

Leighton and Associates, Inc.
A LEIGHTON GROUP COMPANY

October 31, 2012

Project No. 110712-008

RICHLAND COMMUNITIES, INC
4100 NEWPORT PLACE DRIVE
Newport Beach, CA 92672

Attention: Mr. Mike Byer

Subject: Results of Onsite Percolation Testing
Proposed Storm Water Infiltration Basins
Golden Meadows, Tract 31194
City of Menifee, Riverside County, California

References: *Design Handbook for Low Impact Development Best Management Practices, Riverside County Flood Control and Water Conservation District (District), dated September 2011.*

Various Site/Drainage Plans, Tentative Tract 31194, by Hunsaker and Associates, (undated).

Geotechnical Review of Rough Grading Plans, Tract 31194, Menifee, County of Riverside, California, by Leighton and Associates, Inc., PN. 110712-002, dated January 30, 2004.

In accordance with your request and authorization, Leighton and Associates, Inc. (Leighton) is pleased to provide this report presenting the results of our percolation testing for the proposed storm water infiltration basins associated with the subject Tract. The location of field tests was primarily dedicated by Hunsaker and Associates Tentative Tract map, site accessibility and/or prevailing subsurface conditions during field testing.

PURPOSE AND SCOPE OF WORK

The purpose of our testing was to determine the infiltration rates of onsite soils with respect to the proposed storm water retention basins as depicted on the referenced rough grading plans. Services provided for this study consisted of the following:

- Drilling, sampling and logging of two exploratory borings within the proposed storm water basin areas.
- Field percolation testing at 4 locations within park site (Lot 488) and one location within park site/basin (Lot 487) in accordance with the procedures outlined in District's Design Handbook, referenced above.
- Compilation of this report that presents the results of our percolation/infiltration testing and laboratory test results.

SITE DESCRIPTION

The proposed residential development (Tract 31194) is located southeast of Evans Road and Garbani Road in Menifee, California. The site is generally undeveloped and appeared to be used for agricultural purposes.

Topographically, the central and southeastern portions of the site are relatively flat lying while the northern region of the property is characterized by relatively steep hills. A small, northwest-trending drainage channel extends through the northwestern and central portion of the property. A knoll also exists near the southeast corner of the property. Site elevations range from approximately 1,720 feet above mean sea level (msl) in the northeastern corner of the site to approximately 1,500 feet (msl) at the northwestern portion of the site.

SUBSURFACE INVESTIGATION

Our field investigation consisted of excavating two deep exploratory borings and five percolation tests on October 23, 2012 utilizing a truck mounted CME 75 drill rig equipped with an 8-inch hollow-stem auger. The exploratory borings were continuously logged to a minimum depth of 10 feet below bottom of the proposed storm water basins unless encountering refusal. Representative samples were collected for further field and laboratory classification. A staff geologist from our office logged and observed all excavations. The locations of the exploratory borings and percolation test holes are shown on Figure 2. The logs of the exploratory borings are included in Appendix A.

SOILS AND GROUNDWATER CONDITIONS

Based on the results of this study and review of our previous geotechnical investigation report referenced above, the site is underlain by granitic bedrock which is in turn mantled

with a variable thickness of alluvial deposits. Within Lot 488, alluvium was encountered in our Boring B-1 to a depth of approximately 8 feet below ground surface (BGS). These alluvial soils are classified as silty sand (SM) with gravel. Within Lot 487, the alluvium extends to a depth of approximately 11 feet BGS. Groundwater was not encountered in any of our borings or within a depth of 10 feet below bottom of either basin.

PERCOLATION TEST RESULTS

The percolation tests were performed in accordance with the procedures of Section 2.3 of the Riverside County Flood Control and Water Conservation District Design Handbook (RCFC&WCD, 2011). Results reported below are the most conservative reading in minutes per inch drop. The infiltration rates were estimated using the Prochet Method. Field test data are included in Appendix A.

Summary of Percolation/Infiltration Test Results

Location	Test Hole #	Ex. Ground Surface Elev. (ft)	Depth BGS (ft)	Percolation Rate (min/in)	Infiltration Rate (in/hr)	Soil Description
Lot 488	P-1	1523	9.0	42.9	0.12	Weathered Granitic Rock
	P-2	1527	9.5	9.1	0.67	Silty sand (SM) Alluvium/Rock
	P-3	1520	2.5	8.1	1.15	Silty sand (SM) / Alluvium/ Granitic Rock
	P-4	1518	2.5	4.2	2.14	Silty sand (SM) / Alluvium
Lot 487	P-5	1518	2.5	4.5	1.86	Clayey sand (SC) / Alluvium

CONCLUSIONS AND RECOMMENDATIONS

As summarized above, the locations tested appear suitable for onsite infiltration provided bottom of basins is within 3 feet of exiting ground surface (rates varying from 1.15 to 2.14 in/hr). The proposed "flow diversion" structures are likely to be embedded in weathered granitic rock (~9 to 10 feet BGS) and the infiltration rates should be expected to range from 0.12 to 0.67 in/hr based on tests P-1 and P-2.

Based on the above, we recommend that the proposed basins be sized/designed to allow for at least 5 feet of permeable alluvial soils to remain below the bottom of basins. As such, the bottom of basins at the locations tested should not extend more than 3 feet BGS.

LIMITATIONS

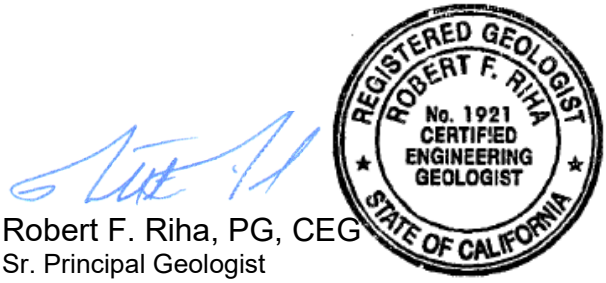
This report was based in part on data obtained from a limited number of observations, soil excavations, samples and tests. Such information is, by necessity, incomplete. The nature of many sites is such that differing soil or geologic conditions can be present within small distances and under varying climatic conditions. Changes in subsurface conditions can and do occur over time. Please notify the engineer if event conditions encountered during construction are different than those described or reflected in this report.

This report was prepared for the sole use of Client and their design team, for application to design of the proposed infiltration basins, in accordance with generally accepted geotechnical engineering practices at this time in California. In addition, since this is subject to review by Riverside County, we recommend that data in this report be only used in the design of this project after review and approval by County, where applicable. Any premature (before County approval) or unauthorized use of or reliance on this report constitutes an agreement to defend and indemnify Leighton from and against any liability which may arise as a result of such use or reliance, regardless of any fault, negligence, or strict liability of Leighton.

If you have any question, please do not hesitate to contact this office. We appreciate this opportunity to be of service.

Respectfully submitted,
LEIGHTON AND ASSOCIATES, INC.





Simon I. Saiid, PE, GE
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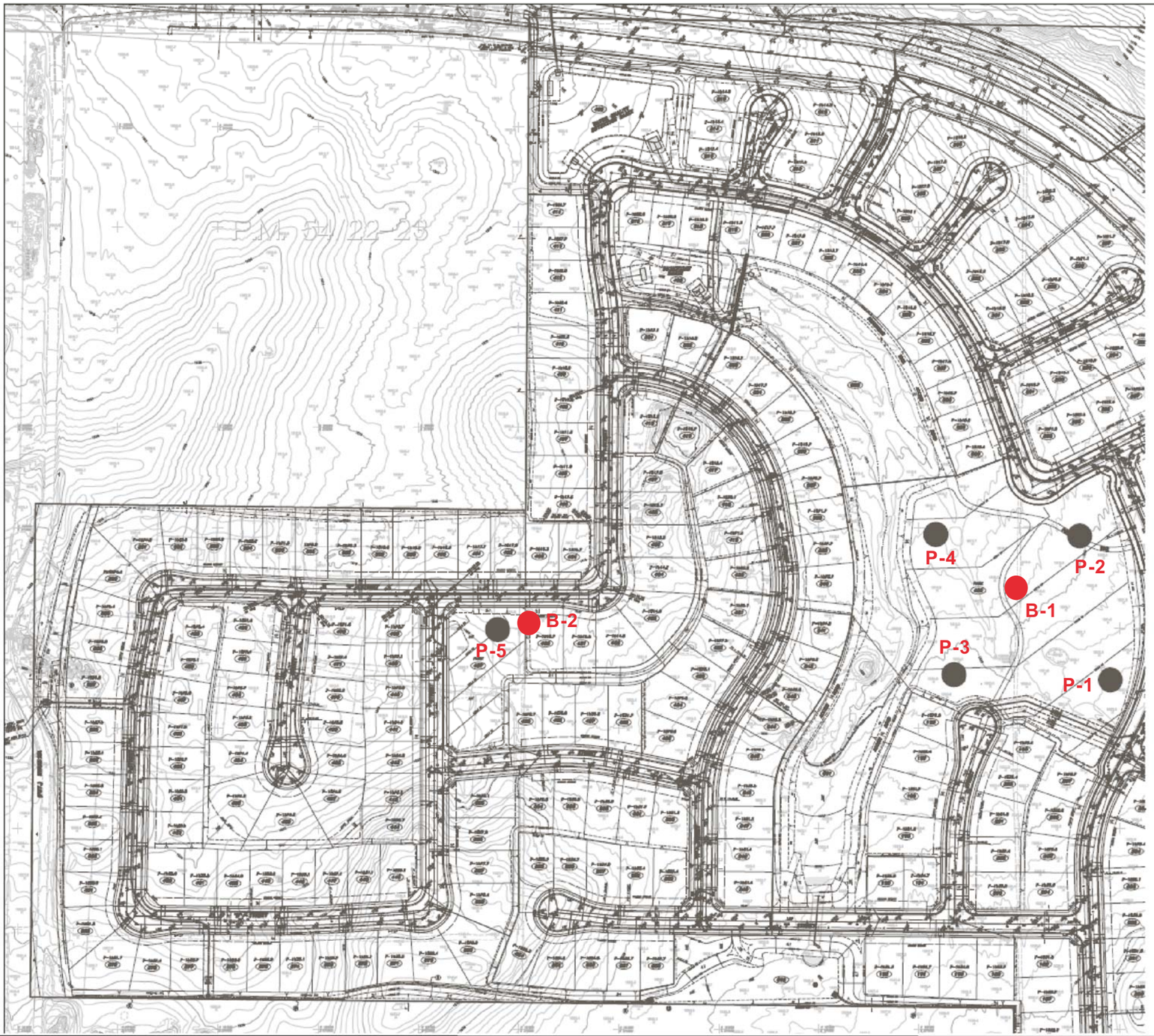
Sr. Principal Geologist
Extension 8914, rriha@leightongroup.com

Attachments: Figure 1 – Percolation Test Location Plan
Appendix A – Perc Data Test Sheets, Log of Exploratory Borings & Laboratory Test Results

Distribution: (1) Addressee (one PDF copy via email)
(2) Hunsaker & Associates, Attention: Ben Etemadi



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LEGEND:

B-2 ● Deep Boring Location

P-5 ● Percolation Test Location

Project: 110712-008	Eng/Geol: RFR/SIS
Scale: Not To Scale	Date: October 2012

Drafted by: BSS | Checked by: SIS | Base Map: Hunsaker & Associates

Site Plan
Golden Meadows
Tract 31194
Menifee, Riverside County, CA

FIGURE 1

Leighton

APPENDIX A

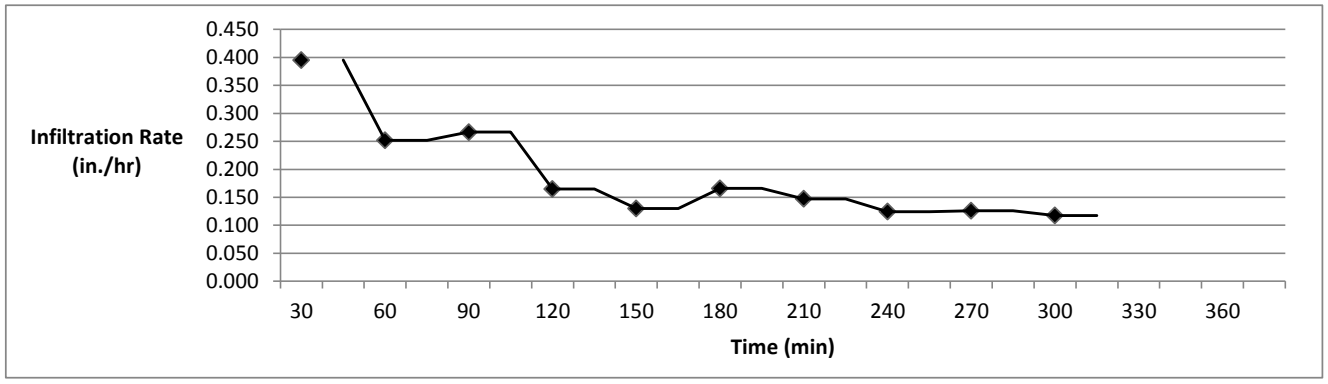
Percolation Data Sheets

Log of Exploratory Borings

Laboratory Test Results / Grain Size Analysis

Test Hole Number:	P-1	Project	Tract 31194	
Date Excavated:	10/23/2012	Project Number	110712-008	
Tested by:	BSS	Date Tested	10/24/2012	
Soil Unit:	Granitic Bedrock	Depth of Test Hole (in.)	108	Ex El ~1523' msl
USCS Soil Type:	Brown Silty Sand with Gravel	Diameter (in.)	9	Sunny ~65 °

Time	Δt (min)	Initial Water Depth (inches)	Final Water Depth (inches)	Change In Water Level (inches)	Infiltration/Percolation Rate	
					inches/hour*	minute/inch
10:32:00	30.00	86.30	84.10	2.20	0.395	13.636
11:02:00						
11:03:00	30.00	84.20	82.70	1.50	0.252	20.000
11:33:00						
11:33:00	30.00	87.30	85.90	1.40	0.266	21.429
12:03:00						
12:04:00	30.00	86.10	85.20	0.90	0.165	33.333
12:34:00						
12:35:00	30.00	86.40	85.70	0.70	0.130	42.857
1:05:00						
1:05:00	30.00	86.30	85.40	0.90	0.166	33.333
1:36:00						
1:36:00	30.00	86.20	85.40	0.80	0.147	37.500
2:06:00						
2:06:00	30.00	85.30	84.60	0.70	0.125	42.857
2:36:00						
2:37:00	30.00	85.60	84.90	0.70	0.126	42.857
3:07:00						
3:07:00	30.00	85.70	85.05	0.65	0.118	46.154
3:37:00						



* Based on Prochet Method

Percolation Test Data

Basin 1

P- 1

Project Number: 110712-008

Project Name: *Golden Meadows*

Date: Oct-12

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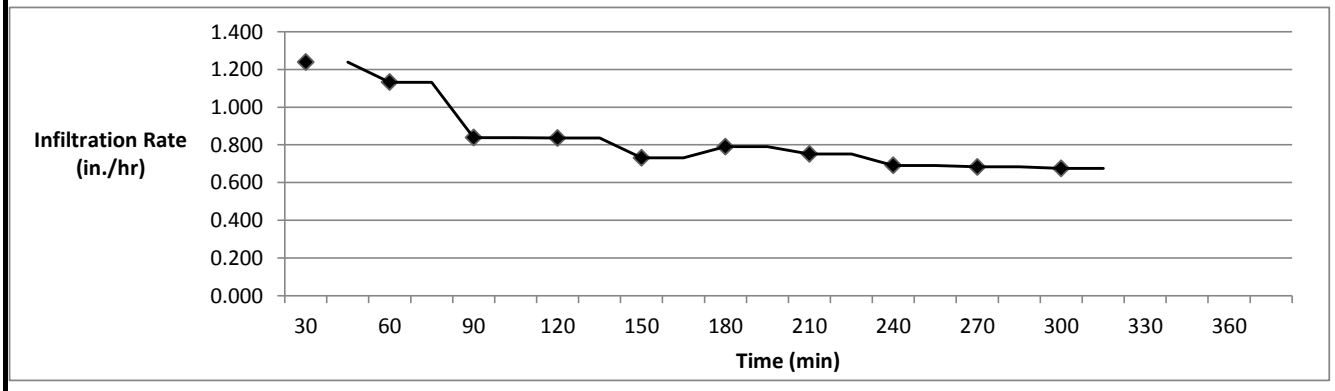
Test Hole Number:	P-2	Project	Tract 30972	
Date Excavated:	10/23/2012	Project Number	110712-008	
Tested by:	BSS	Date Tested	10/24/2012	
Soil Unit:	Alluvium (Qal)/Kgr	Depth of Test Hole (in.)	114	Ex El ~1520' msl
USCS Soil Type:	Dark Brown Silty Sand (SM)	Diameter (in.)	9	Sunny ~75 °

Time	Δt (min)	Initial Water Depth (inches)	Final Water Depth (inches)	Change In Water Level (inches)	Infiltration/Percolation Rate	
					Inches/hour*	minute/inch
10:20:00	30.00	96.20	89.80	6.40	1.239	4.688
10:50:00						
10:50:00	30.00	96.10	90.30	5.80	1.132	5.172
11:20:00						
11:22:00	30.00	96.30	92.20	4.10	0.839	7.317
11:52:00						
11:53:00	30.00	97.20	93.30	3.90	0.836	7.692
12:23:00						
12:24:00	30.00	95.30	91.60	3.70	0.730	8.108
12:54:00						
12:54:00	30.00	96.50	92.70	3.80	0.790	7.895
1:24:00						
1:25:00	30.00	96.50	92.90	3.60	0.752	8.333
1:55:00						
1:56:00	30.00	96.40	93.10	3.30	0.691	9.091
2:26:00						
2:27:00	30.00	96.45	93.20	3.25	0.683	9.231
2:57:00						
2:57:00	30.00	96.50	93.30	3.20	0.674	9.375
3:27:00						



*Based on Prochet Method

Percolation Test Data
Basin 1
P-2

Project Number: 110712-008

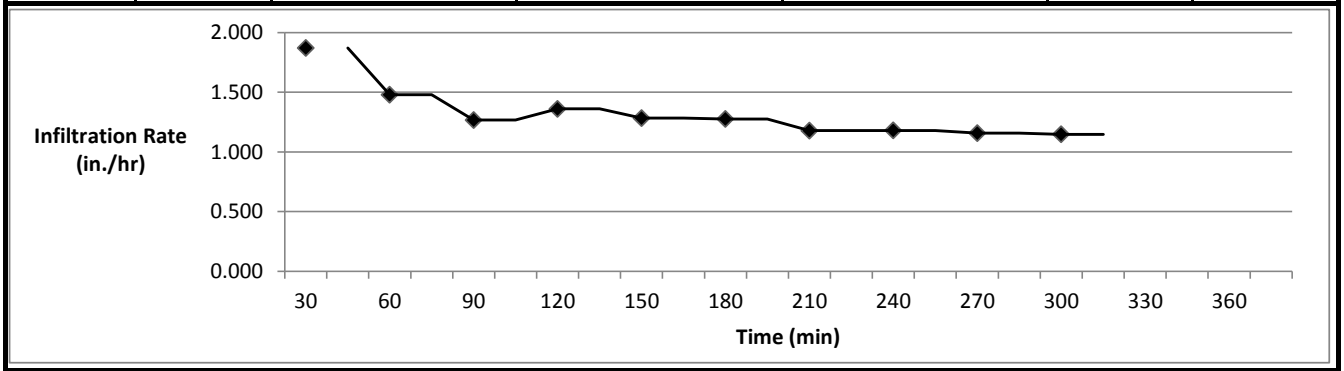
Project Name: *Golden Meadows*

Date: Oct-12

Leighton

Test Hole Number:	P-3	Project	Tract 30972	
Date Excavated:	10/23/2012	Project Number	110712-008	
Tested by:	BSS	Date Tested	10/24/2012	
Soil Unit:	Alluvium (Qal)	Depth of Test Hole (in.)	30	Ex El ~1520.5' msl
USCS Soil Type:	Brown Silty Sand with Gravel	Diameter (in.)	8	Sunny ~75 °

Time	Δt (min)	Initial Water Depth (inches)	Final Water Depth (inches)	Change In Water Level (inches)	Infiltration/Percolation Rate	
					Inches/hour*	minute/inch
10:43:00	30.00	22.00	15.90	6.10	1.870	4.918
11:13:00						
11:14:00	30.00	21.20	16.30	4.90	1.479	6.122
11:44:00						
11:45:00	30.00	21.10	17.00	4.10	1.266	7.317
12:15:00						
12:16:00	30.00	21.50	17.20	4.30	1.360	6.977
12:46:00						
12:47:00	30.00	21.00	16.80	4.20	1.282	7.143
1:17:00						
1:17:00	30.00	21.20	17.10	4.10	1.276	7.317
1:47:00						
1:48:00	30.00	21.00	17.20	3.80	1.178	7.895
2:18:00						
2:18:00	30.00	21.30	17.60	3.70	1.179	8.108
2:48:00						
2:49:00	30.00	21.20	17.55	3.65	1.156	8.219
3:19:00						
3:19:00	30.00	21.25	17.65	3.60	1.147	8.333
3:49:00						



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Percolation Test Data

Basin 1

P-3

Project Number: 110712-008

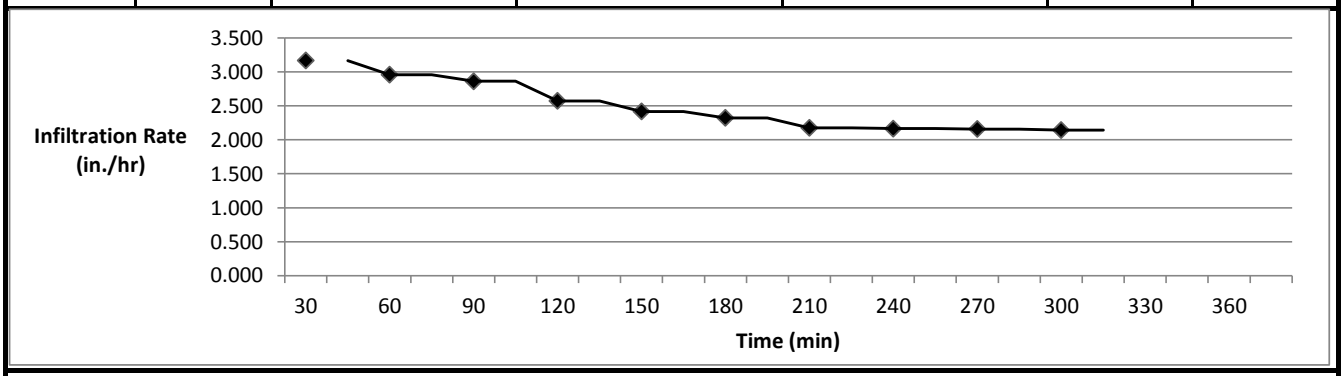
Project Name: *Golden Meadows*

Date: Oct-12

Leighton

Test Hole Number:	P-4	Project	Tract 31194	
Date Excavated:	10/23/2012	Project Number	110712-008	
Tested by:	BSS	Date Tested	10/24/2012	
Soil Unit:	Alluvium (Qal)	Depth of Test Hole (in.)	30	Ex El ~1517' msl
USCS Soil Type:	Brown Silty Sand (SM)	Diameter (in.)	8	Sunny ~75 °

Time	Δt (min)	Initial Water Depth (inches)	Final Water Depth (inches)	Change In Water Level (inches)	Infiltration/Percolation Rate	
					Inches/hour*	minute/inch
10:45:00	30.00	23.00	11.20	11.80	3.168	2.542
11:15:00						
11:16:00	30.00	22.30	10.90	11.40	2.961	2.632
11:46:00						
11:47:00	30.00	22.40	11.70	10.70	2.863	2.804
12:17:00						
12:18:00	30.00	22.20	12.90	9.30	2.574	3.226
12:48:00						
12:49:00	30.00	22.30	13.90	8.40	2.417	3.571
1:19:00						
1:20:00	30.00	22.60	14.90	7.70	2.325	3.896
1:50:00						
1:51:00	30.00	22.50	15.40	7.10	2.176	4.225
2:21:00						
2:22:00	30.00	22.30	15.10	7.20	2.165	4.167
2:52:00						
2:53:00	30.00	22.40	15.30	7.10	2.160	4.225
3:23:00						
3:23:00	30.00	22.30	15.20	7.10	2.143	4.225
3:53:00						



*Based on Prochet Method

Percolation Test Data
Basin 1
P-4

Project Number: 110712-008

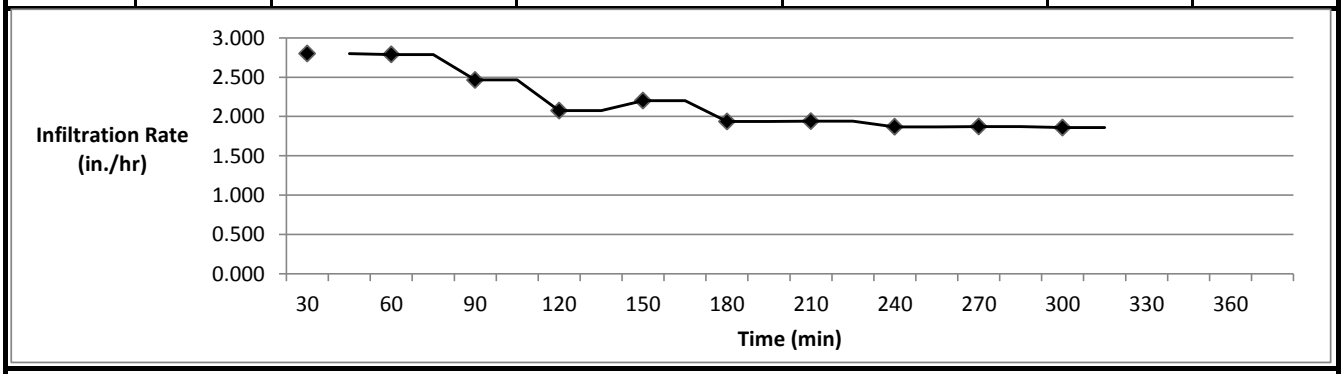
Project Name: *Golden Meadows*

Date: Oct-12

Leighton

Test Hole Number:	P-5	Project	Tract 31194	
Date Excavated:	10/23/2012	Project Number	110712-008	
Tested by:	JTD	Date Tested	12/24/2012	
Soil Unit:	Alluvium (Qal)	Depth of Test Hole (in.)	30	Ex El ~1518' msl
USCS Soil Type:	Dark Brown Silty SAND	Diameter (in.)	8	Sunny ~74 °

Time	Δt (min)	Initial Water Depth (inches)	Final Water Depth (inches)	Change In Water Level (inches)	Infiltration/Percolation Rate	
					Inches/hour*	minute/inch
10:25:00	30.00	21.50	10.20	11.30	2.799	2.655
10:55:00						
10:55:00	30.00	22.00	11.30	10.70	2.788	2.804
11:25:00						
11:26:00	30.00	22.00	13.10	8.90	2.464	3.371
11:56:00						
11:57:00	30.00	21.00	13.30	7.70	2.074	3.896
12:27:00						
12:27:00	30.00	22.00	14.40	7.60	2.203	3.947
12:57:00						
12:58:00	30.00	21.50	14.80	6.70	1.935	4.478
13:28:00						
13:28:00	30.00	22.00	15.60	6.40	1.939	4.688
13:58:00						
13:58:00	30.00	21.00	14.30	6.70	1.868	4.478
14:28:00						
14:29:00	30.00	21.20	14.60	6.60	1.872	4.545
14:59:00						
14:59:00	30.00	21.10	14.50	6.60	1.859	4.545
15:29:00						



*Based on Prochet Method

Percolation Test Data
Basin 2
P-5

Project Number: 110712-008

Project Name: *Golden Meadows*

Date: Oct-12

Leighton

GEOTECHNICAL BORING LOG B-1

Project No.	110712008	**Date Drilled**	10-23-12
Project	Richland Tract 31194	**Logged By**	BSS
Drilling Co.	2R Drilling, Inc.	**Hole Diameter**	8"
Drilling Method	Hollow Stem Auger - 140lb - Auto Hammer - 30" Drop	**Ground Elevation**	1518'
Location	See Boring Location Map	**Sampled By**	BSS

Elevation Feet	Depth Feet	Graphic Log	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
		N S							*This Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.*	
	0									
1515								SM	QUATERNARY ALLUVIUM (Qal) SILTY SAND (SM), medium dense, light yellowish brown, dry, fine sand	
	5								dense, brown, dry to moist	
1510									GRANITIC BEDROCK (Kgr)	
	10			S-1	50-3"			(SM)g	Completely to highly weathered Granitic Rock, breaks into: SILTY SAND with gravel (SM), very dense, light brown, dry, fine to medium sand, weathered (13% fines, 17% gravel)	SA
1505										
	15			S-2	50-1.5"			GP	GRAVEL with silt and sand (GP), very dense, light brown, moist, coarse sand, weathered	
1500									Refusal @ 18' (Bedrock) No Caving or Groundwater Backfilled with Spoils	
	20									
1495										
	25									
1490										
	30									

SAMPLE TYPES:

B	BULK SAMPLE
C	CORE SAMPLE
G	GRAB SAMPLE
R	RING SAMPLE
S	SPLIT SPOON SAMPLE
T	TUBE SAMPLE

TYPE OF TESTS:

-200	% FINES PASSING	DS	DIRECT SHEAR	SA	SIEVE ANALYSIS
AL	ATTERBERG LIMITS	EI	EXPANSION INDEX	SE	SAND EQUIVALENT
CN	CONSOLIDATION	H	HYDROMETER	SG	SPECIFIC GRAVITY
CO	COLLAPSE	MD	MAXIMUM DENSITY	UC	UNCONFINED COMPRESSIVE STRENGTH
CR	CORROSION	PP	POCKET PENETROMETER		
CU	UNDRAINED TRIAXIAL	RV	R VALUE		



*** This log is a part of a report by Leighton and should not be used as a stand-alone document. ***

GEOTECHNICAL BORING LOG B-2

Project No.	110712008	**Date Drilled**	10-23-12
Project	Richland Tract 31194	**Logged By**	BSS
Drilling Co.	2R Drilling, Inc.	**Hole Diameter**	8"
Drilling Method	Hollow Stem Auger - 140lb - Auto Hammer - 30" Drop	**Ground Elevation**	1520'
Location	See Boring Location Map	**Sampled By**	BSS

Elevation Feet	Depth Feet	Graphic Log (N / S)	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
1520	0							SM	QUATERNARY ALLUVIUM (Qal) SILTY SAND (SM), medium dense, dark brown, dry to moist, fine sand	
1515	5			S-1	9 18 12			SC	QUATERNARY OLDER ALLUVIUM (Qaol) CLAYEY SAND (SC), stiff, olive brown, moist, weathered (29% fines)	SA
1510	10			S-2	10 19 50-1"				CLAYEY SAND (SC), very dense, olive gray to brown, moist, fine to medium sand GRANITIC BEDROCK (Kgr) Refusal @ 11.1' (Bedrock) No Caving or Groundwater Backfilled with Spoils	
1505	15									
1500	20									
1495	25									
1490	30									

SAMPLE TYPES:

B	BULK SAMPLE
C	CORE SAMPLE
G	GRAB SAMPLE
R	RING SAMPLE
S	SPLIT SPOON SAMPLE
T	TUBE SAMPLE

TYPE OF TESTS:

-200	% FINES PASSING	DS	DIRECT SHEAR	SA	SIEVE ANALYSIS
AL	ATTERBERG LIMITS	EI	EXPANSION INDEX	SE	SAND EQUIVALENT
CN	CONSOLIDATION	H	HYDROMETER	SG	SPECIFIC GRAVITY
CO	COLLAPSE	MD	MAXIMUM DENSITY	UC	UNCONFINED COMPRESSIVE STRENGTH
CR	CORROSION	PP	POCKET PENETROMETER		
CU	UNDRAINED TRIAXIAL	RV	R VALUE		



*** This log is a part of a report by Leighton and should not be used as a stand-alone document. ***

Leighton

PARTICLE-SIZE DISTRIBUTION (GRADATION) of SOILS USING SIEVE ANALYSIS

ASTM D 6913

Project Name:	GOLDEN MEADOWS		Tested By:	JAP	Date: 10/25/12
Project No.:	110712-008		Checked By:	JMB	Date: 10/26/12
Exploration No.:	**B-1**		Depth (feet):	10.0	
Sample No.:	**S-1**				
Soil Identification:	SILTY SAND WITH LITTLE GRAVEL (SM)g, light brown.				

		Moisture Content of Total Air - Dry Soil	
Container No.:	X-35	Wt. of Air-Dry Soil + Cont. (g)	545.2
Wt. of Air-Dried Soil + Cont.(g)	545.2	Wt. of Dry Soil + Cont. (g)	535.5
Wt. of Container (g)	144.2	Wt. of Container No._____ (g)	144.2
Dry Wt. of Soil (g)	391.3	Moisture Content (%)	2.5

After Wet Sieve	Container No.	X-35
	Wt. of Dry Soil + Container (g)	485.4
	Wt. of Container (g)	144.2
	Dry Wt. of Soil Retained on # 200 Sieve (g)	341.2

U. S. Sieve Size (in.)	U. S. Sieve Size (mm.)	Cumulative Weight Dry Soil Retained (g)	Percent Passing (%)
3"	75.000		100.0
1"	25.000		100.0
3/4"	19.000	0.0	100.0
1/2"	12.500	9.3	97.6
3/8"	9.500	10.8	97.2
#4	4.750	66.3	83.1
#8	2.360	149.0	61.9
#16	1.180	213.8	45.4
#30	0.600	260.3	33.5
#50	0.300	292.9	25.1
#100	0.150	317.9	18.8
#200	0.075	339.4	13.3
PAN			

GRAVEL: **17 %**

SAND: **70 %**

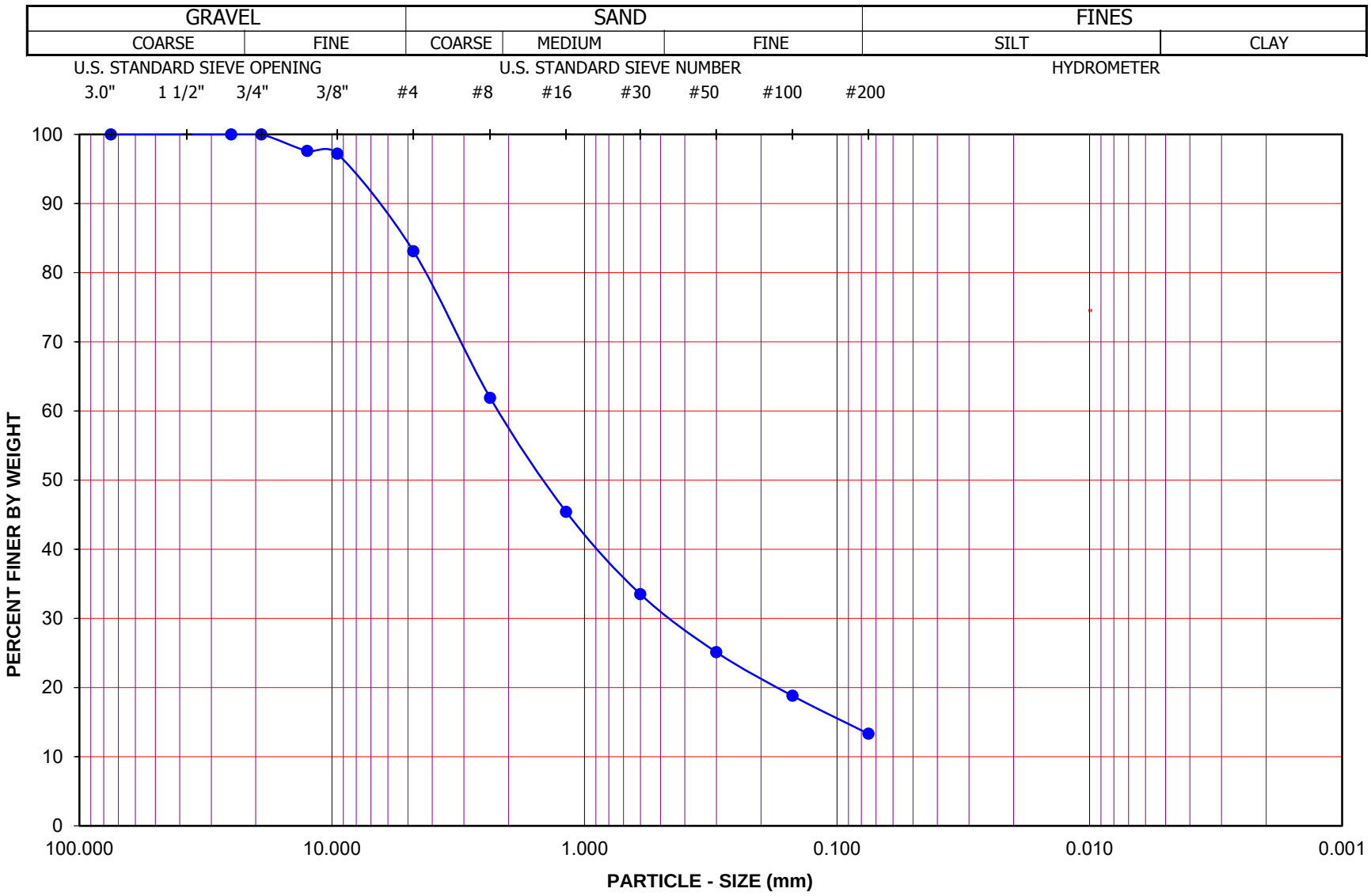
FINES: **13 %**

GROUP SYMBOL: **(SM)g**

Cu = D60/D10 = N/A

Cc = $(D30)^2/(D60*D10)$ = N/A

Remarks: **



Project Name: GOLDEN MEADOWS

Project No.: 110712-008

Exploration No.: B-1 Sample No.: S-1

Depth (feet): 10.0 Soil Type : (SM)g

Soil Identification: SILTY SAND WITH LITTLE GRAVEL (SM)g, light brown.

GR:SA:FI : (%) 17 : 70 : 13

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PARTICLE - SIZE DISTRIBUTION ASTM D 6913

Oct-12

Leighton

PARTICLE-SIZE DISTRIBUTION (GRADATION) of SOILS USING SIEVE ANALYSIS

ASTM D 6913

Project Name:	GOLDEN MEADOWS		Tested By:	JAP	Date: 10/25/12
Project No.:	110712-008		Checked By:	JMB	Date: 10/26/12
Exploration No.:	**B-2**		Depth (feet):	5.0	
Sample No.:	**S-1**				
Soil Identification:	CLAYEY SAND WITH TRACE GRAVEL (SC), yellowish brown.				

		Moisture Content of Total Air - Dry Soil	
Container No.:	KR	Wt. of Air-Dry Soil + Cont. (g)	684.8
Wt. of Air-Dried Soil + Cont.(g)	684.8	Wt. of Dry Soil + Cont. (g)	613.0
Wt. of Container (g)	158.9	Wt. of Container No._____ (g)	158.9
Dry Wt. of Soil (g)	454.1	Moisture Content (%)	15.8

After Wet Sieve	Container No.	KR
	Wt. of Dry Soil + Container (g)	484.8
	Wt. of Container (g)	158.9
	Dry Wt. of Soil Retained on # 200 Sieve (g)	325.9

U. S. Sieve Size (in.)	U. S. Sieve Size (mm.)	Cumulative Weight Dry Soil Retained (g)	Percent Passing (%)
3"	75.000		100.0
1"	25.000		100.0
3/4"	19.000		100.0
1/2"	12.500		100.0
3/8"	9.500	0.0	100.0
#4	4.750	12.3	97.3
#8	2.360	83.6	81.6
#16	1.180	158.4	65.1
#30	0.600	216.4	52.3
#50	0.300	260.1	42.7
#100	0.150	296.5	34.7
#200	0.075	324.8	28.5
PAN			

GRAVEL: **3 %**

SAND: **68 %**

FINES: **29 %**

GROUP SYMBOL: **SC**

Cu = D60/D10 = N/A

Cc = $(D30)^2/(D60*D10)$ = N/A

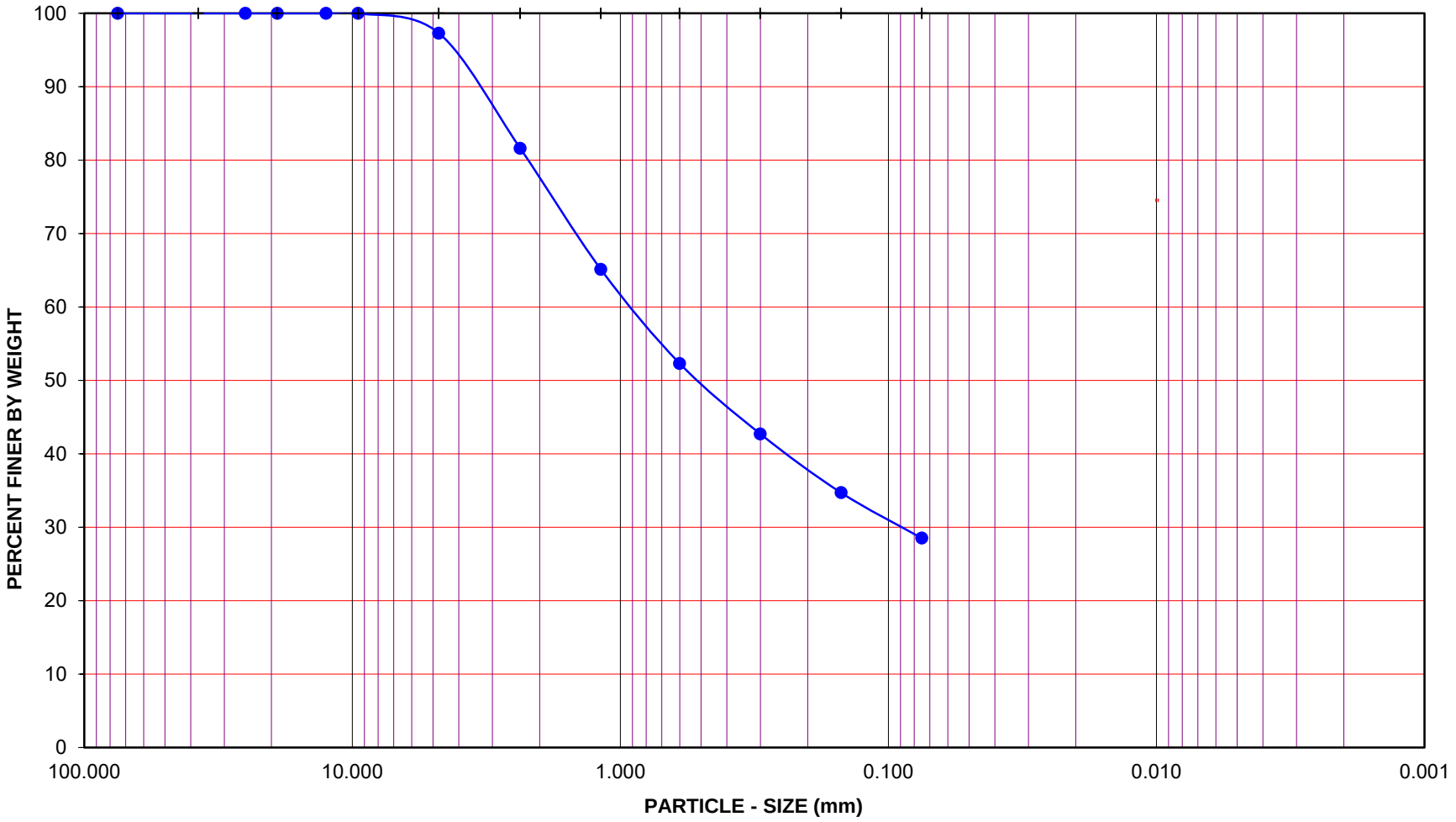
Remarks: **

GRAVEL		SAND			FINES	
COARSE	FINE	COARSE	MEDIUM	FINE	SILT	CLAY

U.S. STANDARD SIEVE OPENING: 3.0" 1 1/2" 3/4" 3/8"

U.S. STANDARD SIEVE NUMBER: #4 #8 #16 #30 #50 #100 #200

HYDROMETER



Project Name: GOLDEN MEADOWS

Project No.: 110712-008

Exploration No.: B-2 Sample No.: S-1

Depth (feet): 5.0 Soil Type : SC

Soil Identification: CLAYEY SAND WITH TRACE GRAVEL (SC), yellowish brown.

GR:SA:FI : (%) 3 : 68 : 29

Leighton

PARTICLE - SIZE DISTRIBUTION ASTM D 6913

Oct-12

Appendix 4: Historical Site Conditions

Phase I Environmental Site Assessment or Other Information on Past Site Use

NOT APPLICABLE

Appendix 5: LID Infeasibility

LID Technical Infeasibility Analysis

NOT APPLICABLE

Appendix 6: BMP Design Details

BMP Sizing, Design Details and other Supporting Documentation

R 07 W | R 06 W | R 05 W | R 04 W | R 03 W | R 02 W | R 01 W | R 01 E | R 02 E | R 03 E | R 04 E | R 05 E

T 01 S
T 02 S
T 03 S
T 04 S
T 05 S
T 06 S
T 07 S
T 08 S

06	05	04	03	02	01
07	08	09	10	11	12
18	17	16	15	14	13
19	20	21	22	23	24
30	29	28	27	26	25
31	32	33	34	35	36

0.85 MiraLoma
0.61 Riverside North
0.54 RiverSide South
0.68 PigeonPass
0.66 MorenoEast
0.85 Beaumont
0.88 PradoDam
0.51 Woodcrest
0.50 LakeMathews
0.68 PerrisReservoir
0.87 VistaGrandeGS
0.70 SanJacintoNWS
1.18 Idyllwild
0.58 SunCity
0.68 Winchester
0.70 ElsinoreNWS
1.11 ElCarisoStation
D85 = 0.60
0.90 HurkeyCreek
0.77 WildomarLaCresta
0.52 SkinnerLake
0.65 Anza
0.77 SantaRosaPlateau
1.00 TemeculaNWS
0.64 AguangaValley

Santa Ana River Watershed
Santa Margarita Watershed

JURUPA VALLEY | EASTVALE | NORCO | CORONA | RIVERSIDE | MORENO VALLEY | CALIMESA | BEAUMONT | SAN JACINTO | PERRIS | CANYON LAKE | LAKE ELSINORE | WILDOMAR | MENIFEE | HEMET | MURRIETA | TEMECULA

N

Rain Gage Locations

RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

Isohyetal Map for the 85th Percentile 24 hour Storm Event

July 2011

Extended Detention Basin Design Procedure	BMP Subarea No. DMA A	Legend:	Required Entries / Calculated Cells

Company Name: Hunsaker & Associates — Date: May 2021

Designed by: Brian Lowell — County/City Case No.:

Design Volume

Tributary Area (BMP Subarea) — A_T = 97.8638 acres

Enter V_{BMP}, determined from Section 2.1 of this Handbook — V_{BMP} = 70,244 ft^3

Basin Footprint

Overall Geometry

Length at Basin Bottom Surface — Length = 240 ft

Width at Basin Bottom Surface — Width = 160 ft

Meets 1.5 : 1 requirement? ✓

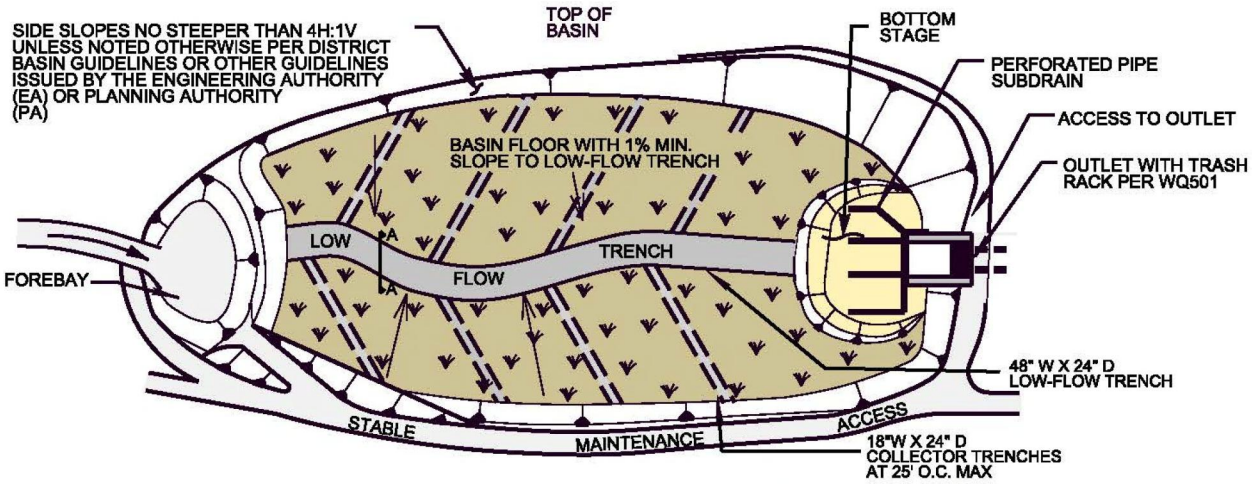
Side Slopes per "Basin Guidelines", Sect. 1.2 — z = 4 :1

Proposed Basin Depth (with no freeboard) — D_B = 6.00 ft

Depth of freeboard (if used) — D_{FB} = 2.00 ft

Minimum Required Allowance for Total Depth (including proposed basin depth, freeboard, minimum depth of bottom stage (D_{BS}=0.33') and minimum filter depth (D_{FD}=2.33')) — D_{REQ} = 10.7 ft

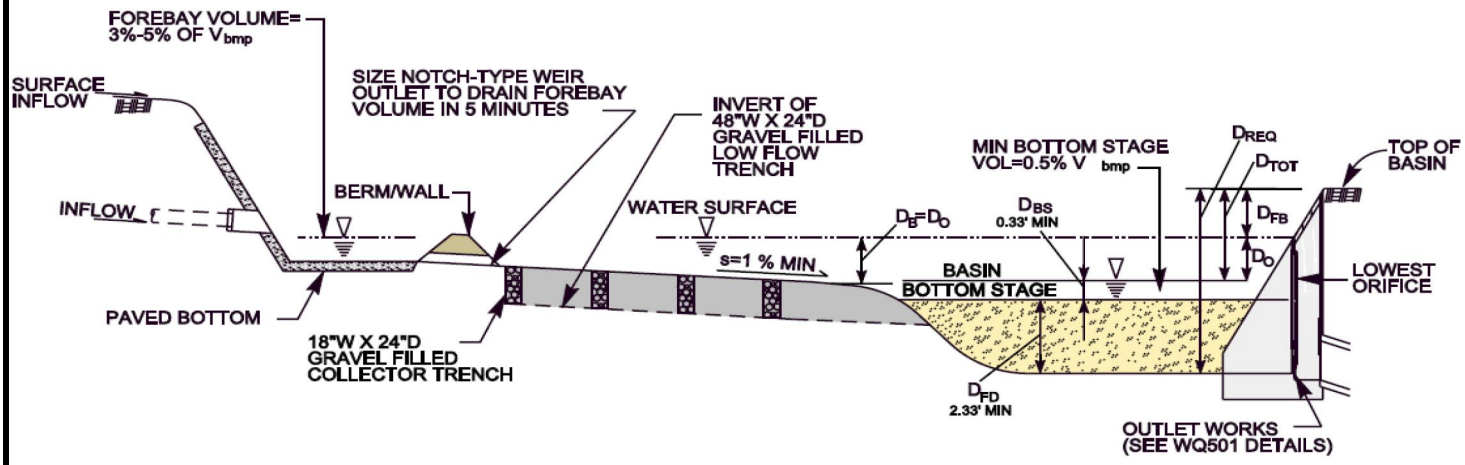
Depth from design water surface elevation to lowest orifice — D_O = 6.0 ft



Basin Design

Basin Design

Proposed Total Basin Depth (proposed depth plus freeboard)	D_{TOT} =	8.00	ft
Basin Invert Longitudinal Slope	Slope =	1.00	%
Basin Invert Transverse Slope (1% min)	Slope =	1	%
Basin Volume	V_{Basin} =	100116	ft^3



Forebay Design

Forebay Volume (3 - 5% V_{BMP})	V_{FB} =	3326	ft^3
Forebay Depth (height of berm)	D_{FBY} =	1.5	ft
Minimum Forebay Surface Area	A_{FB} =	2217	ft^2
Rectangular weir (notch)	W =	4.00	in

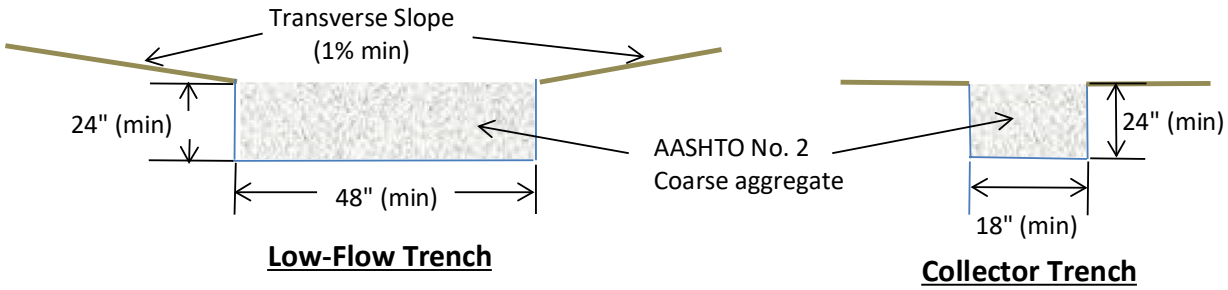
Dry Weather and Low-Flow Management

Low-Flow Trench (see graphic below)

Depth (24 inches minimum, gravel filled)	Depth =	24	inches
Width (48 inches minimum)	Width =	48	inches
Trench Invert Longitudinal Slope	Slope =	1	%

Collector Trenches (see graphic below)

Depth (24 inches minimum)	Depth =	24	inches
Width (18 inches minimum)	Width =	18	inches
Trench Invert Longitudinal Slope	Slope =	1	%
Spacing (25 feet on center maximum)	S =	25	feet



Low-Flow Trench **Collector Trench**

Bottom Stage (Sand Filter) Design

Depth of the Bottom Stage (4" minimum ponding)	D_{BS} =	4	in
Surface Area of Bottom Stage	A_{BS} =	630	ft^2
Dry Weather Ponded Volume (above sand layer)	V_{BS} =	210	ft^3

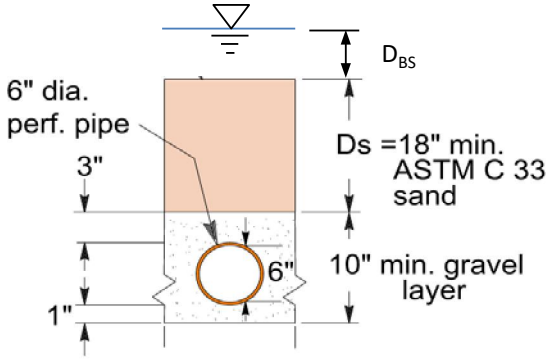
Is V_{BS} no less than 0.5% V_{BMP}? OK

Depth of ASTM-C33 sand (18 inch minimum)

Ds = 18 inches

Diameter of Subdrains: ϕ = 6 in

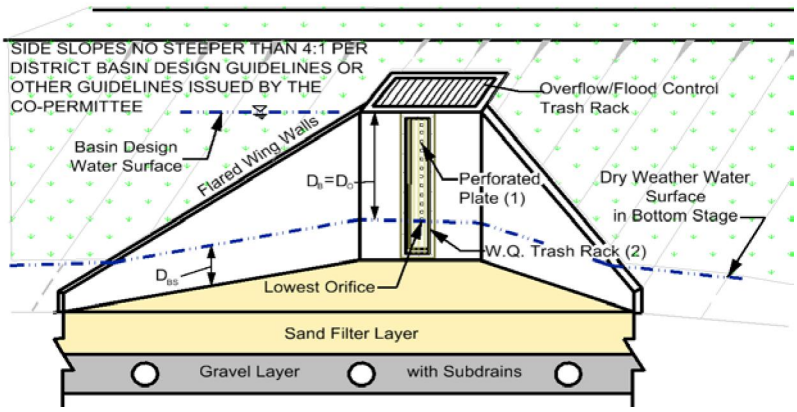
Subdrain Spacing: s = 10 ft. on center



Basin Outlet Design

Outlet Design

Assume an orifice area. Based on the information provided above, the spreadsheet provides discharge vs. stage data. Enter the volume vs. stage data for each interval. This information is used to route the volume through the basin. The size of the orifice is acceptable when the data shows that less than 50% of V_{BMP} has drained in 24 hours, and that 100% drawdown occurs within 72 hours.



Flow Rate, Q (cfs)

$$Q=CA[2g(H-H_o)]^{0.5}$$

Discharge Coefficient,

Default, C = 0.66

Other, C = 0.66

Orifice Area (ft^2)

Orifice Diameter, d; number of orifices per row, n; and number of orifice rows, N (from the bottom up).

d = 1.9 inches

n = 2 per row

N = 1 rows

Aeff = 0.039 ft^2 per row

or

Aeff = 5.668 in^2 per row

From outflow hydrograph, the time where 50% of V_{BMP} has drained from the basin (24 hour minimum):

Time (50%) = 25.75 hrs

OK

From outflow hydrograph, the time where 100% V_{BMP} has drained from the basin(within 72 hours):

Time (100 %) = 56.09 hrs

OK

Headwater Elev. / Stage (ft)	Discharge (cfs)	Volume (acre-ft)	Δt (hrs.)
0	0.0000	0.0000	
0.33	0.1203	0.004	0.74
0.67	0.1703	0.018	1.20
1.00	0.2085	0.026	0.50
1.33	0.2407	0.047	1.15
1.67	0.2692	0.078	1.47
2.00	0.2948	0.148	3.00
2.33	0.3184	0.210	2.43
2.67	0.3404	0.292	3.04
3.00	0.3611	0.459	5.75
3.33	0.3806	0.639	5.87
3.67	0.3992	0.819	5.59
4.00	0.4169	0.999	5.34
4.33	0.4339	1.243	6.92
4.67	0.4503	1.486	6.66
5.00	0.4661	1.730	6.43
5.33	*0.4814*	*2.024*	
5.67	*0.4963*	*2.319*	
6.00	*0.5106*	*2.614*	
6.33			
6.67			
7.00			
7.33			
7.67			
8.00			
8.33			
8.67			
9.00			
9.33			
9.67			
10.00			
		∑ =	56.09

Notes:

Santa Ana Watershed - BMP Design Volume, V_{BMP}

(Rev. 10-2011)

Legend: Required Entries / Calculated Cells

*(Note this worksheet shall **only** be used in conjunction with BMP designs from the **LID BMP Design Handbook**)*

Company Name: Hunsaker & Associates — Date: May 2021

Designed by: Brian Lowell — Case No:

Company Project Number/Name: Golden Meadows - Phase 4 - Major Modification

BMP Identification

BMP NAME / ID: DMA 'A'

Must match Name/ID used on BMP Design Calculation Sheet

Design Rainfall Depth

85th Percentile, 24-hour Rainfall Depth, from the Isohyetal Map in Handbook Appendix E

D_{85}= 0.60 inches

Drainage Management Area Tabulation

Insert additional rows if needed to accommodate all DMAs draining to the BMP

DMA Type/ID	DMA Area (square feet)	Post-Project Surface Type	Effective Imperivous Fraction, I_f	DMA Runoff Factor	DMA Areas x Runoff Factor	Design Storm Depth (in)	Design Capture Volume, V_{BMP} (cubic feet)	Proposed Volume on Plans (cubic feet)
D-1 Roof	412,000	Roofs	1	0.89	367504			
D-2 Driveways	65,920	Concrete or Asphalt	1	0.89	58800.6			
D-3 Pavement	658,876	Concrete or Asphalt	1	0.89	587717.4			
D-4 Sidewalk	140,733	Concrete or Asphalt	1	0.89	125533.8			
D-5 Parkway	161,310	Ornamental Landscaping	0.1	0.11	17818			
D-6 Slopes	423,953	Ornamental Landscaping	0.1	0.11	46829			
D-7 Turf	767,086	Ornamental Landscaping	0.1	0.11	84730.8			
D-8 Natural	1,428,998	Natural (A Soil)	0.03	0.06	89371.2			
D-9 Basin Bottom	31,401	Natural (A Soil)	0.03	0.06	1963.9			
D-10 DG Trail	32,689	Decomposed Granite	0.4	0.28	9143.5			
D-11 Open Space	139,981	Ornamental Landscaping	0.1	0.11	15462			
	4262947	Total			1404874.2	0.60	70243.7	70500

Notes:

3.6 Extended Detention Basin

Type of BMP	LID - Biotreatment
Treatment Mechanisms	Sedimentation, Infiltration, Biofiltration, Evapotranspiration, and Evaporation
Minimum Tributary Drainage Area	5 acres
Other Names	Enhanced Water Quality Basin

Overview

The Extended Detention Basin (EDB) is designed to detain the design volume of stormwater, V_{BMP}, and maximize opportunities for volume losses through infiltration, evaporation, evapotranspiration and surface wetting. Additional pollutant removal is provided through sedimentation, in which pollutants can attach to sediment accumulated in the basin through the process of settling. Stormwater enters the EDB through a *forebay* where any trash, debris, and sediment accumulate for easy removal. Flows from the forebay enter the basin which is vegetated with native grasses that enhance infiltration and evapotranspiration, and which is interspersed with gravel-filled trenches that help further enhance infiltration. Water that does not get infiltrated or evapotranspired is conveyed to the *bottom stage* of the basin. At the bottom stage of the basin, low or incidental dry weather flows will be treated through a sand filter and collected in a subdrain structure. Any additional flows will be detained in the basin for an extended period by incorporating an outlet structure that is more restrictive than a traditional detention basin outlet. The restrictive outlet structure extends the drawdown time of the basin which further allows particles and associated pollutants to settle out before exiting the basin, while maximizing opportunities for additional incidental volume losses.

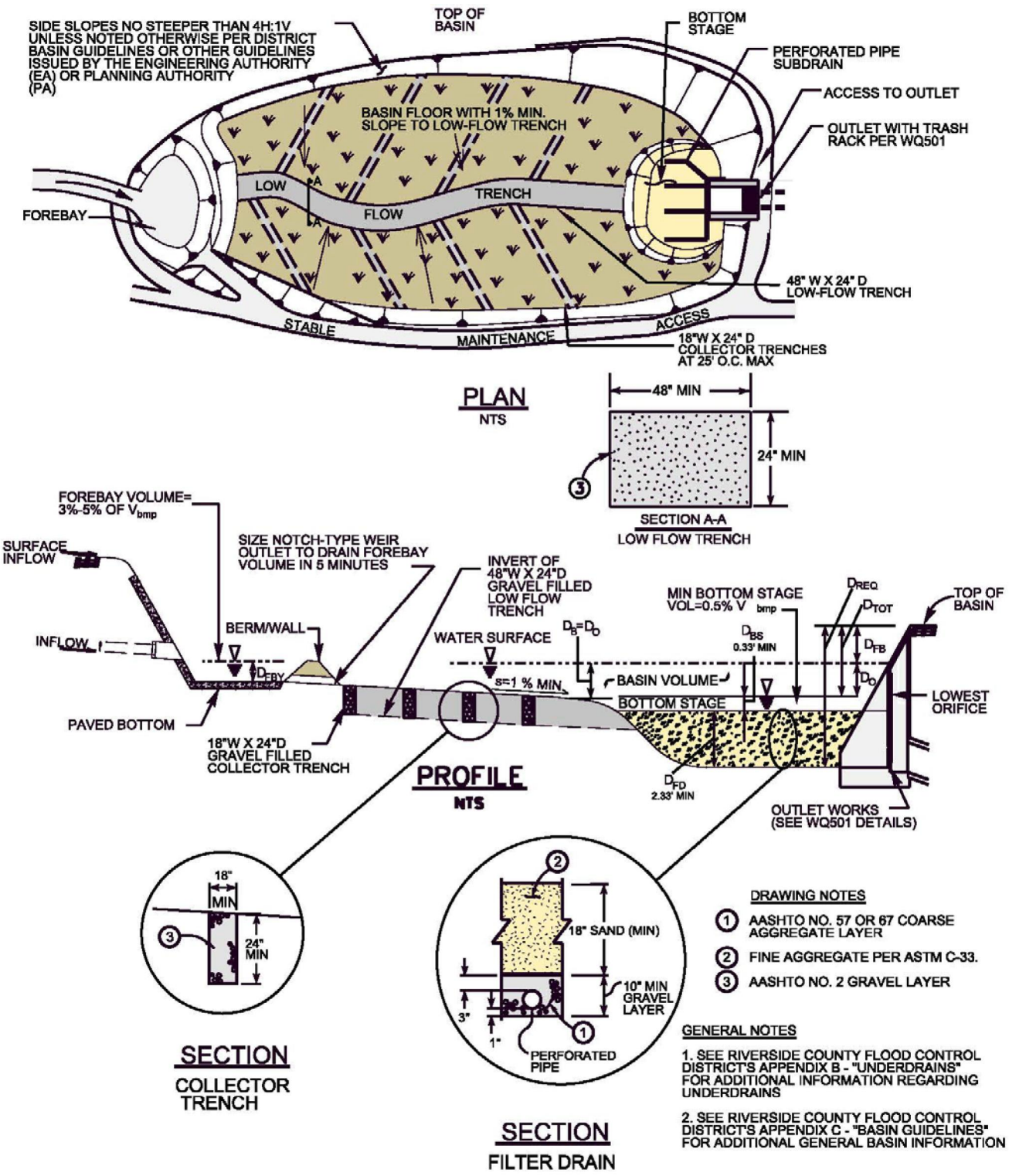


Figure 1 – Extended Detention Basin

Siting Considerations

Soils: EDBs can be used with almost all soils and geology. However, pollutant removal effectiveness is greatly improved when the underlying soil permits at least some infiltration.

Tributary Area: EDBs should only be used where the tributary drainage area is at least 5 acres, since meeting the draw-down requirements (discussed below) for smaller areas would result in very small outlet orifice diameters which would be prone to clogging.

Proximity to Receiving Waters: All site runoff must be treated to the MEP with appropriate BMPs *before* being discharged into Receiving Waters; as such the EDB cannot be constructed in-line within Receiving Waters.

Setbacks: Due to the infiltration characteristics incorporated into the EDB design, the lowest pervious point (beneath the filter drain) of the extended detention facility should be a minimum of 10' above the seasonal high groundwater table. All other setbacks shall be in accordance with applicable standards of the "Basin Guidelines" (Appendix C) or other guidelines issued by the Engineering Authority (EA).

Basin Guidelines: See Section 1 of the "Basin Guidelines" (Appendix C) for additional requirements (i.e., fencing, maintenance access, etc.) that may be required by the Engineering Authority (EA).

Landscaping Requirements

Basin vegetation provides erosion protection, enhances evapotranspiration and infiltration, and improves pollutant removal. The upper stage basin surface, berms and side slopes shall be planted with native grasses. Proper landscape management is also required to ensure that the vegetation does not contribute to water pollution through the use of pesticides, herbicides, or fertilizers. Landscaping shall be in accordance with applicable standards of the "Basin Guidelines" (Appendix C) or other guidelines issued by the EA.

Maintenance Guidelines

Schedule	Inspection and Maintenance Activity
During every scheduled maintenance check (per below), and *as needed* at other times	• Maintain vegetation as needed. Use of fertilizers, pesticides and herbicides should be strongly avoided to ensure they don't contribute to water pollution. If appropriate native plant selections and other IPM methods are used, such products shouldn't be needed. If such projects are used: o Care should be taken to avoid contact with the low-flow or other trenches, and the media filter in the bottom stage. o Products shall be applied in accordance with their labeling, especially in relation to application to water, and in areas subjected to flooding. o Fertilizers should not be applied within 15 days before, after, or during the rainy season. • No ponded water should be present for more than 72 hours to avoid nuisance or vector problems. No algae formation should be visible. Correct problems as needed.
Annually. If possible, schedule these inspections before the beginning of the rain season to allow for any repairs to occur before rains occur.	• Remove debris and litter from the entire basin • Inspect hydraulic and structural facilities. Examine the outlet for clogging, the embankment and spillway integrity, as well as damage to any structural element. • Check for erosion, slumping and overgrowth. Repair as needed. • Inspect sand media at the filter drain to verify it is allowing acceptable infiltration. **Scarify top 3 inches by raking the filter drain's sand surface annually.** • Check the media filter underdrains (via the cleanout) for damage or clogging. Repair as needed. • Remove accumulated sediment and debris from the forebay, and ensure that the notch weir is clear and will allow proper drainage. • Check gravel filled low flow and collector trenches for sediment buildup and repair as needed.
Every 5 years or sooner (depending on whether observed drain times to empty the basin are less than 72 hours).	• Remove the top 3 inches of sand from the filter drain and backfill with 3 inches of new sand to return the sand layer to its original depth. When scarification or removal of the top 3 inches of sand is no longer effective, remove and replace sand filter layer.
Whenever substantial sediment accumulation has occurred.	• Remove accumulated sediment from the bottom of the basin. Removal should extend to original basin depth.

EXTENDED DETENTION BASIN BMP FACT SHEET

Design Summary

Design Parameter	Extended Detention Basin
Drawdown time (total)	72 hours [2,3]
Minimum drawdown time for 50% V_{BMP}	24 hours [2]
Minimum tributary area	5 acres [2]
Outlet erosion control	Energy dissipaters to reduce velocities[1]
Forebay volume	3 to 5 % of V_{BMP} [3]
Basin Invert Longitudinal Slope (min.)	1%
Basin Invert Transverse (cross) Slope (min)	1%
Low-flow trench width (min.)	48 inches
Low-flow trench depth (min.)	24 inches
Slope of low-flow trench along bottom excavated Surface (max.)	1%
Slope of gravel collector trenches along bottom excavated surface (max.)	1 %
Length to width ratio (min.)	1.5:1
Basin depth (min.)	1 foot [3]
Bottom stage volume	0.5 % of V_{BMP} [3]
Bottom stage depth (min)	0.33 feet [3]
Filter drain depth (min)	2.33 feet [3]

1. **Ventura County's Technical Guidance Manual for Stormwater Quality Control Measures**
2. **CA Stormwater BMP Handbook for New Development and Significant Redevelopment**
3. **Denver, Colorado's UDFCD Drainage Criteria Manual, Volume 3**

Note: The information contained in this BMP Factsheet is intended to be a summary of design considerations and requirements. Additional information which applies to all detention basins may be found in the "Basin Guidelines" (Appendix C). In addition, information herein may be superseded by other guidelines issued by the Engineering Authority.

Design Procedure

These steps correspond to and provide a description of the information required in the EDB Design Worksheet.

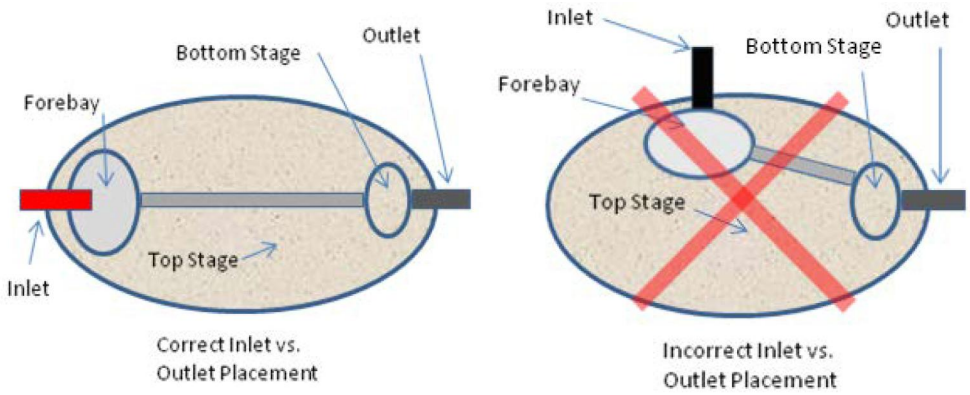
1. Find the Design Volume, V_{BMP}.

a) Enter the tributary area, A_T to the BMP. The minimum tributary area is 5 acres.

b) Enter the Design Volume, V_{BMP}, determined from Section 2.1 of this Handbook.

2. Basin Footprint

a) Enter the length and width of the EDB. The length shall be measured between the inlet to the basin and the outlet structure; and the width shall be measured at the widest point of the basin invert. The length to width ratio should be 1.5:1 or longer to prevent short-circuiting and increase the overall effectiveness of the BMP.



b) Enter the internal basin side slopes. See the "Basin Guidelines" (Appendix C) for side slope requirements. If variable internal side-slopes are used, enter the steepest slope that will be used.

c) Using Figure 1 as a guide, enter the proposed basin depth, D_B, and the freeboard depth, D_{FB}. Based on the information provided, the spreadsheet will calculate the minimum total depth required, D_{REQ}, for this BMP. D_{REQ} is the depth from the bottom of the underdrain layer in the bottom stage (see step 5c), to the top of the freeboard. This calculated minimum required depth can be used to determine if enough elevation difference is available within the design topography to allow for use of this BMP.

d) Additionally, the basin depth D_B is equal to $D_{O,}$ which is the depth from the design pond water surface elevation to the lowest orifice in the outlet structure. D_O is confirmed by the spreadsheet and is used in the Basin Outlet Design described in step 6 below. It should be noted that this lowest orifice is a critical elevation in the design of this BMP. The Volume of the Basin V_{Basin} described in step 3d) is the volume of water above this lowest orifice. This lowest-orifice also represents the dry weather ponded water surface discussed in step 5c below. Below this elevation there must be a minimum of a 4-inch drop down to the surface of the Sand Filter in the bottom stage.

3. Basin Design

a) The Total Basin Depth, D_{TOT}, is calculated automatically, and is the sum of the basin depth D_B plus the freeboard depth D_{FB}.

b) Enter the longitudinal slope of the basin invert. This slope must be at least 1% and is measured along the low flow trench between the forebay and the bottom stage. Note that the surface of the sand layer in the bottom stage must be level (see Figure 1).

c) Enter the transverse slope of the basin invert. This transverse (cross sectional) slope must be at least 1% sloped toward the low flow trench.

d) Enter the Volume of the Basin, V_{Basin}. This volume must be the actual volume of water held within the basin as substantiated by modeling or appropriate volumetric calculations, and must be equal to or greater than V_{BMP}. This volume must be held above the lowest orifice in the Basin Outlet Design described in step 6 below.

4. Forebay Design

All flows must enter the basin through the forebay. The forebay provides a location for the settlement and collection of larger particles, and any other trash or debris. A relatively smooth and level concrete bottom surface should be provided to facilitate mechanical removal of any accumulated sediment, trash and debris.

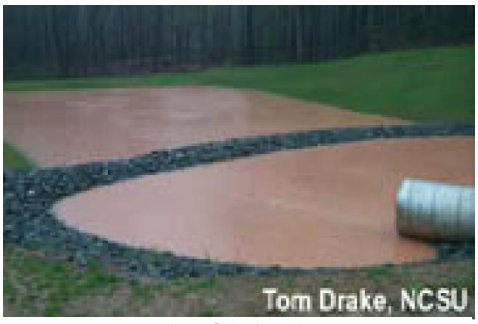


Figure 2: Forebay filled with storm water

a) Enter the Forebay Volume VFB. This volume must be from 3 to 5 percent of V_{BMP}.

b) A rock or concrete berm must be constructed to detain water before it drains into the basin. The top of the berm shall be set no higher than the invert of the inlet conveyance. Enter the Forebay Depth, D_{FBY}.

c) The spreadsheet will calculate the minimum surface area of the forebay, A_{FB}, based on the provided Forebay Volume and Depth. Ensure that the plans provide for a forbay area at least this large.

d) Although the forebay will be well submerged in the design event, a full height rectangular notch-type weir shall be constructed through the berm to prevent permanent ponding in the forebay, and allow water to slowly and fully drain to the main body of the basin. This notch should be offset from the inflow streamline to prevent low-flows from short circuiting. Enter the width, W, of this rectangular notch weir. The width shall not be less than 1.5 inches to prevent clogging. Additionally,

immediately outside the notch construct a minimum 1-foot by 1-foot gravel pad to prevent vegetative growth within the basin invert from blocking the notch.

5. Dry Weather and Low-Flow Management

The basin shall have both a low-flow gravel trench and a network of gravel collector trenches across the invert of the basin, as well as a bottom stage sand filter to treat low flows and dry weather flows (see Figure 1).

a) Low Flow Trench: The low-flow gravel trench conveys flow from the forebay to the bottom stage, while allowing for maximum incidental infiltration and volume loss. The trench shall be a minimum of 48 inches wide by 24 inches deep. This trench shall be unlined and backfilled with AASHTO No. 2 gravel (or similar) to the finished surface of the basin invert, and shall not use underdrains. The bottom excavated surface of the low-flow trench shall be 1 percent or flatter to promote infiltration.



Figure 3: Gravel filled low-flow trench

b) Collector Trenches: Gravel collector trenches beneath the top stage shall be arranged as illustrated in Figure 1 of Appendix C with minimal slope (1% maximum) along their bottom excavated surface to promote infiltration, and must extend from the low-flow trench to the toe of the basin side slopes. They shall be a minimum of 18-inches wide by 24-inches deep, unlined and backfilled with AASHTO No. 2 gravel (or similar) to the finished basin invert surface. The gravel collector trenches shall not use underdrains and shall be constructed with a maximum spacing of 25 feet, center to center. See Figure 1 of Appendix C.

c) Bottom Stage: A depressed sand filter drain area, referred to as the bottom stage, must be constructed adjacent to the outlet structure to treat any dry weather flows. To ensure that dry weather flows are treated through the sand filter and not discharged through the orifice plate, the top surface of the sand filter must be depressed at least 4 inches below the lowest orifice in the outlet structure. This depressed area will create a micro pool of water that is then filtered down through the sand filter and out through underdrains. Based on the minimum dimensions described below, the minimum depth of excavation below the lowest orifice in the outlet structure is 2.33 feet.

   i. Enter the Depth of the bottom stage, D_{BS}. As mentioned above, this depth must be at least 4 inches, and extend down below the lowest orifice in the outlet structure.

   ii. Enter the area of the bottom stage, A_{BS}.

iii. Based on the D_{BS} and A_{BS} entered, the spreadsheet will calculate V_{BS}. This volume is the volume of ponded water that will be held below the lowest orifice in the outlet structure, and above the surface of the sand filter. This volume must be at least 0.5% of V_{BMP}.

iv. Enter the thickness of the ASTM C-33 sand layer that will be provided, D_S. A minimum thickness of 18 inches is required.

v. Below the sand layer, a minimum 10-inch thick layer of gravel shall be installed with underdrains to drain the water that has been treated through the sand filter. The underdrains shall connect into the outlet structure. See Appendix B for standard underdrain construction. Enter the diameter of the underdrain pipe (minimum 6" dia.), and the spacing of the underdrains. The maximum spacing of the underdrains is 20 feet on center, however where the area of the bottom stage is particularly small (less than 500 square feet), the underdrain pipes shall be placed at no more than a 10-foot separation on center.

6. Basin Outlet Design

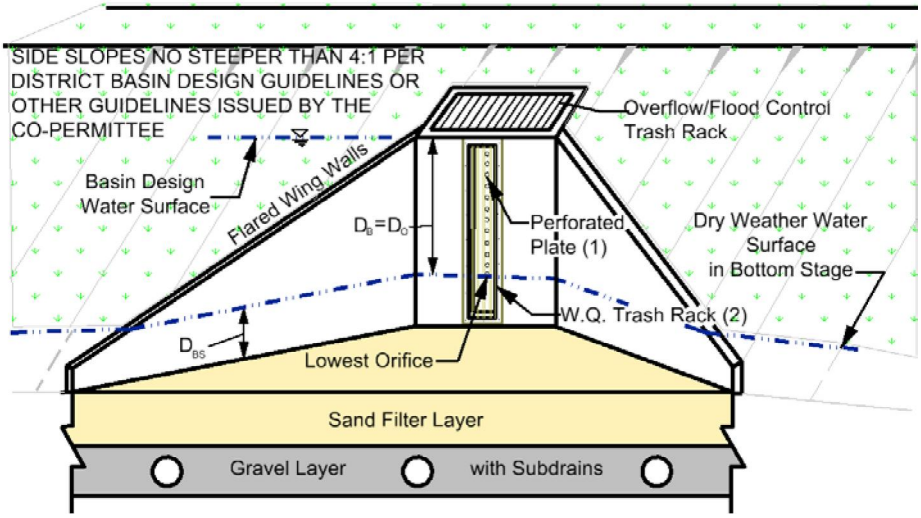


Figure 4: Basin Outlet Structure with Bottom Stage Shown

Outlet structures for publicly maintained basins shall conform to District Standard Drawings WQ501 unless approved in advance by the local Engineering Authority (EA). This standardization is to provide for efficient maintenance. The basin outlet should be sized to release the design volume, VBMP, within a 72-hour period but 50 percent of VBMP within 24 hours. This is an iterative design process where an appropriate control orifice can be selected using the following steps:

a. Develop a Stage vs. Discharge Curve for the Outlet Structure

Estimate the orifice size and outlet plate configuration (number per row, etc.). Based on D_O provided in the Basin Footprint section, the spreadsheet will automatically generate the stage vs. discharge relationship for this outlet:

$$Q = C*A*[2*g*(H-H_o)]^{0.5}$$

Where:

Q = discharge (ft^3/s)

C = orifice coefficient

A = area of the orifice (ft)

g = gravitational constant (32.2 ft2/s)

H = water surface elevation (ft)

H_o = orifice elevation (ft)

The lowest orifice shall be located with its centerline at the top of the bottom stage; at least 4 inches above the surface of the sand filter drain. To help avoid clogging, the minimum orifice diameter is limited to 3/8 inch. Since the 1/4 inch thickness of the orifice plate will be less than the orifice diameter, a value for C of 0.66 may be used. If another value for C is used, justification may be required.

b. Develop a Discharge/Volume vs. Stage Table for the Basin

Based on the shape and size of the basin, develop a relationship between the stage and the volume of water in the basin. Since the orifice spacing is 4 inches on center for the standard orifice plate, the stage intervals must also be 4 inches. Enter the basin volume at each interval starting at the centerline of the lowest orifice.

c. Route the Design Volume through the Basin

The spreadsheet assumes that the Design Volume, $V_{BMP,}$ enters the basin instantaneously and as such, no inflow/outflow hydrograph is necessary. The drawdown time for each stage becomes:

$$\Delta t = V_i/Q$$

Where:

Δt = drawdown time for each stage

V_i = the volume at each stage

Q = the flow rate corresponding to the headwater elevation at each stage.

The spreadsheet automatically determines the drawdown time from the sum of the Δt values for each stage. If the orifice size and plate configuration estimate meets the

hydraulic retention time requirements (50% of the volume empties in not less than 24 hours, 100% of the volume empties in no more than 72 hours), the outlet is correctly sized. If these requirements are not met, select a new orifice size or configuration and repeat the process starting at Step 6a.

7. Outlet Protection

To prevent the orifices from clogging, trash racks are required where perforated vertical outlet control plates are used. This allows for easier access to outlet orifices for inspection and cleaning. Trash racks shall be sized to prevent clogging of the primary water quality outlet without restricting the hydraulic capacity of the outlet control orifices. The orifice plate shall be protected with a trash rack conforming to Standard Drawing WQ501 (at end of this section) with at least six square feet of open surface area or 25 times the total orifice area, whichever is greater. The rack shall be adequately secured to prevent it from being removed or opened when maintenance is not occurring.

Overflow Structure Similar to Standard Drawing Number WQ 501
(Photo courtesy of Colorado Association of Stormwater Floodplain Managers)



Trash rack with screen



8. Overflow Outlet

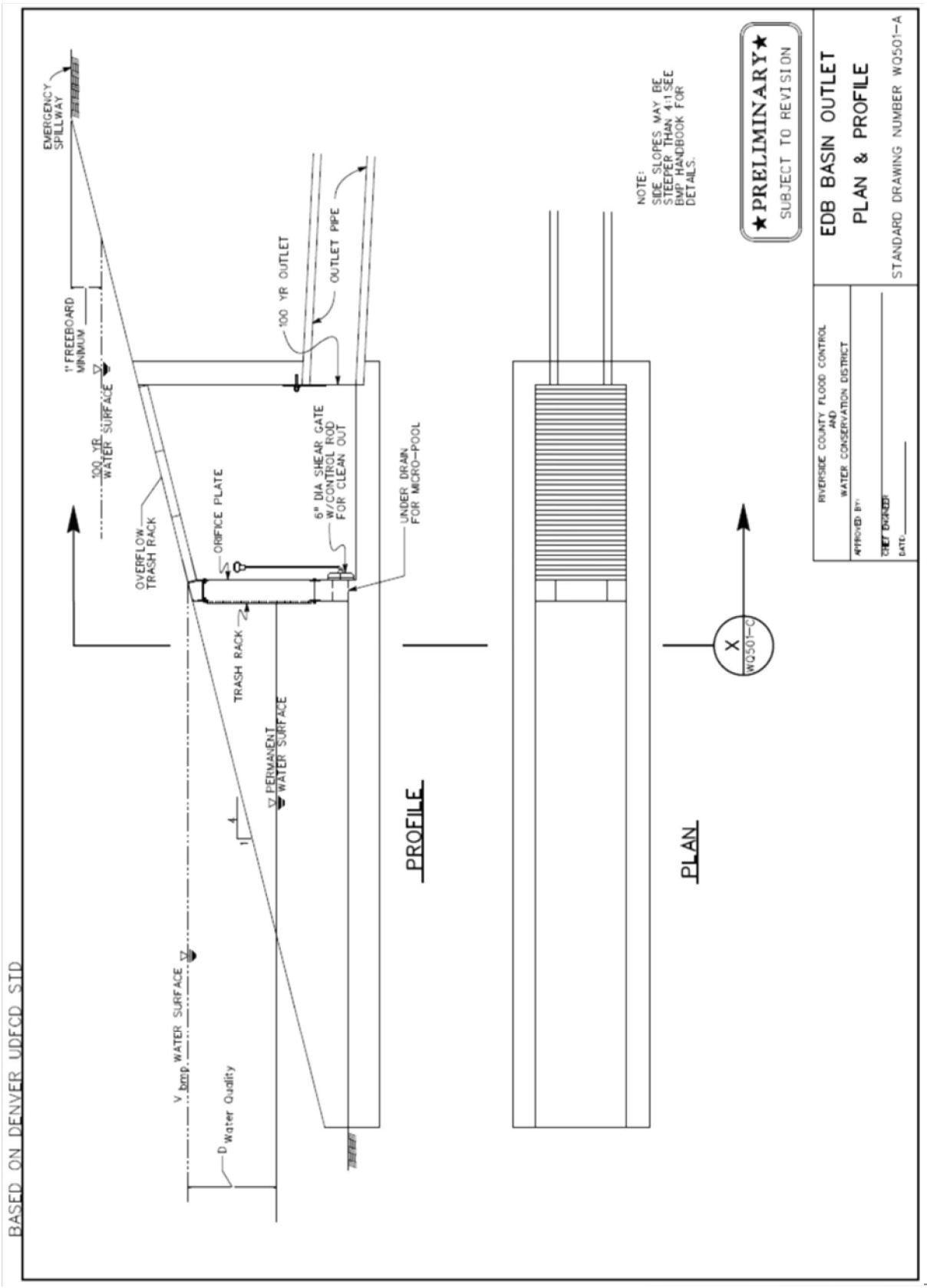
Overflow outlets for publicly maintained basins shall conform to Standard Drawing WQ501 (at end of this section) unless approved in advance by the Engineering Authority (EA).

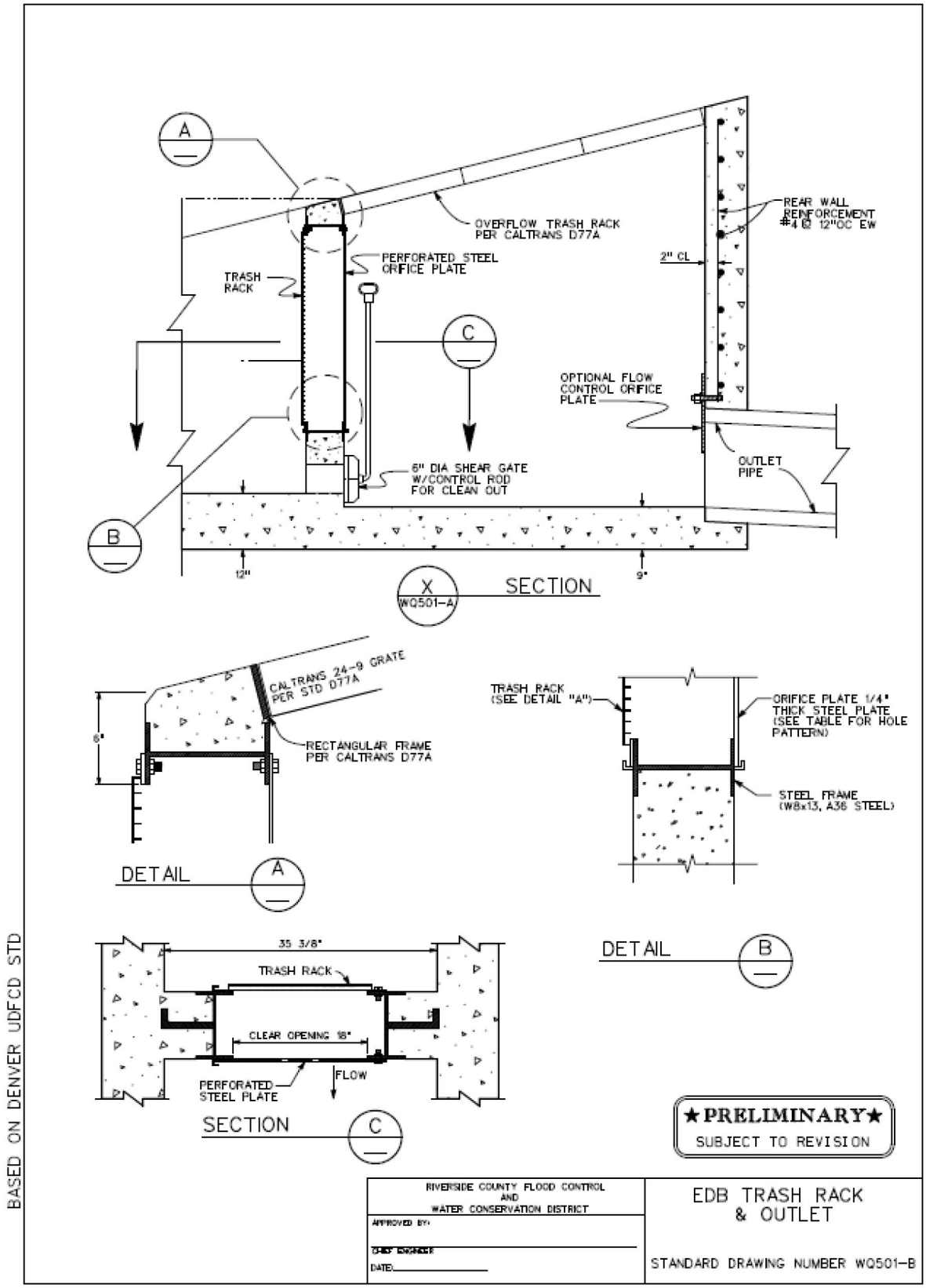
9. Embankment

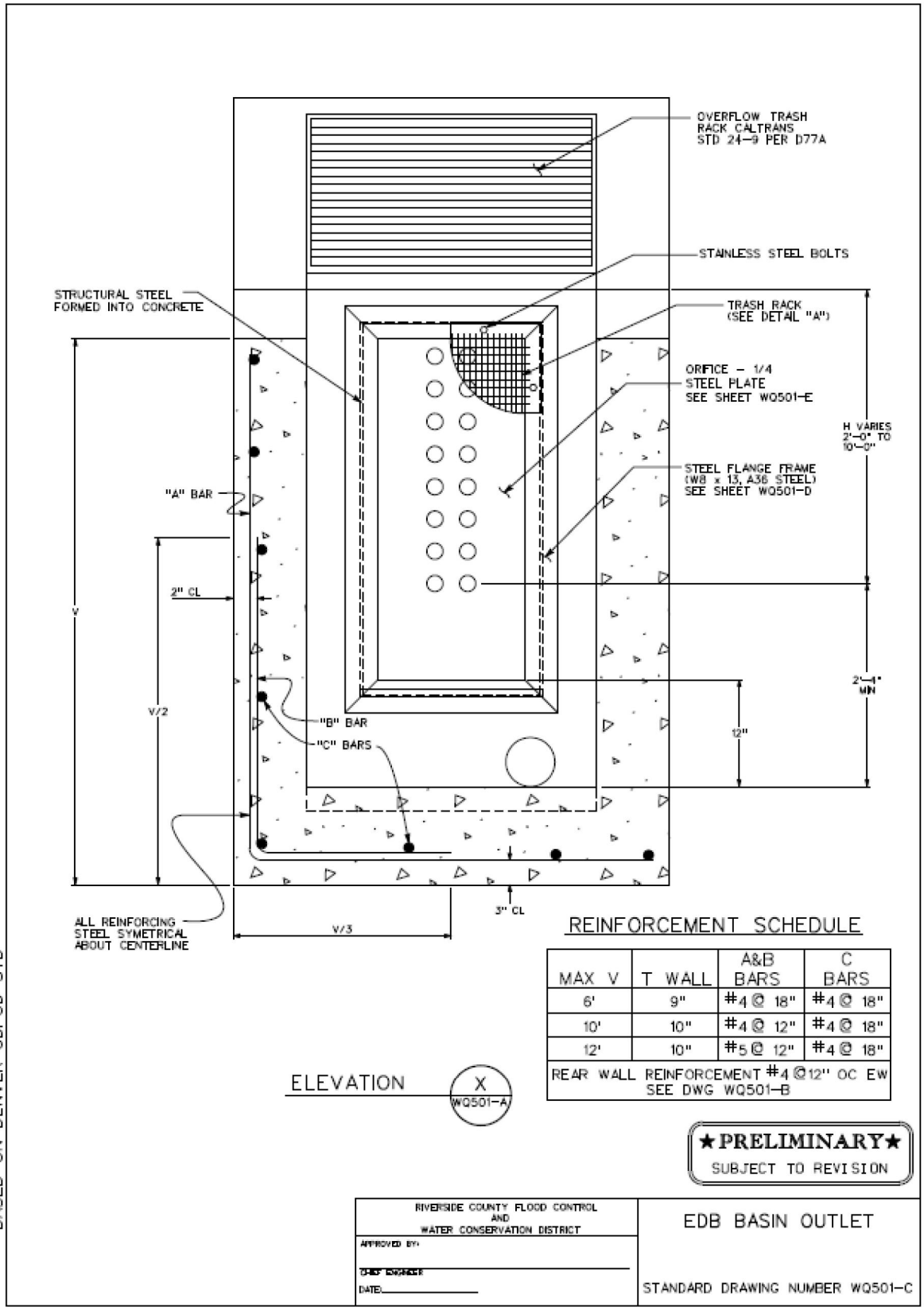
Embankments shall be designed in accordance with applicable standards of Riverside County Flood Control District's "Basin Guidelines" (Appendix C) or other guidelines issued by the Engineering Authority (EA). Where applicable, embankment designs must additionally conform to the requirements of the State of California Division of Safety of Dams.

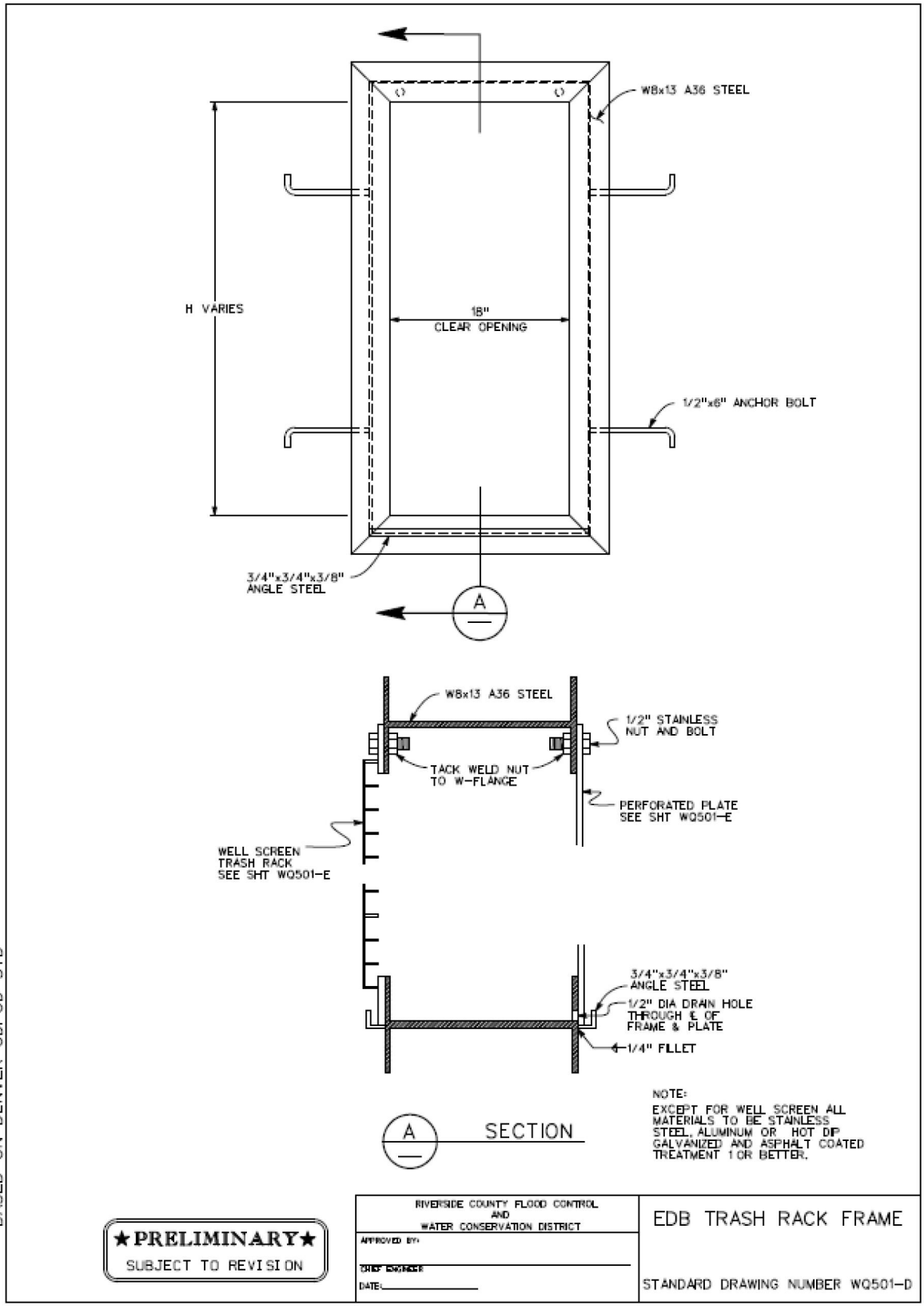
10. Spillway and Overflow Structures

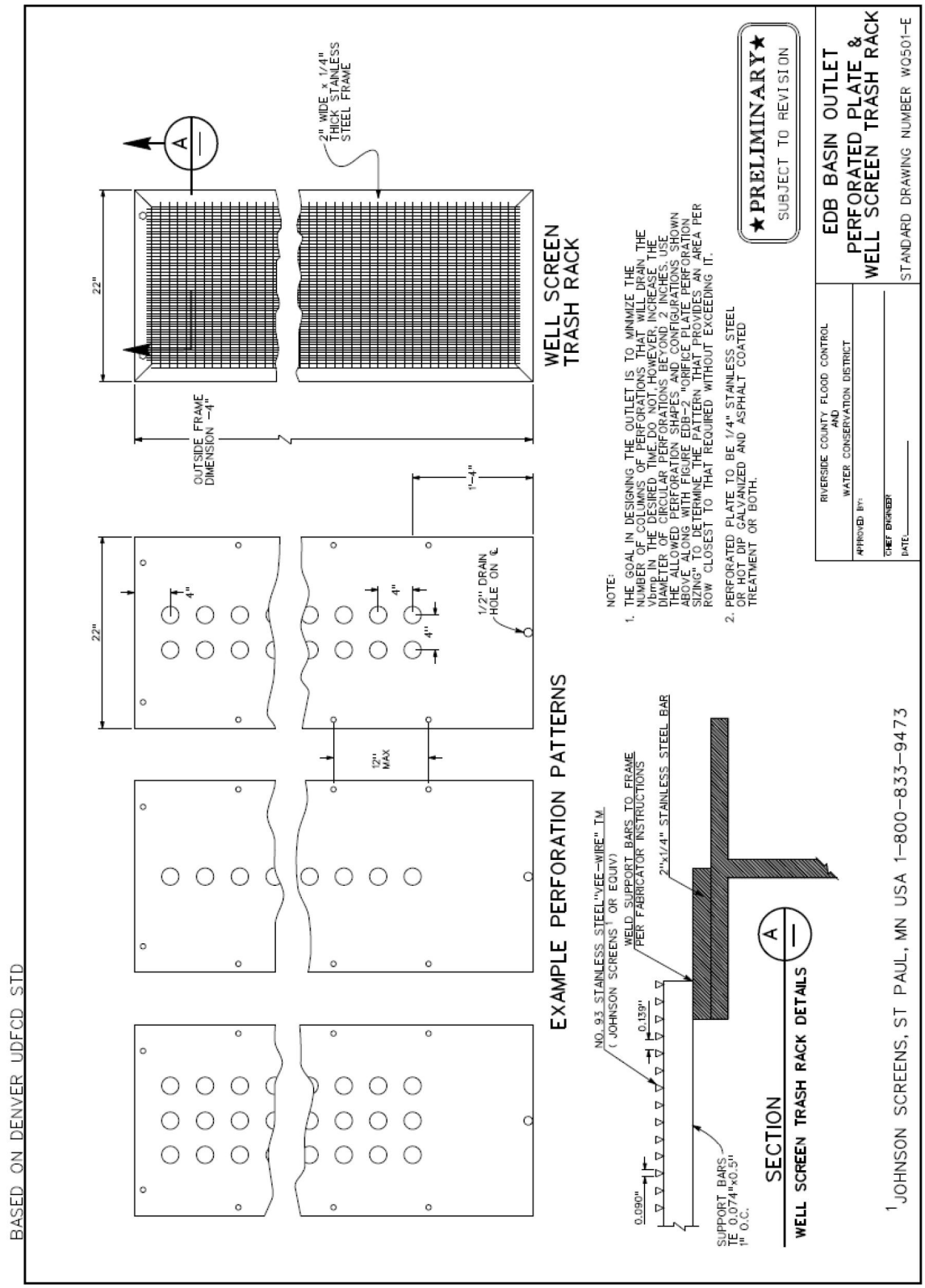
Spillway and overflow structures should be designed in accordance with applicable standards of the "Basin Guidelines" (Appendix C) or other guidelines issued by the Engineering Authority (EA).

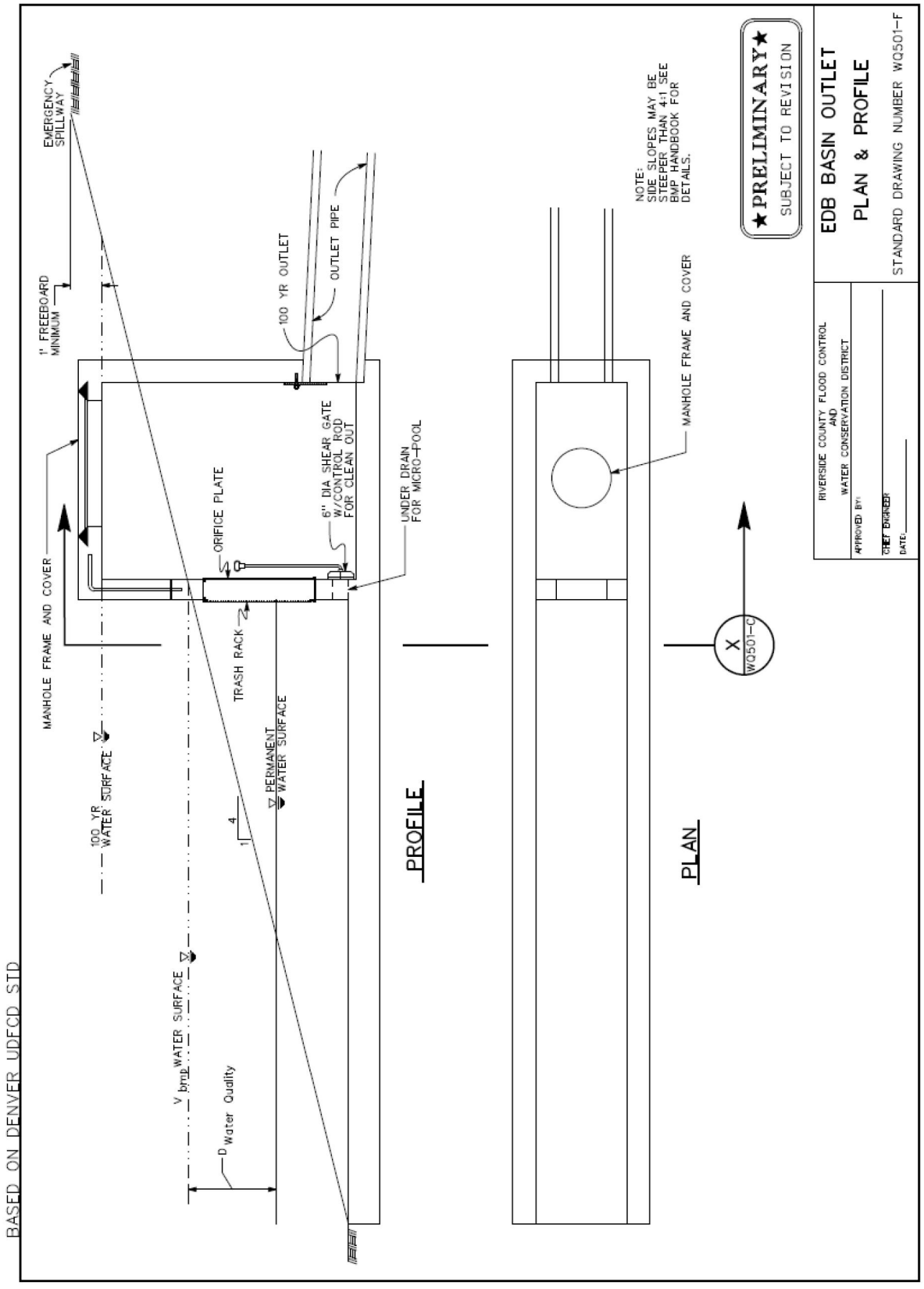

EMERGENCY SPILLWAY
1' FREEBOARD MINIMUM
100 YR WATER SURFACE
OVERFLOW TRASH RACK
ORIFICE PLATE
6" DIA SHEAR GATE W/CONTROL ROD FOR CLEAN OUT
100 YR OUTLET
OUTLET PIPE
UNDER DRAIN FOR MICRO-POOL
TRASH RACK
PERMANENT WATER SURFACE
WATER SURFACE
Water Quality
PROFILE
PLAN
NOTE:
SIDE SLOPES MAY BE STEEPER THAN 4:1 SEE BMP HANDBOOK FOR DETAILS.
★PRELIMINARY★
SUBJECT TO REVISION
EDB BASIN OUTLET
PLAN & PROFILE
STANDARD DRAWING NUMBER WQ501-A
RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT
APPROVED BY:
CHIEF ENGINEER
DATE:
BASED ON DENVER UDFCD STD

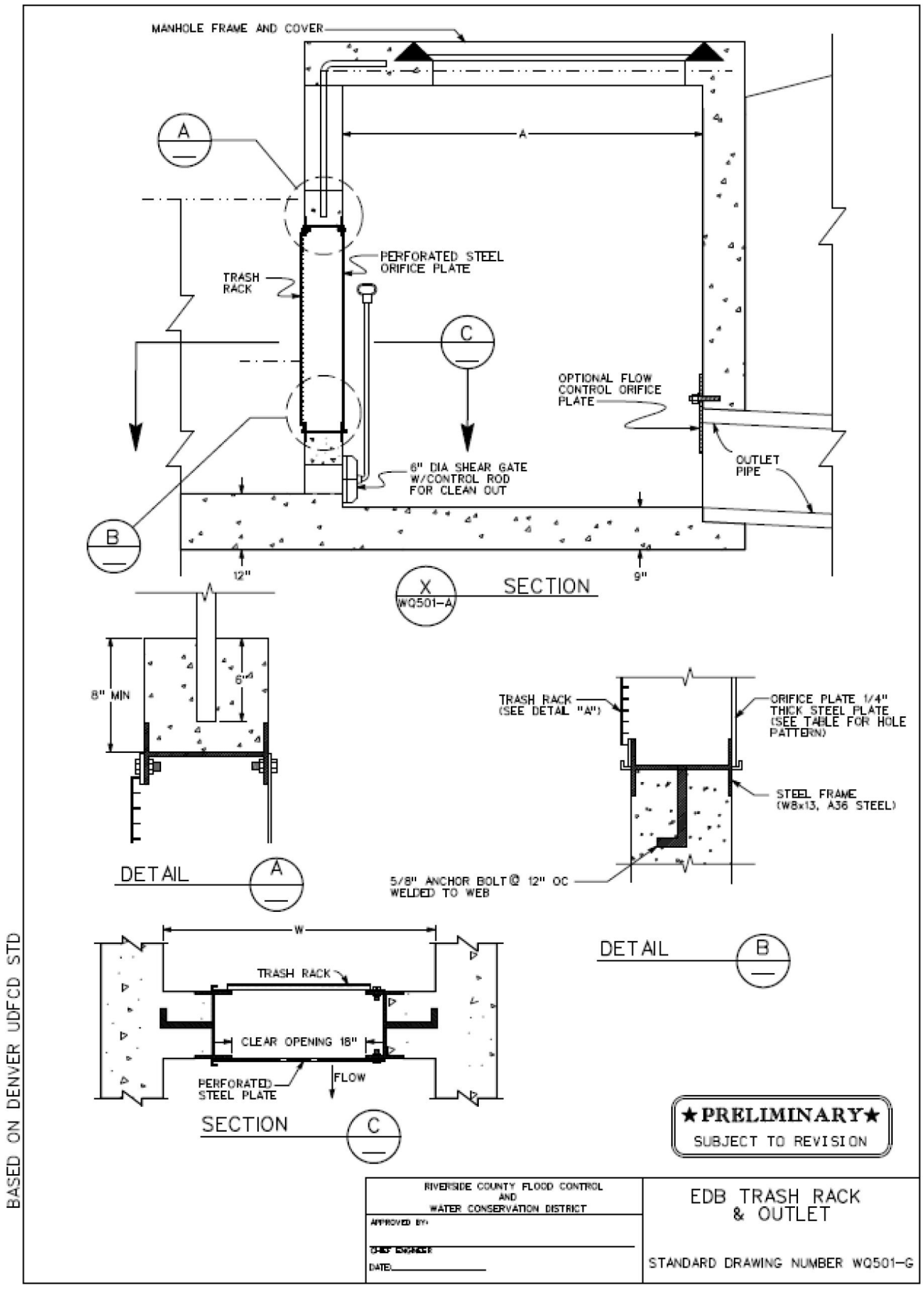

A
B
C
OVERFLOW TRASH RACK PER CALTRANS D77A
REAR WALL REINFORCEMENT #4 @ 12"OC EW
PERFORATED STEEL ORIFICE PLATE
TRASH RACK
2" CL
OPTIONAL FLOW CONTROL ORIFICE PLATE
6" DIA SHEAR GATE W/CONTROL ROD FOR CLEAN OUT
OUTLET PIPE
12"
9"
X
WQ501-A
SECTION
CALTRANS 24-9 GRATE PER STD D77A
RECTANGULAR FRAME PER CALTRANS D77A
6"
DETAIL A
TRASH RACK (SEE DETAIL "A")
ORIFICE PLATE 1/4" THICK STEEL PLATE (SEE TABLE FOR HOLE PATTERN)
STEEL FRAME (W8x13, A36 STEEL)
DETAIL B
35 3/8"
TRASH RACK
CLEAR OPENING 18"
FLOW
PERFORATED STEEL PLATE
SECTION C
★PRELIMINARY★
SUBJECT TO REVISION
BASED ON DENVER UDFCD STD
RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT
APPROVED BY:
CHIEF ENGINEER
DATE
EDB TRASH RACK & OUTLET
STANDARD DRAWING NUMBER WQ501-B

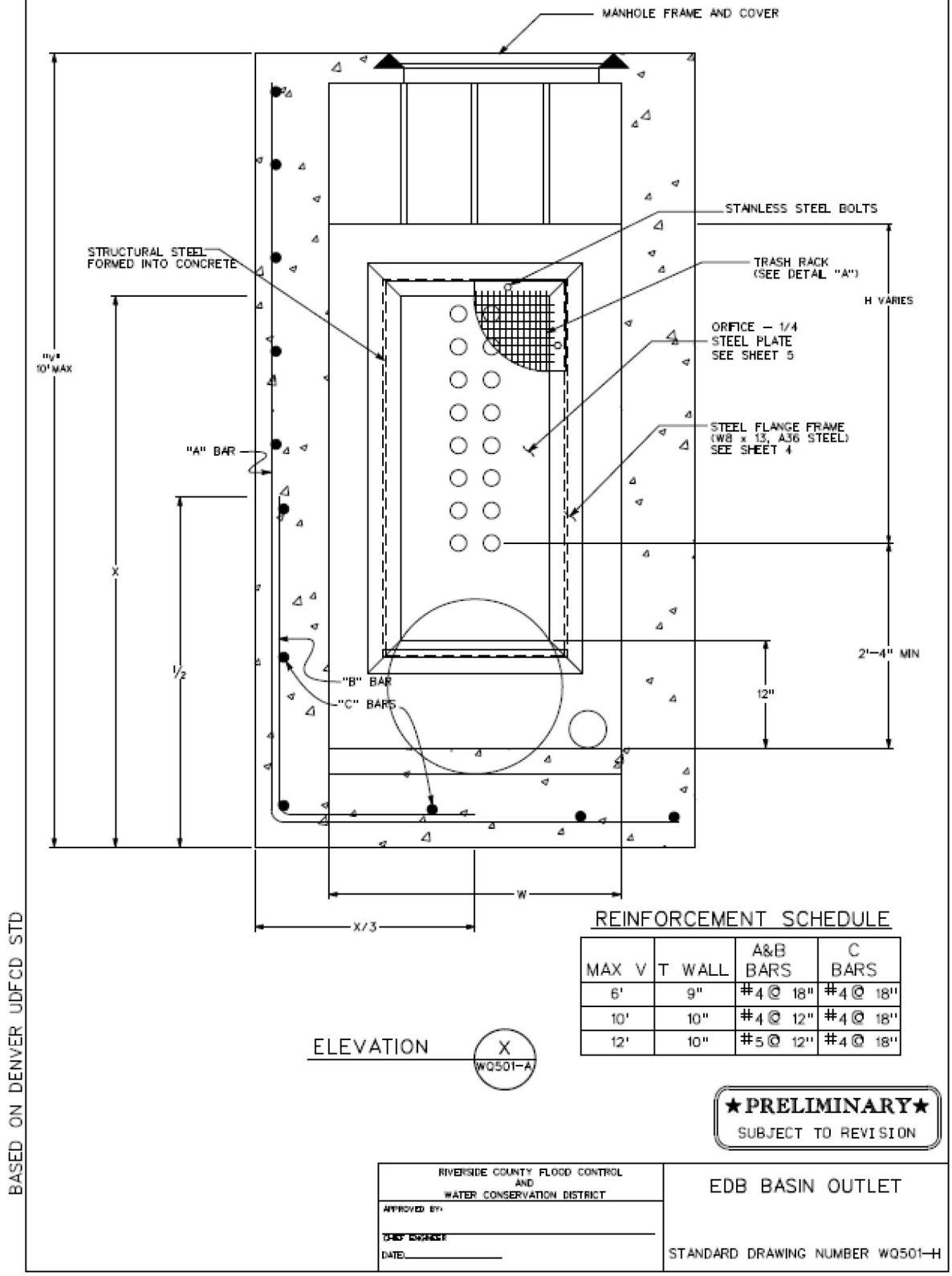

OVERFLOW TRASH RACK CALTRANS STD 24-9 PER D77A
STAINLESS STEEL BOLTS
STRUCTURAL STEEL FORMED INTO CONCRETE
TRASH RACK (SEE DETAIL "A")
ORIFICE - 1/4 STEEL PLATE SEE SHEET WQ501-E
H VARIES 2'-0" TO 10'-0"
STEEL FLANGE FRAME (W8 x 13, A36 STEEL) SEE SHEET WQ501-D
"A" BAR
2" CL
V
V/2
"B" BAR
"C" BARS
2'-1" MIN
12"
3" CL
ALL REINFORCING STEEL SYMETRICAL ABOUT CENTERLINE
V/3
ELEVATION
X
WQ501-A
BASED ON DENVER UDFCD STD
REINFORCEMENT SCHEDULE
MAX V | T WALL | A&B BARS | C BARS
6' | 9" | #4 @ 18" | #4 @ 18"
10' | 10" | #4 @ 12" | #4 @ 18"
12' | 10" | #5 @ 12" | #4 @ 18"
REAR WALL REINFORCEMENT #4 @12" OC EW SEE DWG WQ501-B
★PRELIMINARY★
SUBJECT TO REVISION
RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT
APPROVED BY:
CHIEF ENGINEER
DATE:
EDB BASIN OUTLET
STANDARD DRAWING NUMBER WQ501-C


W8x13 A36 STEEL
H VARIES
18"
CLEAR OPENING
1/2"x6" ANCHOR BOLT
3/4"x3/4"x3/8"
ANGLE STEEL
A
W8x13 A36 STEEL
1/2" STAINLESS
NUT AND BOLT
TACK WELD NUT
TO W-FLANGE
PERFORATED PLATE
SEE SHT WQ501-E
WELL SCREEN
TRASH RACK
SEE SHT WQ501-E
3/4"x3/4"x3/8"
ANGLE STEEL
1/2" DIA DRAIN HOLE
THROUGH ℄ OF
FRAME & PLATE
1/4" FILLET
A
SECTION
NOTE:
EXCEPT FOR WELL SCREEN ALL
MATERIALS TO BE STAINLESS
STEEL, ALUMINUM OR HOT DIP
GALVANIZED AND ASPHALT COATED
TREATMENT 1 OR BETTER.
BASED ON DENVER UDFCD STD
★PRELIMINARY★
SUBJECT TO REVISION
RIVERSIDE COUNTY FLOOD CONTROL
AND
WATER CONSERVATION DISTRICT
APPROVED BY:
CHIEF ENGINEER
DATE:
EDB TRASH RACK FRAME
STANDARD DRAWING NUMBER WQ501-D


BASED ON DENVER UDFCD STD
WELL SCREEN TRASH RACK
2" WIDE x 1/4" THICK STAINLESS STEEL FRAME
22"
OUTSIDE FRAME DIMENSION -4"
EXAMPLE PERFORATION PATTERNS
4"
1/2" DRAIN HOLE ON ℄
12" MAX
1-4"
NOTE:
1. THE GOAL IN DESIGNING THE OUTLET IS TO MINIMIZE THE NUMBER OF COLUMNS OF PERFORATIONS THAT WILL DRAIN THE WATER QUALITY VOLUME, HOWEVER, INCREASE THE DIAMETER OF CIRCULAR PERFORATIONS BEYOND 2 INCHES, USE THE ALLOWED PERFORATION SHAPES AND CONFIGURATIONS SHOWN ABOVE ALONG WITH FIGURE EDB-2 "ORIFICE PLATE PERFORATION SIZING" TO DETERMINE THE PATTERN THAT PROVIDES AN AREA PER ROW CLOSEST TO THAT REQUIRED WITHOUT EXCEEDING IT.
2. PERFORATED PLATE TO BE 1/4" STAINLESS STEEL OR HOT DIP GALVANIZED AND ASPHALT COATED TREATMENT OR BOTH.
★PRELIMINARY★
SUBJECT TO REVISION
RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT
APPROVED BY:
CHIEF ENGINEER
DATE:
EDB BASIN OUTLET
PERFORATED PLATE & WELL SCREEN TRASH RACK
STANDARD DRAWING NUMBER WQ501-E
NO. 93 STAINLESS STEEL "VEE-WIRE" TM (JOHNSON SCREENS[1] OR EQUIV)
WELD SUPPORT BARS TO FRAME PER FABRICATOR INSTRUCTIONS
2"x1/4" STAINLESS STEEL BAR
0.139"
0.090"
SUPPORT BARS TE 0.074"x0.5" 1" O.C.
SECTION
WELL SCREEN TRASH RACK DETAILS
[1]JOHNSON SCREENS, ST PAUL, MN USA 1-800-833-9473


BASED ON DENVER UDFCD STD
EMERGENCY SPILLWAY
1' FREEBOARD MINIMUM
100 YR OUTLET
OUTLET PIPE
6" DIA SHEAR GATE W/CONTROL ROD FOR CLEAN OUT
ORIFICE PLATE
UNDER DRAIN FOR MICRO-POOL
MANHOLE FRAME AND COVER
TRASH RACK
100 YR WATER SURFACE
PERMANENT WATER SURFACE
4
1
V brnp
WATER SURFACE
D Water Quality
PROFILE
NOTE:
SIDE SLOPES MAY BE STEEPER THAN 4:1 SEE BMP HANDBOOK FOR DETAILS.
MANHOLE FRAME AND COVER
X
WQ501-C
PLAN
★PRELIMINARY★
SUBJECT TO REVISION
EDB BASIN OUTLET
PLAN & PROFILE
STANDARD DRAWING NUMBER WQ501-F
RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT
APPROVED BY:
CHIEF ENGINEER
DATE:


MANHOLE FRAME AND COVER
A
A
PERFORATED STEEL ORIFICE PLATE
TRASH RACK
C
OPTIONAL FLOW CONTROL ORIFICE PLATE
6" DIA SHEAR GATE W/CONTROL ROD FOR CLEAN OUT
OUTLET PIPE
B
12"
9"
X
WQ501-A
SECTION
8" MIN
6"
DETAIL
A
TRASH RACK (SEE DETAIL "A")
ORIFICE PLATE 1/4" THICK STEEL PLATE (SEE TABLE FOR HOLE PATTERN)
STEEL FRAME (W8x13, A36 STEEL)
5/8" ANCHOR BOLT @ 12" OC WELDED TO WEB
DETAIL
B
W
TRASH RACK
CLEAR OPENING 18"
PERFORATED STEEL PLATE
FLOW
SECTION
C
★PRELIMINARY★
SUBJECT TO REVISION
BASED ON DENVER UDFCD STD
RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT
APPROVED BY:
DATE:
EDB TRASH RACK & OUTLET
STANDARD DRAWING NUMBER WQ501-G


MANHOLE FRAME AND COVER
STAINLESS STEEL BOLTS
STRUCTURAL STEEL FORMED INTO CONCRETE
TRASH RACK (SEE DETAIL "A")
H VARIES
ORIFICE – 1/4 STEEL PLATE SEE SHEET 5
"y" 10' MAX
"A" BAR
STEEL FLANGE FRAME (W8 x 13, A36 STEEL) SEE SHEET 4
X
1/2
"B" BAR
"C" BARS
2'–4" MIN
12"
W
X/3
BASED ON DENVER UDFCD STD
REINFORCEMENT SCHEDULE
MAX V | T WALL | A&B BARS | C BARS
6' | 9" | #4 @ 18" | #4 @ 18"
10' | 10" | #4 @ 12" | #4 @ 18"
12' | 10" | #5 @ 12" | #4 @ 18"
ELEVATION X WQ501-A
★PRELIMINARY★
SUBJECT TO REVISION
RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT
APPROVED BY:
CHIEF ENGINEER
DATE:
EDB BASIN OUTLET
STANDARD DRAWING NUMBER WQ501–H

Appendix 7: Hydromodification

Supporting Detail Relating to Hydrologic Conditions of Concern

Appendix 8: Source Control

Pollutant Sources/Source Control Checklist

Appendix 8
STORMWATER POLLUTANT SOURCES/SOURCE CONTROL CHECKLIST

How to use this worksheet (also see instructions in Section H of the 2018 SMR WQMP Template):

1. Review Column 1 and identify which of these potential sources of stormwater pollutants apply to your site. Check each box that applies.
2. Review Column 2 and incorporate all of the corresponding applicable BMPs in your WQMP Exhibit.
3. Review Columns 3 and 4 and incorporate all of the corresponding applicable permanent controls and operational BMPs in your WQMP. Use the format shown in Table H.1 of this WQMP Template. Describe your specific BMPs in an accompanying narrative, and explain any special conditions or situations that required omitting BMPs or substituting alternative BMPs for those shown here.

IF THESE SOURCES WILL BE ON THE PROJECT SITE ...	**... THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE**		
1 **Potential Sources of Runoff Pollutants**	**2** **Permanent Controls—Show on WQMP Drawings**	**3** **Permanent Controls—List in WQMP Table and Narrative**	**4** **Operational BMPs—Include in WQMP Table and Narrative**
☑ **A.** On-site storm drain inlets	☑ Locations of inlets.	☑ Mark all inlets with the words "Only Rain Down the Storm Drain" or similar. Catch Basin Markers may be available from the Riverside County Flood Control and Water Conservation District, call 951.955.1200 to verify.	☑ Maintain and periodically repaint or replace inlet markings. ☑ Provide stormwater pollution prevention information to new site owners, lessees, or operators. ☑ See applicable operational BMPs in Fact Sheet SC-44, "Drainage System Maintenance," in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com ☑ Include the following in lease agreements: "Tenant shall not allow anyone to discharge anything to storm drains or to store or deposit materials so as to create a potential discharge to storm drains."
☑ **B.** Interior floor drains and elevator shaft sump pumps		☑ State that interior floor drains and elevator shaft sump pumps will be plumbed to sanitary sewer.	☑ Inspect and maintain drains to prevent blockages and overflow.
☐ **C.** Interior parking garages		☐ State that parking garage floor drains will be plumbed to the sanitary sewer.	☐ Inspect and maintain drains to prevent blockages and overflow.

IF THESE SOURCES WILL BE ON THE PROJECT SITE ...	... THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE		
1 **Potential Sources of Runoff Pollutants**	**2** **Permanent Controls—Show on WQMP Drawings**	**3** **Permanent Controls—List in WQMP Table and Narrative**	**4** **Operational BMPs—Include in WQMP Table and Narrative**
☐ **D1.** Need for future indoor & structural pest control		☐ Note building design features that discourage entry of pests.	☐ Provide Integrated Pest Management information to owners, lessees, and operators.
☑ **D2.** Landscape/ Outdoor Pesticide Use	☑ Show locations of native trees or areas of shrubs and ground cover to be undisturbed and retained. ☑ Show self-retaining landscape areas, if any. ☑ Show stormwater treatment and hydrograph modification management BMPs.	State that final landscape plans will accomplish all of the following. ☑ Preserve existing native trees, shrubs, and ground cover to the maximum extent possible. ☑ Design landscaping to minimize irrigation and runoff, to promote surface infiltration where appropriate, and to minimize the use of fertilizers and pesticides that can contribute to stormwater pollution. ☑ Where landscaped areas are used to retain or detain stormwater, specify plants that are tolerant of saturated soil conditions. ☐ Consider using pest-resistant plants, especially adjacent to hardscape. To insure successful establishment, select plants appropriate to site soils, slopes, climate, sun, wind, rain, land use, air movement, ecological consistency, and plant interactions.	☑ Maintain landscaping using minimum or no pesticides. ☑ See applicable operational BMPs in "What you should know for…..Landscape and Gardening" at: http://www.rcwatershed.org/about/materials-library/#1450469138395-bb76dd39-d810 ☑ Provide IPM information to new owners, lessees and operators.

IF THESE SOURCES WILL BE ON THE PROJECT SITE ...	... THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE		
1 Potential Sources of Runoff Pollutants	2 Permanent Controls—Show on WQMP Drawings	3 Permanent Controls—List in WQMP Table and Narrative	4 Operational BMPs—Include in WQMP Table and Narrative
☑ **E.** Pools, spas, ponds, decorative fountains, and other water features.	☑ Show location of water feature and a sanitary sewer cleanout in an accessible area within 10 feet. (Exception: Public pools must be plumbed according to County Department of Environmental Health Guidelines.)	If the Co-Permittee requires pools to be plumbed to the sanitary sewer, place a note on the plans and state in the narrative that this connection will be made according to local requirements.	☑ See applicable operational BMPs in "Guidelines for Maintaining Your Swimming Pool, Jacuzzi and Garden Fountain" at: http://www.rcwatershed.org/about/materials-library/#1450469201433-f5f358c9-6008
☑ **F.** Food service	☑ For restaurants, grocery stores, and other food service operations, show location (indoors or in a covered area outdoors) of a floor sink or other area for cleaning floor mats, containers, and equipment. ☑ On the drawing, show a note that this drain will be connected to a grease interceptor before discharging to the sanitary sewer.	☑ Describe the location and features of the designated cleaning area. ☑ Describe the items to be cleaned in this facility and how it has been sized to insure that the largest items can be accommodated.	☑ See the brochure, "The Food Service Industry Best Management Practices for: Restaurants, Grocery Stores, Delicatessens and Bakeries" at http://www.rcwatershed.org/about/materials-library/#1450389926766-61e8af0b-53a9 Provide this brochure to new site owners, lessees, and operators.
☑ **G.** Refuse areas	☑ Show where site refuse and recycled materials will be handled and stored for pickup. See local municipal requirements for sizes and other details of refuse areas. ☑ If dumpsters or other receptacles are outdoors, show how the designated area will be covered, graded, and paved to prevent run-on and show locations of berms to prevent runoff from the area. ☑ Any drains from dumpsters, compactors, and tallow bin areas shall be connected to a grease removal device before discharge to sanitary sewer.	☑ State how site refuse will be handled and provide supporting detail to what is shown on plans. ☑ State that signs will be posted on or near dumpsters with the words "Do not dump hazardous materials here" or similar.	☑ State how the following will be implemented: Provide adequate number of receptacles. Inspect receptacles regularly; repair or replace leaky receptacles. Keep receptacles covered. Prohibit/prevent dumping of liquid or hazardous wastes. Post "no hazardous materials" signs. Inspect and pick up litter daily and clean up spills immediately. Keep spill control materials available on-site. See Fact Sheet SC-34, "Waste Handling and Disposal" in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com

IF THESE SOURCES WILL BE ON THE PROJECT SITE ...	... THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE		
1 **Potential Sources of Runoff Pollutants**	**2** **Permanent Controls—Show on WQMP Drawings**	**3** **Permanent Controls—List in WQMP Table and Narrative**	**4** **Operational BMPs—Include in WQMP Table and Narrative**
❑ **H.** Industrial processes.	❑ Show process area.	❑ If industrial processes are to be located on site, state: "All process activities to be performed indoors. No processes to drain to exterior or to storm drain system."	❑ See Fact Sheet SC-10, "Non-Stormwater Discharges" in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com See the brochure "Industrial & Commercial Facilities Best Management Practices for: Industrial, Commercial Facilities" at; http://www.rcwatershed.org/about/materials-library/#1450389926766-61e8af0b-53a9
❑ **I.** Outdoor storage of equipment or materials. (See rows J and K for source control measures for vehicle cleaning, repair, and maintenance.)	❑ Show any outdoor storage areas, including how materials will be covered. Show how areas will be graded and bermed to prevent run-on or run-off from area. ❑ Storage of non-hazardous liquids shall be covered by a roof and/or drain to the sanitary sewer system, and be contained by berms, dikes, liners, or vaults. ❑ Storage of hazardous materials and wastes must be in compliance with the local hazardous materials ordinance and a Hazardous Materials Management Plan for the site.	❑ Include a detailed description of materials to be stored, storage areas, and structural features to prevent pollutants from entering storm drains. Where appropriate, reference documentation of compliance with the requirements of Hazardous Materials Programs for: ▪ Hazardous Waste Generation ▪ Hazardous Materials Release Response and Inventory ▪ California Accidental Release (CalARP) ▪ Aboveground Storage Tank ▪ Uniform Fire Code Article 80 Section 103(b) & (c) 1991 ▪ Underground Storage Tank www.cchealth.org/groups/hazmat/	❑ See the Fact Sheets SC-31, "Outdoor Liquid Container Storage" and SC-33, "Outdoor Storage of Raw Materials " in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com

IF THESE SOURCES WILL BE ON THE PROJECT SITE ...	... THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE		
1 **Potential Sources of Runoff Pollutants**	**2** **Permanent Controls—Show on WQMP Drawings**	**3** **Permanent Controls—List in WQMP Table and Narrative**	**4** **Operational BMPs—Include in WQMP Table and Narrative**
❑ **J.** Vehicle and Equipment Cleaning	❑ Show on drawings as appropriate: (1) Commercial/industrial facilities having vehicle/equipment cleaning needs shall either provide a covered, bermed area for washing activities or discourage vehicle/equipment washing by removing hose bibs and installing signs prohibiting such uses. (2) Multi-dwelling complexes shall have a paved, bermed, and covered car wash area (unless car washing is prohibited on-site and hoses are provided with an automatic shut-off to discourage such use). (3) Washing areas for cars, vehicles, and equipment shall be paved, designed to prevent run-on to or runoff from the area, and plumbed to drain to the sanitary sewer. (4) Commercial car wash facilities shall be designed such that no runoff from the facility is discharged to the storm drain system. Wastewater from the facility shall discharge to the sanitary sewer, or a wastewater reclamation system shall be installed.	❑ If a car wash area is not provided, describe any measures taken to discourage on-site car washing and explain how these will be enforced.	Describe operational measures to implement the following (if applicable): ❑ Washwater from vehicle and equipment washing operations shall not be discharged to the storm drain system. Refer to "Outdoor Cleaning Activities and Professional Mobile Service Providers" for many of the Potential Sources of Runoff Pollutants categories below. Brochure can be found at: http://www.rcwatershed.org/about/materials-library/#1450389926766-61e8af0b-53a9 ❑ Car dealerships and similar may rinse cars with water only.

IF THESE SOURCES WILL BE ON THE PROJECT SITE ...	... THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE		
1 **Potential Sources of Runoff Pollutants**	2 **Permanent Controls—Show on WQMP Drawings**	3 **Permanent Controls—List in WQMP Table and Narrative**	4 **Operational BMPs—Include in WQMP Table and Narrative**
❑ **K.** Vehicle/Equipment Repair and Maintenance	❑ Accommodate all vehicle equipment repair and maintenance indoors. Or designate an outdoor work area and design the area to prevent run-on and runoff of stormwater. ❑ Show secondary containment for exterior work areas where motor oil, brake fluid, gasoline, diesel fuel, radiator fluid, acid-containing batteries or other hazardous materials or hazardous wastes are used or stored. Drains shall not be installed within the secondary containment areas. ❑ Add a note on the plans that states either (1) there are no floor drains, or (2) floor drains are connected to wastewater pretreatment systems prior to discharge to the sanitary sewer and an industrial waste discharge permit will be obtained.	❑ State that no vehicle repair or maintenance will be done outdoors, or else describe the required features of the outdoor work area. ❑ State that there are no floor drains or if there are floor drains, note the agency from which an industrial waste discharge permit will be obtained and that the design meets that agency's requirements. ❑ State that there are no tanks, containers or sinks to be used for parts cleaning or rinsing or, if there are, note the agency from which an industrial waste discharge permit will be obtained and that the design meets that agency's requirements.	In the Stormwater Control Plan, note that all of the following restrictions apply to use the site: ❑ No person shall dispose of, nor permit the disposal, directly or indirectly of vehicle fluids, hazardous materials, or rinsewater from parts cleaning into storm drains. ❑ No vehicle fluid removal shall be performed outside a building, nor on asphalt or ground surfaces, whether inside or outside a building, except in such a manner as to ensure that any spilled fluid will be in an area of secondary containment. Leaking vehicle fluids shall be contained or drained from the vehicle immediately. ❑ No person shall leave unattended drip parts or other open containers containing vehicle fluid, unless such containers are in use or in an area of secondary containment. Refer to "Automotive Maintenance & Car Care Best Management Practices for Auto Body Shops, Auto Repair Shops, Car Dealerships, Gas Stations and Fleet Service Operations; "Outdoor Cleaning Activities;" and "Professional Mobile Service Providers" for many of the Potential Sources of Runoff Pollutants. Brochures can be found at: http://www.rcwatershed.org/about/materials-library/#1450389926766-61e8af0b-53a9

IF THESE SOURCES WILL BE ON THE PROJECT SITE ...	... THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE		
1 Potential Sources of Runoff Pollutants	2 Permanent Controls—Show on WQMP Drawings	3 Permanent Controls—List in WQMP Table and Narrative	4 Operational BMPs—Include in WQMP Table and Narrative
☑ **L.** Fuel Dispensing Areas	☑ Fueling areas[6] shall have impermeable floors (i.e., portland cement concrete or equivalent smooth impervious surface) that are: a) graded at the minimum slope necessary to prevent ponding; and b) separated from the rest of the site by a grade break that prevents run-on of stormwater to the maximum extent practicable. ☑ Fueling areas shall be covered by a canopy that extends a minimum of ten feet in each direction from each pump. [Alternative: The fueling area must be covered and the cover's minimum dimensions must be equal to or greater than the area within the grade break or fuel dispensing area[1].] The canopy [or cover] shall not drain onto the fueling area.		☑ The property owner shall dry sweep the fueling area routinely. ☑ See the Fact Sheet SD-30 , "Fueling Areas" in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com

[6] The fueling area shall be defined as the area extending a minimum of 6.5 feet from the corner of each fuel dispenser or the length at which the hose and nozzle assembly may be operated plus a minimum of one foot, whichever is greater.

IF THESE SOURCES WILL BE ON THE PROJECT SITE ...	... THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE		
1 Potential Sources of Runoff Pollutants	2 Permanent Controls—Show on WQMP Drawings	3 Permanent Controls—List in WQMP Table and Narrative	4 Operational BMPs—Include in WQMP Table and Narrative
☑ **M.** Loading Docks	☑ Show a preliminary design for the loading dock area, including roofing and drainage. Loading docks shall be covered and/or graded to minimize run-on to and runoff from the loading area. Roof downspouts shall be positioned to direct stormwater away from the loading area. Water from loading dock areas shall be drained to the sanitary sewer, or diverted and collected for ultimate discharge to the sanitary sewer. ☑ Loading dock areas draining directly to the sanitary sewer shall be equipped with a spill control valve or equivalent device, which shall be kept closed during periods of operation. ☑ Provide a roof overhang over the loading area or install door skirts (cowling) at each bay that enclose the end of the trailer.		☑ Move loaded and unloaded items indoors as soon as possible. ☑ See Fact Sheet SC-30, "Outdoor Loading and Unloading," in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com

IF THESE SOURCES WILL BE ON THE PROJECT SITE ...	... THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE		
1 **Potential Sources of Runoff Pollutants**	**2** **Permanent Controls—Show on WQMP Drawings**	**3** **Permanent Controls—List in WQMP Table and Narrative**	**4** **Operational BMPs—Include in WQMP Table and Narrative**
☑ **N.** Fire Sprinkler Test Water		☑ Provide a means to drain fire sprinkler test water to the sanitary sewer.	☑ See the note in Fact Sheet SC-41, "Building and Grounds Maintenance," in the CASQA Stormwater Quality Handbooks at www.cabmphandbooks.com
O. Miscellaneous Drain or Wash Water or Other Sources ❑ Boiler drain lines ❑ Condensate drain lines ☑ Rooftop equipment ❑ Drainage sumps ❑ Roofing, gutters, and trim. ❑ Other sources		❑ Boiler drain lines shall be directly or indirectly connected to the sanitary sewer system and may not discharge to the storm drain system. ❑ Condensate drain lines may discharge to landscaped areas if the flow is small enough that runoff will not occur. Condensate drain lines may not discharge to the storm drain system. ☑ Rooftop equipment with potential to produce pollutants shall be roofed and/or have secondary containment. ❑ Any drainage sumps on-site shall feature a sediment sump to reduce the quantity of sediment in pumped water. ❑ Avoid roofing, gutters, and trim made of copper or other unprotected metals that may leach into runoff. ❑ Include controls for other sources as specified by local reviewer.	

Appendix 8
STORMWATER POLLUTANT SOURCES/SOURCE CONTROL CHECKLIST

IF THESE SOURCES WILL BE ON THE PROJECT SITE ...	... THEN YOUR WQMP SHOULD INCLUDE THESE SOURCE CONTROL BMPs, AS APPLICABLE		
1 Potential Sources of Runoff Pollutants	2 Permanent Controls—Show on WQMP Drawings	3 Permanent Controls—List in WQMP Table and Narrative	4 Operational BMPs—Include in WQMP Table and Narrative
☑ **P.** Plazas, sidewalks, and parking lots.			☑ Sweep plazas, sidewalks, and parking lots regularly to prevent accumulation of litter and debris. Collect debris from pressure washing to prevent entry into the storm drain system. Collect washwater containing any cleaning agent or degreaser and discharge to the sanitary sewer not to a storm drain.

Appendix 9: O&M

Operation and Maintenance Plan and Documentation of Finance, Maintenance and Recording Mechanisms

CITY OF MENIFEE
WATER QUALITY MANAGEMENT PLAN AND STORMWATER BMP MAINTENANCE AND RIGHT OF ENTRY AGREEMENT WITH ARANTINE HILLS HOLDINGS, LP

1. PARTIES AND DATE.

THIS WATER QUALITY MANAGEMENT PLAN AND STORMWATER BMP MAINTENANCE AND RIGHT OF ENTRY AGREEMENT ("Agreement") is made and entered into in the City of Menifee, California, this ___ day of _____ 2021 by and between the City of Menifee, a California municipal corporation ("City"), and _____, with its principal place of business at _____ ("Owner"). This Agreement applies to property located at APN No. _____ in the County of Riverside, State of California.

2. RECITALS.

2.1 The Owner owns real property ("Property") in the City of Menifee, County of Riverside, State of California, more specifically described in Exhibit "A" and depicted in Exhibit "B", each of which exhibits is attached hereto and incorporated herein by this reference.

2.2 At the time of initial approval of Owner's development project known as _____, within the Property, the City required the project to employ Best Management Practices, hereinafter referred to as "BMPs," to minimize pollutants in urban runoff.

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

2.4 The WQMP has been certified by the Owner and reviewed and approved by the City.

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

2.6 The Owner is aware that periodic and continuous maintenance, including, but not necessarily limited to, filter material replacement and sediment removal, is required to assure peak performance of all BMPs in the WQMP and that, furthermore, such maintenance activity will require compliance with all Local, State, or Federal laws

and regulations, including those pertaining to confined space and waste disposal methods, in effect at the time such maintenance occurs

3. TERMS.

3.1 Responsibility for Operation and Maintenance of BMPs. Owner shall diligently maintain all BMPs in a manner assuring peak performance at all times. All reasonable precautions shall be exercised by Owner and Owner's representative or contractor in the removal and extraction of any material(s) from the BMPs and the ultimate disposal of the material(s) in a manner consistent with all relevant laws and regulations in effect at the time. As may be requested from time to time by the City, the Owner shall provide the City with documentation identifying the material(s) removed, the quantity, and disposal destination.

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

3.3 City Maintenance at Owner's Expense. In the event Owner, or its successors or assigns, fails to accomplish the necessary maintenance contemplated by this Agreement, within five (5) days of being given written notice by the City, the City is hereby authorized to cause any maintenance necessary to be done and charge the entire cost and expense to the Owner or Owner's successors or assigns, including administrative costs, attorneys fees and interest thereon at the maximum rate authorized by the Civil Code from the date of the notice of expense until paid in full. The City, at its sole election, may make these costs to be a lien upon the property that may be collected at the same time and in the same manner as ordinary municipal taxes as provided in Government Code section 38773.5. Nothing in this section or this Agreement creates an obligation by the City to maintain or repair any BMP, nor does this section prohibit the City from pursuing other legal recourse against Owner.

3.4 Recording. This Agreement shall be recorded in the Office of the Recorder of Riverside County, California, at the expense of the Owner and shall constitute notice to all successors and assigns of the title to said Property of the obligation herein set forth, and also a lien in such amount as will fully reimburse the City, including interest as herein above set forth, subject to foreclosure in event of default in payment.

3.5 Attorney's Fees. In event of legal action occasioned by any default or action of the Owner, or its successors or assigns, the Owner and its successors or assigns agree(s) to pay all costs incurred by the City in enforcing the terms of this Agreement,

including reasonable attorney's fees and costs, and that the same shall become a part of the lien against said Property.

3.6 Covenant. It is the intent of the parties hereto that burdens and benefits herein undertaken shall constitute covenants that run with said Property and constitute a lien there against.

3.7 Binding on Successors. The obligations herein undertaken shall be binding upon the heirs, successors, executors, administrators and assigns of the parties hereto. The term "Owner" shall include not only the present Owner, but also its heirs, successors, executors, administrators, and assigns. Owner shall notify any successor to title of all or part of the Property about the existence of this Agreement. Owner shall provide such notice prior to such successor obtaining an interest in all or part of the Property. Owner shall provide a copy of such notice to the City at the same time such notice is provided to the successor.

3.8 Indemnity and Insurance. The Owner, its heirs, successors, executors, administrators and assigns agree to defend, indemnify and holds harmless the City, its officials, employees and its authorized agents from any and all damages, accidents, casualties, occurrences or claims (collectively, "Claims") which might arise or be asserted against the City and which are in any way connected with the construction, operation, presence, existence or maintenance of the BMP by the Owner, or from any personal injury or property damage that may result from the City or other public entities entering the Property under Sections 2 or 3 of this Agreement; provided, however, that in no event shall Owner, its heirs, successors, executors, administrators and assigns be obligated to defend, indemnify or hold harmless the City, its officials, employees, and its authorized agents from any Claims arising from the City's or its officials, employees, and its authorized agents active negligence or willful misconduct while the City enters the Property under Section 2 or 3 of this Agreement.. The Owner shall maintain liability insurance in commercially reasonable amounts, but not less than $1,000,000.00, covering the BMP and City. The City shall require proof of insurance to be provided to City on a regular basis as determined by the City.

3.9 Time of the Essence. Time is of the essence in the performance of this Agreement.

3.10 Notice. Any notice to a party required or called for in this Agreement shall be served in person, or by deposit in the U.S. Mail, first class postage prepaid, to the address set forth below. Notice(s) shall be deemed effective upon receipt, or seventy-two (72) hours after deposit in the U.S. Mail, whichever is earlier. A party may change a notice address only by providing written notice thereof to the other party.

IF TO CITY:

City of Menifee

IF TO OWNER:

[SIGNATURES ON FOLLOWING PAGE]

[REMAINDER OF PAGE LEFT INTENTIONALLY BLANK]

SIGNATURE PAGE TO
CITY OF MENIFEE
WATER QUALITY MANAGEMENT PLAN AND STORMWATER BMP MAINTENANCE AND RIGHT OF ENTRY AGREEMENT
WITH GUARDIAN CAPITAL

IN WITNESS THEREOF, the parties hereto have executed this Agreement as of the date first written above.

CITY OF MENIFEE
a California municipal corporation

By: _____

ATTEST:

_____
City Clerk

OWNER

By: _____
Signature

_____
Name (Print)

_____
Title (Print)

By: _____
Signature

_____
Name (Print)

_____
Title (Print)

ATTEST:

_____
[***INSERT NAME***]
[***INSERT TITLE***]

[***NOTE (READ AND DELETE THIS BLOCK BEFORE USING MODEL): SIGNATURE BLOCKS CAN VARY DEPENDING UPON THE APPLICANT'S TYPE OF LEGAL ENTITY (E.G. CORPORATION; GENERAL PARTNERSHIP; LIMITED PARTNERSHIP; LIMITED LIABILITY PARTNERSHIP OR COMPANY; OR AN INDIVIDUAL). THIS MODEL CONTAINS A GENERAL FRAMEWORK WHICH WILL WORK FOR MOST CORPORATIONS, INDIVIDUAL (NON-CORPORATE) PARTNERSHIPS AND INDIVIDUAL SOLE PROPRIETORSHIPS. PLEASE REFER TO THE CITY CLERK'S "SIGNATURE REQUIREMENT" MEMO ON THE INFO WEB FOR COMPLETE INFORMATION***]

NOTARY ACKNOWLEDGEMENT OF CITY

STATE OF CALIFORNIA)
COUNTY OF _____)

On _____ before me, (here insert name and title of the officer), personally appeared _____, who proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

I certify under penalty of perjury under the laws of the State of California that the foregoing paragraph is true and correct.

WITNESS my hand and official seal.

Signature of Notary Public: (Seal)

_____

_____

NOTARY ACKNOWLEDGEMENT OF CITY

STATE OF CALIFORNIA)
COUNTY OF _____)

On _____ before me, (here insert name and title of the officer), personally appeared _____, who proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

I certify under penalty of perjury under the laws of the State of California that the foregoing paragraph is true and correct.

WITNESS my hand and official seal.

Signature of Notary Public: (Seal)

_____

_____

NOTARY ACKNOWLEDGEMENT OF OWNER

STATE OF CALIFORNIA)
COUNTY OF _____)

On _____ before me, (here insert name and title of the officer), personally appeared _____, who proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

I certify under penalty of perjury under the laws of the State of California that the foregoing paragraph is true and correct.

WITNESS my hand and official seal.

Signature of Notary Public: (Seal)

_____

_____

NOTARY ACKNOWLEDGEMENT OF OWNER

STATE OF CALIFORNIA)
COUNTY OF _____)

On _____ before me, (here insert name and title of the officer), personally appeared _____, who proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

I certify under penalty of perjury under the laws of the State of California that the foregoing paragraph is true and correct.

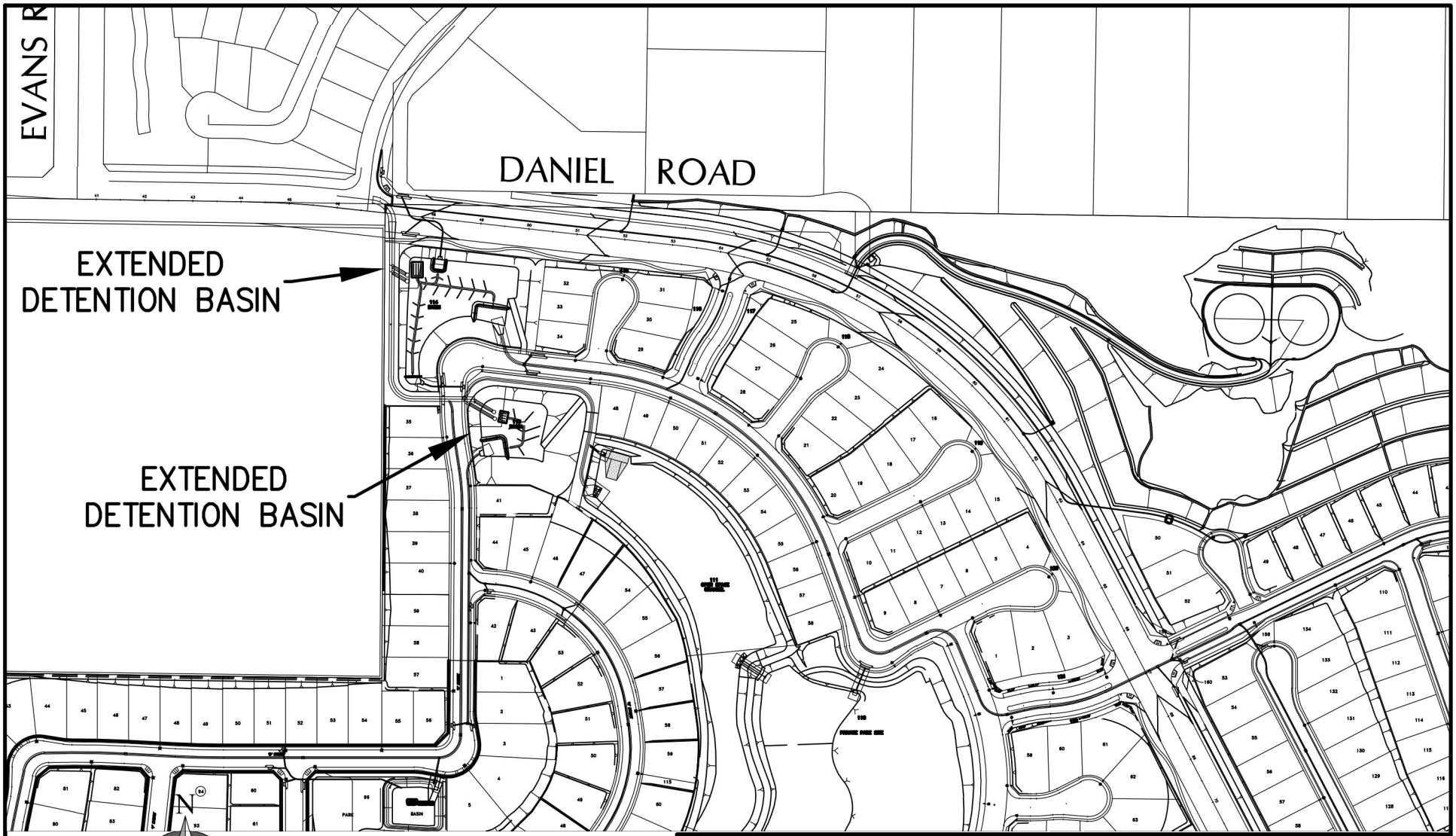
WITNESS my hand and official seal.

Signature of Notary Public: (Seal)

_____

_____

EXHIBIT "A"
(LEGAL DESCRIPTION)



0 200 400 800

SCALE: 1" = 400'

BRIAN R. LOWELL
RCE 74550

CITY OF MENIFEE, COUNTY OF RIVERSIDE
BIOFILTRATION - MODULAR WETLAND SYSTEM

PREPARED BY	CHECKED BY	DATE	SHEET 1 OF 1
C. ERICKSON	B. LOWELL	6/03/2021	

HUNSAKER & ASSOCIATES
IRVINE, INC
INLAND EMPIRE REGION
2900 ADAMS STREET, SUITE A-15
RIVERSIDE CA 92504 (951)352-7200
PLANNING/ENGINEERING/SURVEYING/GOVERNMENT RELATIONS

W.O.: -

SCALE: 1" = 400'

Appendix 10: Educational Materials

BMP Fact Sheets, Maintenance Guidelines and Other End-User BMP Information

3.1 INFILTRATION BASIN

Type of BMP	LID - Infiltration
Treatment Mechanisms	Infiltration, Evapotranspiration (when vegetated), Evaporation, and Sedimentation
Maximum Treatment Area	50 acres
Other Names	Bioinfiltration Basin

Description

An Infiltration Basin is a flat earthen basin designed to capture the design capture volume, V_{BMP}. The stormwater infiltrates through the bottom of the basin into the underlying soil over a 72 hour drawdown period. Flows exceeding V_{BMP} must discharge to a downstream conveyance system. Trash and sediment accumulate within the forebay as stormwater passes into the basin. Infiltration basins are highly effective in removing all targeted pollutants from stormwater runoff.



Figure 1 – Infiltration Basin

See Appendix A, and Appendix C, Section 1 of *Basin Guidelines*, for additional requirements.

Siting Considerations

The use of infiltration basins may be restricted by concerns over ground water contamination, soil permeability, and clogging at the site. See the applicable WQMP for any specific feasibility considerations for using infiltration BMPs. Where this BMP is being used, the soil beneath the basin must be thoroughly evaluated in a geotechnical report since the underlying soils are critical to the basin's long term performance. To protect the basin from erosion, the sides and bottom of the basin must be vegetated, preferably with native or low water use plant species.

In addition, these basins may not be appropriate for the following site conditions:

- Industrial sites or locations where spills of toxic materials may occur
- Sites with very low soil infiltration rates
- Sites with high groundwater tables or excessively high soil infiltration rates, where pollutants can affect ground water quality
- Sites with unstabilized soil or construction activity upstream
- On steeply sloping terrain
- Infiltration basins located in a fill condition should refer to Appendix A of this Handbook for details on special requirements/restrictions

Setbacks

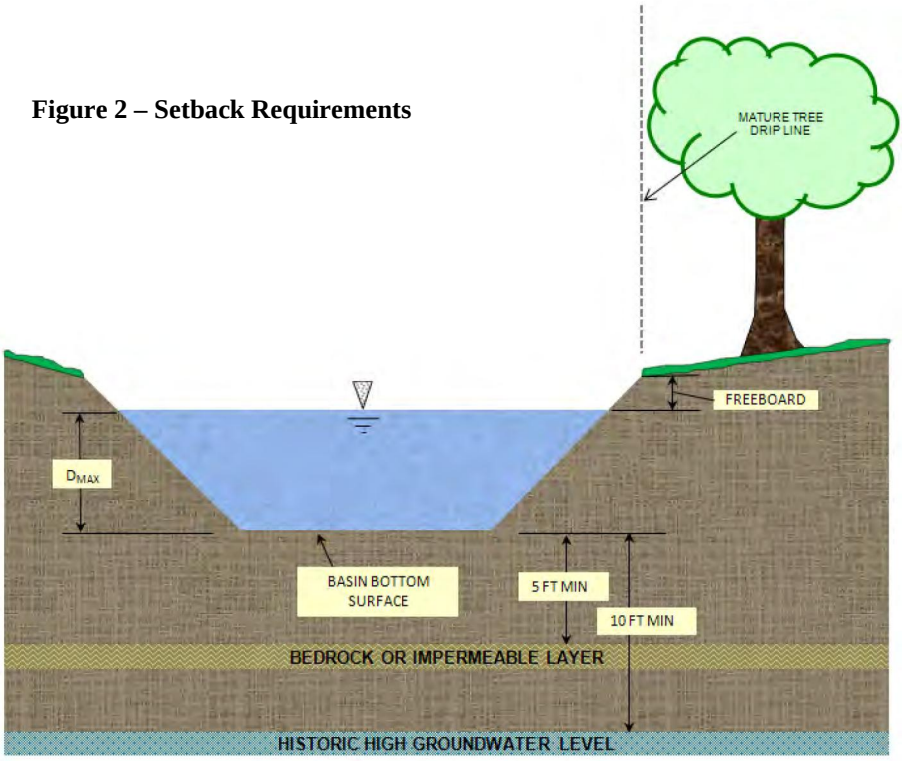
Always consult your geotechnical engineer for site specific recommendations regarding setbacks for infiltration trenches. Recommended setbacks are needed to protect buildings, existing trees, walls, onsite or nearby wells, streams, and tanks. Setbacks should be considered early in the design process since they can affect where infiltration facilities may be placed and how deep they are allowed to be. For instance, depth setbacks can dictate fairly shallow facilities that will have a larger footprint and, in some cases, may make an infiltration basin infeasible. In that instance, another BMP must be selected.

Infiltration basins typically must be set back:

- 10 feet from the historic high groundwater (measured vertically from the bottom of the basin, as shown in Figure 2)
- 5 feet from bedrock or impermeable surface layer (measured vertically from the bottom of the basin, as shown in Figure 2)
- From all existing mature tree drip lines as indicated in Figure 2 (to protect their root structure)
- 100 feet horizontally from wells, tanks or springs

Setbacks to walls and foundations must be included as part of the Geotechnical Report. All other setbacks shall be in accordance with applicable standards of the District's *Basin Guidelines* (Appendix C).

Figure 2 – Setback Requirements



Forebay

A concrete forebay shall be provided to reduce sediment clogging and to reduce erosion. The forebay shall have a design volume of at least 0.5% V_{BMP} and a minimum 1 foot high concrete splashwall / berm. Full height notch-type weir(s), offset from the line of flow from the basin inlet to prevent short circuiting, shall be used to outlet the forebay. It is recommended that two weirs be used and that they be located on opposite sides of the forebay (see Figure 2).

Overflow

Flows exceeding V_{BMP} must discharge to an acceptable downstream conveyance system. Where an adequate outlet is present, an overflow structure may be used. Where an embankment is present, an emergency spillway may be used instead. Overflows must be placed just above the design water surface for V_{BMP} and be near the outlet of the system. The overflow structure shall be similar to the District's Standard Drawing CB 110. Additional details may be found in the District's *Basin Guidelines* (Appendix C).

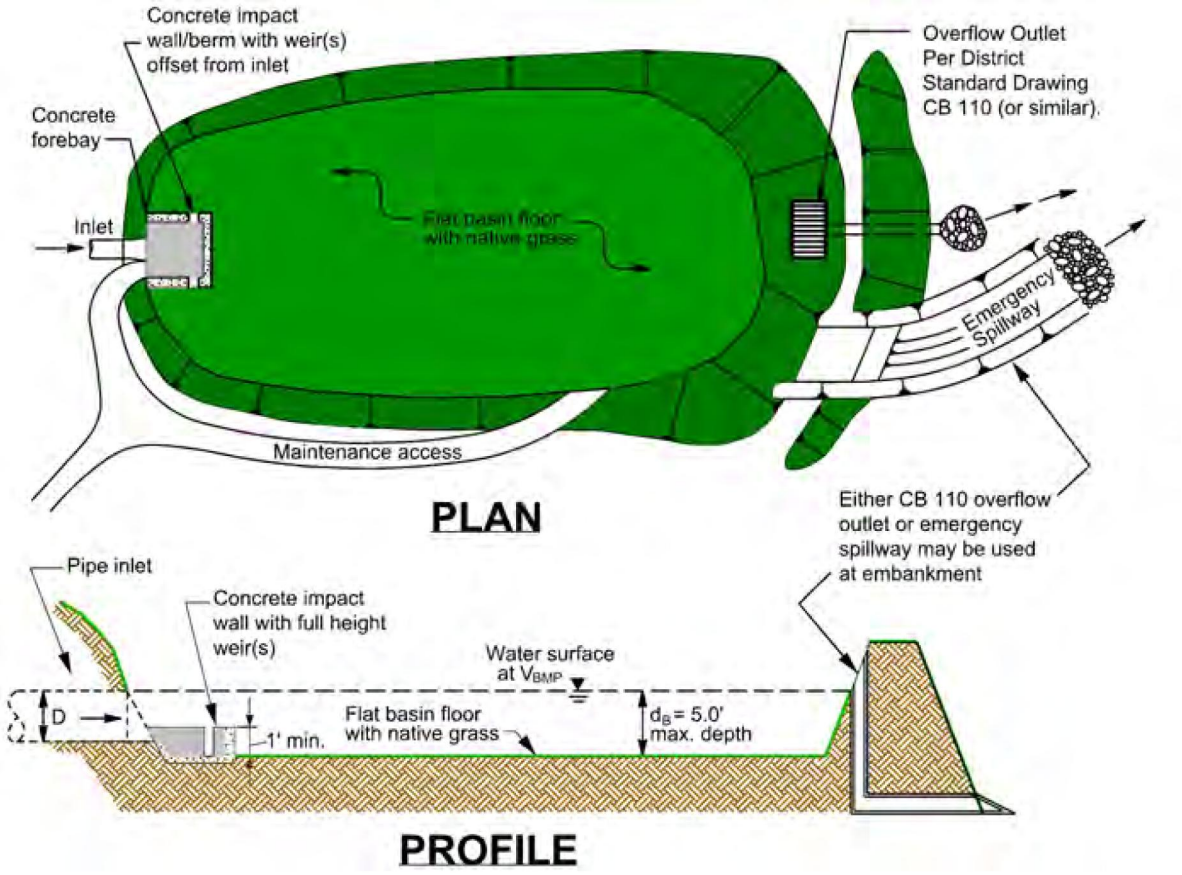


Figure 3 – Infiltration Basin

Landscaping Requirements

Basin vegetation provides erosion protection, improves sediment removal and assists in allowing infiltration to occur. The basin surface and side slopes shall be planted with native grasses. Proper landscape management is also required to ensure that the vegetation does not contribute to water pollution through pesticides, herbicides, or fertilizers. Landscaping shall be in accordance with County of Riverside Ordinance 859 and the District's *Basin Guidelines* (Appendix C), or other guidelines issued by the Engineering Authority.

Maintenance

Normal maintenance of an infiltration basin includes the maintenance of landscaping, debris and trash removal from the surface of the basin, and tending to problems associated with standing water (vectors, odors, etc.). Significant ponding, especially more than 72 hours after an event, may indicate that the basin surface is no longer providing sufficient infiltration and requires aeration. See the District's *Basin Guidelines* (Appendix C) for additional requirements (i.e., fencing, maintenance access, etc.).

Table 1 - Inspection and Maintenance

Schedule	Inspection and Maintenance Activity
Ongoing including just before annual storm seasons and following rainfall events.	• Maintain vegetation as needed. Use of fertilizers, pesticides and herbicides should be strenuously avoided to ensure they don't contribute to water pollution. If appropriate native plant selections and other IPM methods are used, such products shouldn't be needed. If such projects are used, o Products shall be applied in accordance with their labeling, especially in relation to application to water, and in areas subjected to flooding. o Fertilizers should not be applied within 15 days before, after, or during the rain season. • Remove debris and litter from the entire basin to minimize clogging and improve aesthetics. • Check for obvious problems and repair as needed. Address odor, insects, and overgrowth issues associated with stagnant or standing water in the basin bottom. There should be no long-term ponding water. • Check for erosion and sediment laden areas in the basin. Repair as needed. Clean forebay if needed. • Revegetate side slopes where needed.
Annually. If possible, schedule these inspections within 72 hours after a significant rainfall.	• Inspection of hydraulic and structural facilities. Examine the inlet for blockage, the embankment and spillway integrity, as well as damage to any structural element. • Check for erosion, slumping and overgrowth. Repair as needed. • Check basin depth for sediment build up and reduced total capacity. Scrape bottom as needed and remove sediment. Restore to original cross-section and infiltration rate. Replant basin vegetation. • Verify the basin bottom is allowing acceptable infiltration. Use a disc or other method to aerate basin bottom only if there is actual significant loss of infiltrative capacity, rather than on a routine basis[1]. • No water should be present 72 hours after an event. No long term standing water should be present at all. No algae formation should be visible. Correct problem as needed.

1. **CA Stormwater BMP Handbook for New Development and Significant Redevelopment**

Table 2 - Design and Sizing Criteria for Infiltration Basins

Design Parameter	Infiltration Basin
Design Volume	V_{BMP}
Forebay Volume	0.5% V_{BMP}
Drawdown time (maximum)	72 hours
Maximum tributary area	50 acres [2]
Minimum infiltration rate	Must be sufficient to drain the basin within the required Drawdown time over the life of the BMP. The WQMP may include specific requirements for minimum tested infiltration rates.
Maximum Depth	5 feet
Spillway erosion control	Energy dissipators to reduce velocities[1]
Basin Slope	0%
Freeboard (minimum)	1 foot [1]
Historic High Groundwater Setback (max)	10 feet
Bedrock/impermeable layer setback (max)	5 feet
Tree setbacks	Mature tree drip line must not overhang the basin
Set back from wells, tanks or springs	100 feet
Set back from foundations	As recommended in Geotechnical Report

1. **Ventura County's Technical Guidance Manual for Stormwater Quality Control Measures**
2. **CA Stormwater BMP Handbook for New Development and Significant Redevelopment**

Note: The information contained in this BMP Factsheet is intended to be a summary of design considerations and requirements. Additional information which applies to all detention basins may be found in the District's Basin Guidelines (Appendix C). In addition, information herein may be superseded by other guidelines issued by the co-permittee.

INFILTRATION BASIN SIZING PROCEDURE

1. Find the Design Volume, V_{BMP}.
    a) Enter the Tributary Area, $A_{T.}$
    b) Enter the Design Volume, V_{BMP}, determined from Section 2.1 of this Handbook.
2. Determine the Maximum Depth.
    a) Enter the infiltration rate. The infiltration rate shall be established as described in Appendix A: "Infiltration Testing".
    b) Enter the design Factor of Safety from Table 1 in Appendix A: "Infiltration Testing".
    c) The spreadsheet will determine D_1, the maximum allowable depth of the basin based on the infiltration rate along with the maximum drawdown time (72 hours) and the Factor of Safety.

$$D_1 = [(t) \times (I)] / 12s$$

Where I = site infiltration rate (in/hr)
s = safety factor
t = drawdown time (maximum 72 hours)

d) Enter the depth of freeboard.

e) Enter the depth to the historic high groundwater level measured from the top of the basin.

f) Enter the depth to the top of bedrock or other impermeable layer measured from the finished grade.

g) The spreadsheet will determine D_2, the total basin depth (including freeboard, if used) of the basin, based on restrictions to the depth by groundwater and an impermeable layer.

D_2 = Depth to groundwater – (10 + freeboard) (ft);

or

D_2 = Depth to impermeable layer – (5 + freeboard) (ft)

Whichever is least.

h) The spreadsheet will determine the maximum allowable effective depth of basin, D_{MAX}, based on the smallest value between D_1 and D_2. D_{MAX} is the maximum depth of water only and does not include freeboard. D_{MAX} shall not exceed 5 feet.

3. Basin Geometry

a) Enter the basin side slopes, z (no steeper than 4:1).

b) Enter the proposed basin depth, d_B excluding freeboard.

c) The spreadsheet will determine the minimum required surface area of the basin:

$$A_s = V_{BMP} / d_B$$

Where A_s = minimum area required (ft^2)
V_{BMP} = volume of the infiltration basin (ft^3)
d_B= proposed depth not to exceed maximum allowable depth, D_{MAX} (ft)

d) Enter the proposed bottom surface area. This area shall not be less than the minimum required surface area.

4. Forebay

A concrete forebay with a design volume of at least 0.5% V_{BMP} and a minimum 1 foot high concrete splashwall shall be provided. Full-height rectangular weir(s) shall be used to outlet the forebay. The weir(s) must be offset from the line of flow from the basin inlet. It is recommended that two weirs be used and that they be located on opposite sides of the forebay (see Figure 2).

a) The spreadsheet will determine the minimum required forebay volume based on 0.5% V_{BMP}.

b) Enter the proposed depth of the forebay berm/splashwall (1foot minimum).

c) The spreadsheet will determine the minimum required forebay surface area.

d) Enter the width of rectangular weir to be used (minimum 1.5 inches). Weir width should be established based on a 5 minute drawdown time.

Infiltration Basin TC-11



Design Considerations

- Soil for Infiltration
- Slope
- Aesthetics

Targeted Constituents

☑	Sediment	■
☑	Nutrients	■
☑	Trash	■
☑	Metals	■
☑	Bacteria	■
☑	Oil and Grease	■
☑	Organics	■

Legend ***(Removal Effectiveness)***

● Low ■ High

▲ Medium

Description

An infiltration basin is a shallow impoundment that is designed to infiltrate stormwater. Infiltration basins use the natural filtering ability of the soil to remove pollutants in stormwater runoff. Infiltration facilities store runoff until it gradually exfiltrates through the soil and eventually into the water table. This practice has high pollutant removal efficiency and can also help recharge groundwater, thus helping to maintain low flows in stream systems. Infiltration basins can be challenging to apply on many sites, however, because of soils requirements. In addition, some studies have shown relatively high failure rates compared with other management practices.

California Experience

Infiltration basins have a long history of use in California, especially in the Central Valley. Basins located in Fresno were among those initially evaluated in the National Urban Runoff Program and were found to be effective at reducing the volume of runoff, while posing little long-term threat to groundwater quality (EPA, 1983; Schroeder, 1995). Proper siting of these devices is crucial as underscored by the experience of Caltrans in siting two basins in Southern California. The basin with marginal separation from groundwater and soil permeability failed immediately and could never be rehabilitated.

Advantages

- Provides 100% reduction in the load discharged to surface waters.
- The principal benefit of infiltration basins is the approximation of pre-development hydrology during which a

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significant portion of the average annual rainfall runoff is infiltrated and evaporated rather than flushed directly to creeks.

- If the water quality volume is adequately sized, infiltration basins can be useful for providing control of channel forming (erosion) and high frequency (generally less than the 2-year) flood events.

Limitations

- May not be appropriate for industrial sites or locations where spills may occur.
- Infiltration basins require a minimum soil infiltration rate of 0.5 inches/hour, not appropriate at sites with Hydrologic Soil Types C and D.
- If infiltration rates exceed 2.4 inches/hour, then the runoff should be fully treated prior to infiltration to protect groundwater quality.
- Not suitable on fill sites or steep slopes.
- Risk of groundwater contamination in very coarse soils.
- Upstream drainage area must be completely stabilized before construction.
- Difficult to restore functioning of infiltration basins once clogged.

Design and Sizing Guidelines

- Water quality volume determined by local requirements or sized so that 85% of the annual runoff volume is captured.
- Basin sized so that the entire water quality volume is infiltrated within 48 hours.
- Vegetation establishment on the basin floor may help reduce the clogging rate.

Construction/Inspection Considerations

- Before construction begins, stabilize the entire area draining to the facility. If impossible, place a diversion berm around the perimeter of the infiltration site to prevent sediment entrance during construction or remove the top 2 inches of soil after the site is stabililized. Stabilize the entire contributing drainage area, including the side slopes, before allowing any runoff to enter once construction is complete.
- Place excavated material such that it can not be washed back into the basin if a storm occurs during construction of the facility.
- Build the basin without driving heavy equipment over the infiltration surface. Any equipment driven on the surface should have extra-wide ("low pressure") tires. Prior to any construction, rope off the infiltration area to stop entrance by unwanted equipment.
- After final grading, till the infiltration surface deeply.
- Use appropriate erosion control seed mix for the specific project and location.

Performance

As water migrates through porous soil and rock, pollutant attenuation mechanisms include precipitation, sorption, physical filtration, and bacterial degradation. If functioning properly, this approach is presumed to have high removal efficiencies for particulate pollutants and moderate removal of soluble pollutants. Actual pollutant removal in the subsurface would be expected to vary depending upon site-specific soil types. This technology eliminates discharge to surface waters except for the very largest storms; consequently, complete removal of all stormwater constituents can be assumed.

There remain some concerns about the potential for groundwater contamination despite the findings of the NURP and Nightingale (1975; 1987a,b,c; 1989). For instance, a report by Pitt et al. (1994) highlighted the potential for groundwater contamination from intentional and unintentional stormwater infiltration. That report recommends that infiltration facilities not be sited in areas where high concentrations are present or where there is a potential for spills of toxic material. Conversely, Schroeder (1995) reported that there was no evidence of groundwater impacts from an infiltration basin serving a large industrial catchment in Fresno, CA.

Siting Criteria

The key element in siting infiltration basins is identifying sites with appropriate soil and hydrogeologic properties, which is critical for long term performance. In one study conducted in Prince George's County, Maryland (Galli, 1992), all of the infiltration basins investigated clogged within 2 years. It is believed that these failures were for the most part due to allowing infiltration at sites with rates of less than 0.5 in/hr, basing siting on soil type rather than field infiltration tests, and poor construction practices that resulted in soil compaction of the basin invert.

A study of 23 infiltration basins in the Pacific Northwest showed better long-term performance in an area with highly permeable soils (Hilding, 1996). In this study, few of the infiltration basins had failed after 10 years. Consequently, the following guidelines for identifying appropriate soil and subsurface conditions should be rigorously adhered to.

- Determine soil type (consider RCS soil type 'A, B or C' only) from mapping and consult USDA soil survey tables to review other parameters such as the amount of silt and clay, presence of a restrictive layer or seasonal high water table, and estimated permeability. The soil should not have more than 30% clay or more than 40% of clay and silt combined. Eliminate sites that are clearly unsuitable for infiltration.

- Groundwater separation should be at least 3 m from the basin invert to the measured ground water elevation. There is concern at the state and regional levels of the impact on groundwater quality from infiltrated runoff, especially when the separation between groundwater and the surface is small.

- Location away from buildings, slopes and highway pavement (greater than 6 m) and wells and bridge structures (greater than 30 m). Sites constructed of fill, having a base flow or with a slope greater than 15% should not be considered.

- Ensure that adequate head is available to operate flow splitter structures (to allow the basin to be offline) without ponding in the splitter structure or creating backwater upstream of the splitter.

- Base flow should not be present in the tributary watershed.

Secondary Screening Based on Site Geotechnical Investigation

- At least three in-hole conductivity tests shall be performed using USBR 7300-89 or Bouwer-Rice procedures (the latter if groundwater is encountered within the boring), two tests at different locations within the proposed basin and the third down gradient by no more than approximately 10 m. The tests shall measure permeability in the side slopes and the bed within a depth of 3 m of the invert.

- The minimum acceptable hydraulic conductivity as measured in any of the three required test holes is 13 mm/hr. If any test hole shows less than the minimum value, the site should be disqualified from further consideration.

- Exclude from consideration sites constructed in fill or partially in fill unless no silts or clays are present in the soil boring. Fill tends to be compacted, with clays in a dispersed rather than flocculated state, greatly reducing permeability.

- The geotechnical investigation should be such that a good understanding is gained as to how the stormwater runoff will move in the soil (horizontally or vertically) and if there are any geological conditions that could inhibit the movement of water.

Additional Design Guidelines

(1) Basin Sizing - The required water quality volume is determined by local regulations or sufficient to capture 85% of the annual runoff.

(2) Provide pretreatment if sediment loading is a maintenance concern for the basin.

(3) Include energy dissipation in the inlet design for the basins. Avoid designs that include a permanent pool to reduce opportunity for standing water and associated vector problems.

(4) Basin invert area should be determined by the equation:

$$A = \frac{WQV}{kt}$$

where A = Basin invert area (m^2)

WQV = water quality volume (m^3)

k = 0.5 times the lowest field-measured hydraulic conductivity (m/hr)

t = drawdown time (48 hr)

(5) The use of vertical piping, either for distribution or infiltration enhancement shall not be allowed to avoid device classification as a Class V injection well per 40 CFR146.5(e)(4).

Maintenance

Regular maintenance is critical to the successful operation of infiltration basins. Recommended operation and maintenance guidelines include:

- Inspections and maintenance to ensure that water infiltrates into the subsurface completely (recommended infiltration rate of 72 hours or less) and that vegetation is carefully managed to prevent creating mosquito and other vector habitats.
- Observe drain time for the design storm after completion or modification of the facility to confirm that the desired drain time has been obtained.
- Schedule semiannual inspections for beginning and end of the wet season to identify potential problems such as erosion of the basin side slopes and invert, standing water, trash and debris, and sediment accumulation.
- Remove accumulated trash and debris in the basin at the start and end of the wet season.
- Inspect for standing water at the end of the wet season.
- Trim vegetation at the beginning and end of the wet season to prevent establishment of woody vegetation and for aesthetic and vector reasons.
- Remove accumulated sediment and regrade when the accumulated sediment volume exceeds 10% of the basin.
- If erosion is occurring within the basin, revegetate immediately and stabilize with an erosion control mulch or mat until vegetation cover is established.
- To avoid reversing soil development, scarification or other disturbance should only be performed when there are actual signs of clogging, rather than on a routine basis. Always remove deposited sediments before scarification, and use a hand-guided rotary tiller, if possible, or a disc harrow pulled by a very light tractor.

Cost

Infiltration basins are relatively cost-effective practices because little infrastructure is needed when constructing them. One study estimated the total construction cost at about $2 per ft (adjusted for inflation) of storage for a 0.25-acre basin (SWRPC, 1991). As with other BMPs, these published cost estimates may deviate greatly from what might be incurred at a specific site. For instance, Caltrans spent about $18/ft^3 for the two infiltration basins constructed in southern California, each of which had a water quality volume of about 0.34 ac.-ft. Much of the higher cost can be attributed to changes in the storm drain system necessary to route the runoff to the basin locations.

Infiltration basins typically consume about 2 to 3% of the site draining to them, which is relatively small. Additional space may be required for buffer, landscaping, access road, and fencing. Maintenance costs are estimated at 5 to 10% of construction costs.

One cost concern associated with infiltration practices is the maintenance burden and longevity. If improperly maintained, infiltration basins have a high failure rate. Thus, it may be necessary to replace the basin with a different technology after a relatively short period of time.

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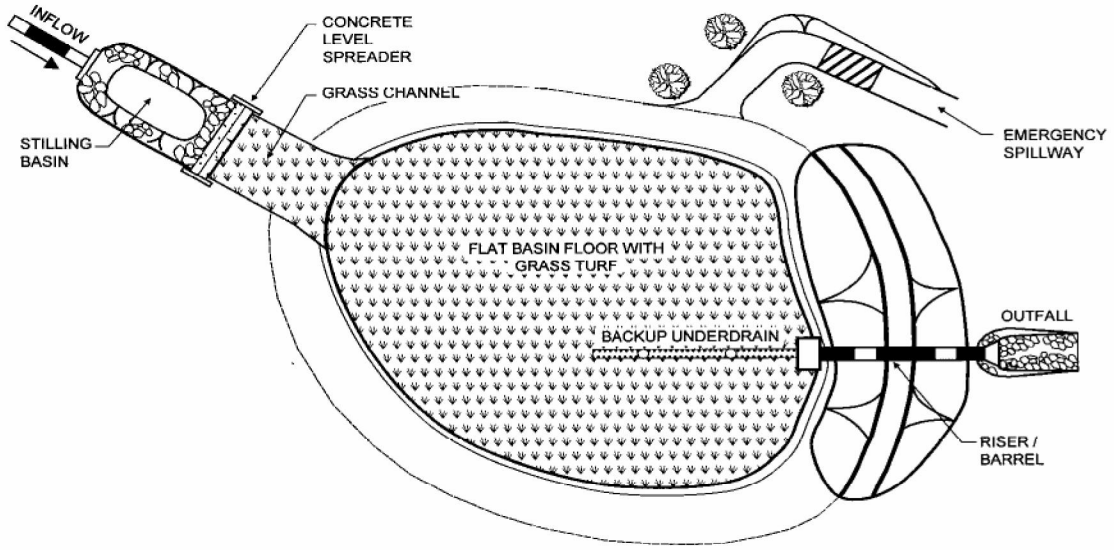
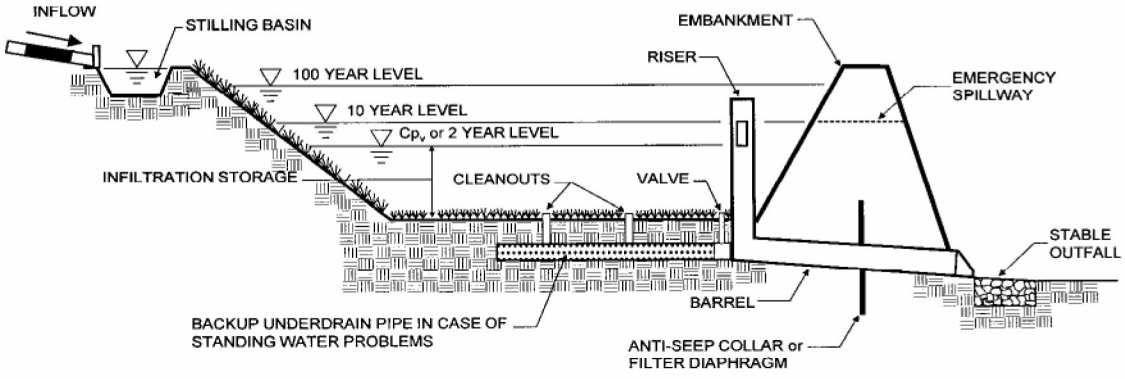
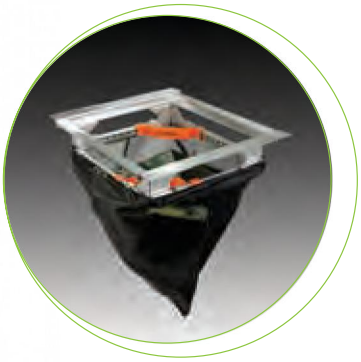


PLAN VIEW



PROFILE

FLEXSTORM® PURE PERMANENT INLET PROTECTION



SPECIFY WITH CONFIDENCE

State DOTs and Municipalities across the country now have a universal structural BMP to address the issue of storm sewer inlet protection: FLEXSTORM PURE Inlet Filters.

The FLEXSTORM PURE system is the preferred choice for permanent inlet protection and storm water runoff control. Constructed of versatile stainless steel, FLEXSTORM PURE Inlet Filters will fit any drainage structure and are available with site-specific filter bags providing various levels of filtration. Whether you're the specifier or the user, it's clear to see how FLEXSTORM PURE Inlet Filters outperform the competition.

APPLICATIONS:

Car Washes	Gas Stations
Commercial	Parking Lots
Loading Ramps	Dock Drains
Industrial	Maintenance

FEATURES:

- Stainless Steel filter framing is custom configured to fit perfectly into any drainage structure, whether a standard design or obstructed inlet opening
- Filtered Flow Rates and Ultimate Bypass Rates are designed to meet your specific inlet requirements
- Multiple Filter Bags are available targeting site specific removal of trash, litter, leaves, or small particles, oil and grease
- Filters work below grade with an ultimate bypass allowing inlet area to drain with a full bag
- Units install in seconds and are easily maintained with the FLEXSTORM Universal Removal Tool (no heavy machinery required)

BENEFITS:

- Receive payback on your investment: durable stainless steel framing provides extended service life while replaceable filter bags handle loads with a safety factor of 5
- Meet stringent removal requirements:
  - –FX filter bags are rated for > 80% removal efficiency of street sweep-size particles
  - –PC/PC+ filter bags have been tested to 99% TSS removal of OK-110 US Silica Sand and 97% TPH (total petroleum hydrocarbon) removal
- Help prevent fines: FLEXSTORM Inlet Filters comply with EPA NPDES initiatives as a temporary or permanent BMP
- Available through 5,000 ADS distributors nationwide
- If not in stock, orders up to 100 pcs can ship within 48 hours



ADS Service: ADS representatives are committed to providing you with the answers to all your questions, including selecting the proper filter, specifications, installation and more. Also try the ADS FLEXSTORM Online Product Condfigurator at *www.inletfilters.com*

*The Most **Advanced** Name in Drainage Systems®*

FLEXSTORM PURE INLET FILTERS SPECIFICATION

IDENTIFICATION

The installer shall inspect the plans and/or worksite to determine the quantity of each drainage structure casting type. The foundry casting number, exact grate size and clear opening size, or other information will be necessary to finalize the FLEXSTORM part number and dimensions. The units are shipped to the field configured precisely to fit the identified drainage structure.

MATERIAL AND PERFORMANCE

The FLEXSTORM Inlet Filter system is comprised of a corrosion resistant steel frame and a replaceable geotextile filter bag attached to the frame with a stainless steel locking band. The filter bag hangs suspended at a distance below the grate that shall allow full water flow into the drainage structure if the bag is completely filled with sediment. The standard Woven Polypropylene FX filter bags are rated for 200 gpm/sqft with a removal efficiency of 82% when filtering a USDA Sandy Loam sediment load. The Post Construction PC filter bags are rated for 137 gpm/sqft and have been 3rd party tested at 99% TSS removal to 110 micron and 97% TPH removal of used motor oil hydrocarbon mix.

INSTALLATION

Remove the grate from the casting or concrete drainage structure. Clean the ledge (lip) of the casting frame or drain- age structure to ensure it is free of stone and dirt. Drop in the FLEXSTORM Inlet Filter through the clear opening and be sure the suspension hangers rest firmly on the inside ledge (lip) of the casting. Replace the grate and confirm it is elevated no more than 1/8", which is the thickness of the steel hangers. For wall mount units, follow instructions for attaching the stainless steel mounting brackets using the provided concrete fasteners.

INSPECTION FREQUENCY

Construction site inspection should occur following each 1⁄2" or more rain event. Post Construction inspections should occur three times per year (every four months) in areas with mild year round rainfall and four times per year (every three months Feb–Nov) in areas with summer rains before and after the winter snowfall season. Industrial application site inspections (loading ramps, wash racks, maintenance facilities) should occur on a regularly scheduled basis no less than three times per year.

MAINTENANCE GUIDELINES

Empty the filter bag if more than half filled with sediment and debris, or as directed by the Engineer. Remove the grate, engage the lifting bars or handles with the FLEXSTORM Removal Tool, and lift from the drainage structure. Dispose of the sediment or debris as directed by the Engineer or Maintenance Contract in accordance with EPA guidelines.

As an alternative, an industrial vacuum may be used to collect the accumulated sediment. Remove any caked on silt from the sediment bag and reverse flush the bag with medium spray for optimal filtration. Replace the bag if torn or punctured to 1⁄2" diameter or greater on the lower half of the bag. Post Construction PC/PC+ Bags should be maintained prior to 50% oil saturation. The average 2' x 2' PC filter bag will retain approx. 96 oz (5.4 lbs) of oil at which time it should be serviced or replaced. It can be centrifuged or passed through a wringer to recover the oils, and the fabric reused with 85% to 90% efficacy. It may also be recycled for its fuel value through waste to energy incineration. When utilizing the MyCelx Skimmer Pouches in the + bags, note that the skimmers start yellow in color and will gradually turn brown as they become saturated, indicating time for replacement. Each MyCelx skimmer pouch will absorb approximately 89 oz (5 lbs) of oil before requiring replacement. It may also be recycled for its fuel value through waste to energy incineration. Dispose of all oil contaminated products in accordance with EPA guidelines.

FILTER BAG REPLACEMENT

Remove the bag by loosening or cutting off the clamping band. Take the new filter bag, which is equipped with a stainless steel worm drive clamping band, and use a screw driver to tighten the bag around the frame channel. Ensure the bag is secure and that there is no slack around the perimeter of the band.

Lift Handles ease installation and maintenance



Replaceable Sediment Bag

1/8" thick steel hangers& channels; precision stampings **configured to fit each individual casting**



CAD drawings, work instructions and test reports on website: ***www.inletfilters.com***



For more information on FLEXSTORM Inlet Filters and other ADS products, please contact our Customer Service Representatives at 1-800-821-6710

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POWERED BY filtrexx TECHNOLOGY

STORMEXX® CLEAN CATCH BASIN FILTER



FlexStorm has partnered with Filtrexx to offer the latest in compost filter technology. The StormExx Clean Catch Basin Filter utilizes an enhanced cartridge filter for the capture and removal of sediment, hydrocarbons, heavy metals, nutrients and bacteria from stormwater runoff. The filter insert sits below the grate and will fit any round or rectangular storm drain using FlexStorm engineered framing systems.

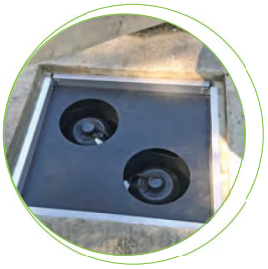


FEATURES & BENEFITS:

- Easy to install, maintain and replace
- Treats stormwater at the street/inlet level
- Patented multi-stage filtration system
- Option for double units
- Overflow bypass of 500+ gpm

REMOVAL RATES:

- TSS: 90%
- Total Phosphorous: 59%
- Soluble Phosphorous: 94%
- Ammonium Nitrate: 41%
- Chromium: 24%
- E. Coli: 93%
- pH (low) neutralized to 6.62
- Oil/Hydrocarbons: 99%
- Copper: 75%
- Zinc: 58%
- Cadmium: 99%
- Arsenic: 18%
- Total Coliform: 79%
- pH (high) neutralized to 8.31
- Turbidity: 76%
- Nickel: 58%
- TKN: 22%
- Lead: 60%
- Selenium: 25%
- Fecal Coliform: 71%



Values are total efficiency removal percentage of typical standard input stormwater concentrations over 10 run-off events. All pollutants are common stormwater pollutants and part of industrial and municipal stormwater permit effluent limit guideline regulations. For methodology, reference Filtrexx TechLink Research Summary #3338.







*THE MOST **ADVANCED** NAME IN WATER MANAGEMENT SOLUTIONS™*

STORMEXX CLEAN CATCH BASIN FILTER

SUMMARY

StormExx inserts are for use at stormwater catch basins in roadways, parking lots and paved areas as indicated on the plans and specifications. The inserts remove sediment, hydrocarbons, heavy metals, nutrients and bacteria from stormwater run-off. Installer must provide size and type as required upon placing order. Inserts shall include all components required for a complete installation at each catch basin as indicated on drawings. Each insert shall include a stainless steel framing system and a replaceable filter/absorber cartridge with filter media having a combined total volume of approximately 1,200 cubic inches.

CATCH BASIN INSERT FEATURES AND CHARACTERISTICS

1. Filter Cartridge Size: Nominal 10" in diameter by 18" high with center perforated HDPE tube. Stormwater flows through media horizontally on a downward path through the filter/absorber cartridge before exiting the perforated tube. The cartridge shall slip over a perforated internal drain tube that exits through the bottom of the housing. The cartridge shall contain approximately 1,200 cubic inches of various absorbent material arranged primarily in layers. The outer surface of the cartridge shall be covered with a poly strainer fabric. Cartridge shall be easily removable for replacement. Drain tube with perforations may extend above filter/absorber portion to allow a minimum flow rate to deter standing water if unit becomes plugged or blinded.
2. Nominal Flow Rate: 15-40 gpm through clean filter/absorber cartridge. Unit features a large overflow opening area and space between housing, deflector and catch basin that allows for high overflow rates with minimum restriction during storm conditions. Overflow capable of passing several hundred gpm.
3. Nominal Flow Rate with Pre-Strainer: Where leaves and other surface material are anticipated, a pre-strainer can be used. Flow restriction can occur when pre-strainer is restricted or plugged.
4. Filter Housing: HDPE solid housing suitable for full height sediment containment and shall be nominal 15 gallons retention size. Smaller size capacity may be used on shallow catch basins. A perforated tube shall be incorporated within the housing to allow the filter/absorber cartridge to slip on for easy replacement. A locking screw-on-cap keeps cartridge in place during use. Use modified or shorter housing (with less storage, flow and filtration) where depth of catch basin is shallow or to suit basin.
5. Frame/Deflector: Each insert shall be fitted with a custom frame that directs incoming water from the grate inlet to the housing. Materials include HDPE or poly sheet and/or Type 304 SS sheet and frame.

OPERATION AND MAINTENANCE GUIDELINES

StormExx catch basin inserts are used to intercept stormwater as it passes through the grate. Heavy sediment items settle to the bottom of the housing and the collected water starts to rise and pass through the filter cartridge. As the rainfall rate increases, the water level may rise to the top of the cartridge. During high rainfall flow events excess untreated water will overflow the housing. **Note**: The most concentrated contaminants in stormwater generally occur at the beginning of each rain event. Stormwater treatment devices are frequently sized to treat this "first flush" event. Each site and installation may vary widely as to exposure to sediment, construction debris, landscaping and other pollutants.

With periodic site inspections, the proper care and maintenance frequency may be determined for a proper service schedule. The StormExx inserts should be inspected during each season before and after rain events to ensure that the insert filter assembly is ready to accept and treat stormwater run-off. Keep the grate and area within 6' of the grate clean and free of leaves, grass clippings, sediment and debris to minimize these contaminants from entering the unit housing. This is especially important during leaf fall season as decaying leaves on the filter cartridge can shorten filter life. Periodic visual inspections involve looking through the grate to see if any standing water exists. The collected water should drain through the filter cartridge that is designed for deep bed loading. As it becomes blinded or plugged with sediment, the flow rate capability will be reduced. Replace filter cartridge if standing water is in the housing. Maintenance schedules will vary with rainfall and pollutant concentration levels. Typical post-construction installations will require cartridge change-outs once or twice per year. If sediment reaches a height of 6" to 8" above bottom of the 24" housing, the sediment should be dumped and the filter cartridge inspected and replaced if necessary. Collected leaves, grass clippings, sediment, debris and spent filter cartridges that are not considered hazardous may be disposed of in on-site trash bins if approved by client. Cartridge disposal shall be in accordance with applicable rules and regulations.

Advanced Drainage Systems, Inc.
1-800-821-6710 www.ads-pipe.com

FLEXSTORM www.inletfilters.com

ADS "Terms and Conditions of Sale" are available on the ADS website, www.ads-pipe.com
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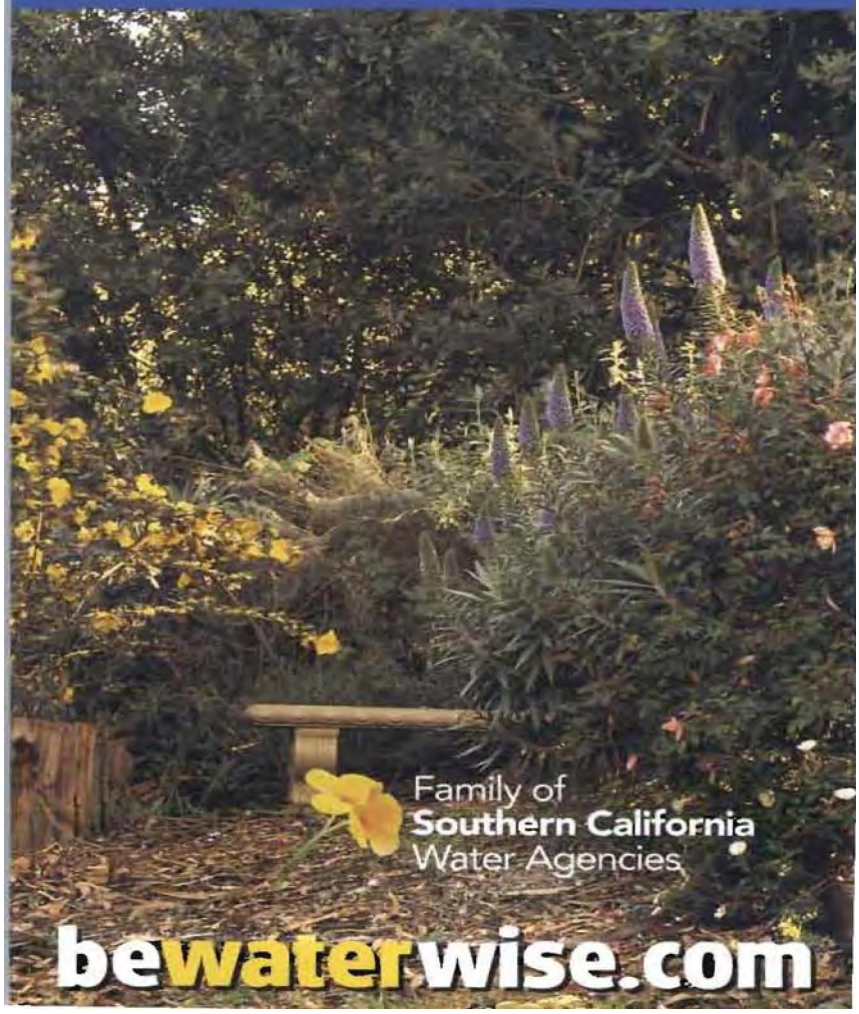
10 Ways to Save Water Outdoors



TIP #1 The average homeowner uses twice the amount of water needed to keep plants healthy. Use the watering calculator and index at **bewaterwise.com** to know exactly how much water your plants need.

TIP #2 Check your sprinkler system for leaks, overspray and broken sprinkler heads. Update with drip or other more water-efficient sprinklers where appropriate.

TIP #3 This fall, plant a portion of your garden with beautiful native and California Friendly plants. Browse the plant database at **bewaterwise.com** to find just the right look for your outdoor spaces.

TIP #4 Reduce the amount of water-thirsty grass. Keep only what you need and replace the rest with less-thirsty plants or permeable paving.

TIP #5 For the grass you keep, set your lawnmower blade higher.

TIP #6 Adjust your sprinkler timer downward in September. Plants need less water when days are shorter.

TIP #7 Use a broom instead of the hose for cleaning sidewalks and patios.

TIP #8 Mulch! A layer of bark, gravel, compost, sawdust or low-growing groundcover evens out soil temperature and allows better water retention.

TIP #9 Check the list of invasive plants that hurt our environment at **caleppc.org** and remove any from your garden.

TIP #10 Share these tips with your gardener, neighbors and friends. Water conservation should be a part of every Southern Californian's lifestyle, but that doesn't mean we can't have lush and beautiful outdoor spaces.

bewaterwise.com

After the Storm

What is stormwater runoff?

Stormwater runoff occurs when precipitation from rain or snowmelt flows over the ground. Impervious surfaces like driveways, sidewalks, and streets prevent stormwater from naturally soaking into the ground.

Why is stormwater runoff a problem?

Stormwater can pick up debris, chemicals, dirt, and other pollutants and flow into a storm sewer system or directly to a lake, stream, river, wetland, or coastal water. Anything that enters a storm sewer system is discharged untreated into the waterbodies we use for swimming, fishing, and providing drinking water.

The effects of pollution

Polluted stormwater runoff can have many adverse effects on plants, fish, animals, and people.

- Sediment can cloud the water and make it difficult or impossible for aquatic plants to grow. Sediment also can destroy aquatic habitats.
- Excess nutrients can cause algae blooms. When algae die, they sink to the bottom and decompose in a process that removes oxygen from the water. Fish and other aquatic organisms can't exist in water with low dissolved oxygen levels.

- Bacteria and other pathogens can wash into swimming areas and create health hazards, often making beach closures necessary.
- Debris—plastic bags, six-pack rings, bottles, and cigarette butts—washed into waterbodies can choke, suffocate, or disable aquatic life like ducks, fish, turtles, and birds.
- Household hazardous wastes like insecticides, pesticides, paint, solvents, used motor oil, and other auto fluids can poison aquatic life. Land animals and people can become sick or die from eating diseased fish and shellfish or ingesting polluted water.
- Polluted stormwater often affects drinking water sources. This, in turn, can affect human health and increase drinking water treatment costs.

EPA 833-B-03-002

January 2003

A Citizen's Guide to Understanding Stormwater

For more information contact:

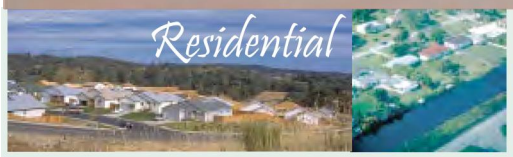
or visit
www.epa.gov/npdes/stormwater
www.epa.gov/nps

Stormwater Pollution Solutions



Education is essential to changing people's behavior. Signs and markers near storm drains warn residents that pollutants entering the drains will be carried untreated into a local waterbody.

Residential



Recycle or properly dispose of household products that contain chemicals, such as insecticides, pesticides, paint, solvents, and used motor oil and other auto fluids. Don't pour them onto the ground or into storm drains.

Auto care



Washing your car and degreasing auto parts at home can send detergents and other contaminants through the storm sewer system. Dumping automotive fluids into storm drains has the same result as dumping the materials directly into a waterbody.

- Use a commercial car wash that treats or recycles its wastewater, or wash your car on your yard so the water infiltrates into the ground.
- Repair leaks and dispose of used auto fluids and batteries at designated drop-off or recycling locations.

Lawn care



Excess fertilizers and pesticides applied to lawns and gardens wash off and pollute streams. In addition, yard clippings and leaves can wash into storm drains and contribute nutrients and organic matter to streams.

- Don't overwater your lawn. Consider using a soaker hose instead of a sprinkler.
- Use pesticides and fertilizers sparingly. When use is necessary, use these chemicals in the recommended amounts. Use organic mulch or safer pest control methods whenever possible.
- Compost or mulch yard waste. Don't leave it in the street or sweep it into storm drains or streams.
- Cover piles of dirt or mulch being used in landscaping projects.

Septic systems



Leaking and poorly maintained septic systems release nutrients and pathogens (bacteria and viruses) that can be picked up by stormwater and discharged into nearby waterbodies. Pathogens can cause public health problems and environmental concerns.

- Inspect your system every 3 years and pump your tank as necessary (every 3 to 5 years).
- Don't dispose of household hazardous waste in sinks or toilets.

Pet waste



Pet waste can be a major source of bacteria and excess nutrients in local waters.

- When walking your pet, remember to pick up the waste and dispose of it properly. Flushing pet waste is the best disposal method. Leaving pet waste on the ground increases public health risks by allowing harmful bacteria and nutrients to wash into the storm drain and eventually into local waterbodies.

Residential landscaping

Permeable Pavement—Traditional concrete and asphalt don't allow water to soak into the ground. Instead these surfaces rely on storm drains to divert unwanted water. Permeable pavement systems allow rain and snowmelt to soak through, decreasing stormwater runoff.



Rain Barrels—You can collect rainwater from rooftops in mosquito-proof containers. The water can be used later on lawn or garden areas.

Rain Gardens and Grassy Swales—Specially designed areas planted with native plants can provide natural places for rainwater to collect and soak into the ground. Rain from rooftop areas or paved areas can be diverted into these areas rather than into storm drains.



Vegetated Filter Strips—Filter strips are areas of native grass or plants created along roadways or streams. They trap the pollutants stormwater picks up as it flows across driveways and streets.

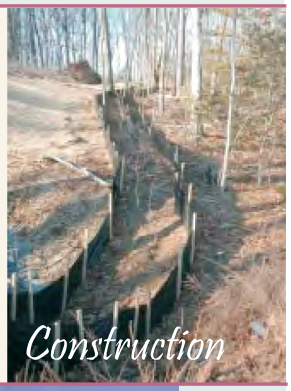
Commercial



Dirt, oil, and debris that collect in parking lots and paved areas can be washed into the storm sewer system and eventually enter local waterbodies.

- Sweep up litter and debris from sidewalks, driveways and parking lots, especially around storm drains.
- Cover grease storage and dumpsters and keep them clean to avoid leaks.
- Report any chemical spill to the local hazardous waste cleanup team. They'll know the best way to keep spills from harming the environment.

Construction



Erosion controls that aren't maintained can cause excessive amounts of sediment and debris to be carried into the stormwater system. Construction vehicles can leak fuel, oil, and other harmful fluids that can be picked up by stormwater and deposited into local waterbodies.

- Divert stormwater away from disturbed or exposed areas of the construction site.
- Install silt fences, vehicle mud removal areas, vegetative cover, and other sediment and erosion controls and properly maintain them, especially after rainstorms.
- Prevent soil erosion by minimizing disturbed areas during construction projects, and seed and mulch bare areas as soon as possible.

Agriculture

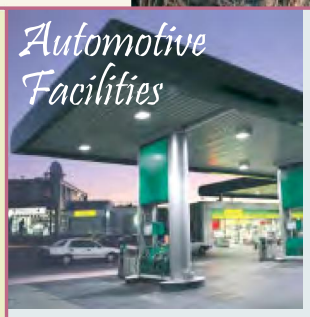


Lack of vegetation on streambanks can lead to erosion. Overgrazed pastures can also contribute excessive amounts of sediment to local waterbodies. Excess fertilizers and pesticides can poison aquatic animals and lead to destructive algae blooms. Livestock in streams can contaminate waterways with bacteria, making them unsafe for human contact.



- Keep livestock away from streambanks and provide them a water source away from waterbodies.
- Store and apply manure away from waterbodies and in accordance with a nutrient management plan.
- Vegetate riparian areas along waterways.
- Rotate animal grazing to prevent soil erosion in fields.
- Apply fertilizers and pesticides according to label instructions to save money and minimize pollution.

Automotive Facilities



Uncovered fueling stations allow spills to be washed into storm drains. Cars waiting to be repaired can leak fuel, oil, and other harmful fluids that can be picked up by stormwater.

- Clean up spills immediately and properly dispose of cleanup materials.
- Provide cover over fueling stations and design or retrofit facilities for spill containment.
- Properly maintain fleet vehicles to prevent oil, gas, and other discharges from being washed into local waterbodies.
- Install and maintain oil/water separators.

Forestry



Improperly managed logging operations can result in erosion and sedimentation.

- Conduct preharvest planning to prevent erosion and lower costs.
- Use logging methods and equipment that minimize soil disturbance.
- Plan and design skid trails, yard areas, and truck access roads to minimize stream crossings and avoid disturbing the forest floor.
- Construct stream crossings so that they minimize erosion and physical changes to streams.
- Expedite revegetation of cleared areas.

For Information:

For information on "closed-loop" suppliers and recycling/disposal vendors, contact:
County of Riverside
Health Services Agency
Department of Environmental Health
at (909) 358-5055.

SPILL RESPONSE AGENCY:
HAZ-MAT: (909) 358-5055
AFTER 5:00 P.M.: (909) 358-5245 OR 911

RECYCLING AND HAZARDOUS WASTE DISPOSAL: (909) 358-5055

TO REPORT ILLEGAL DUMPING OR A CLOGGED STORM DRAIN: 1-800-506-2555

To order additional brochures or to obtain information on other pollution prevention activities, call: (909) 955-1111.

The Cities and County of Riverside
StormWater/CleanWater Protection Program
1-800-506-2555

StormWater
CleanWater
PROTECTION PROGRAM

Riverside County gratefully acknowledges the Santa Clara Valley Nonpoint Source Pollution Control Program and the City of Los Angeles Stormwater Management Division for information provided in this brochure.

StormWater Pollution

What you should know for...

AUTOMOTIVE MAINTENANCE & CAR CARE



Best Management Practices (BMPS) for:

- **Auto Body Shops**
- **Auto Repair Shops**
- **Car Dealerships**
- **Gas Stations**
- **Fleet Service Operations**

StormWater Pollution . . . What You Should Know

Riverside County has two drainage systems - sanitary sewers and storm drains. The storm drain system is designed to help prevent flooding by carrying excess rainwater away from streets. Since the storm drain system does not provide for water treatment, it also 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.



Rain and water runoff from automotive shops and businesses can carry pollutant material into storm drains. Examples of pollutants include oil and grease from cars, copper and asbestos from worn brake linings, zinc from tires, and toxics from spilled fluids.

Stormwater pollution causes as much as 60% of our water pollution problem. It jeopardizes the quality of our waterways and poses a threat to groundwater resources if pollutants percolate through soil.

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 on pollution prevention activities such as the Best Management Practices (BMPs) 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 discharges containing oil, antifreeze, gasoline and other waste materials.

PLEASE NOTE: A common stormwater pollution problem associated with automotive shops and businesses is the hosing down of service bays, parking and other areas. Often, this activity flushes pollutants into the storm drain system. The discharges of pollutants is ***strictly prohibited*** by local ordinances and state and federal regulations.

Keep your shop in tune. Follow these Practices to help prevent stormwater pollution . . .

1. Changing Automotive Fluids

- Designate an area away from storm or sanitary drains to change automotive fluids.
- Collect, separate, and recycle motor oil, antifreeze, transmission fluid, and gear oil.
- Drain brake fluid and other non-recyclables into a proper container and handle as a hazardous waste.
- Use a radiator flushing fluid that can be recycled, and add it to the waste antifreeze.



2. Working on Transmissions, Engines, and Miscellaneous Repairs

- Keep a drip pan or a wide low-rimmed container under vehicles to catch fluids whenever you unclip hoses, unscrew filters, or change parts, to contain unexpected leaks.

3. Preventing Leaks and Spills

- Avoid spills by emptying and wiping drip pans when you move them to another vehicle or when they are half-full.
- Routinely check equipment to wipe up spills and repair leaks.
- Place large pans or an inflatable portable berm under wrecked cars.
- Drain all fluids from wrecked vehicles or "parts" cars you keep on site.

4. Cleaning up Spills

- Clean up small spills immediately using shop rags.



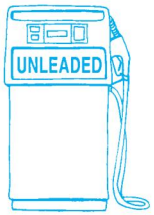
- Keep dry absorbent materials and/or a wet/dry vacuum cleaner on hand for mid-sized spills.
- Contain large spills immediately; block or shut off floor and parking lot drains and notify the authorities.
- Train employees to be familiar with hazardous spill response plans and emergency procedures.

5. Identify and Control Wastewater Discharges

- Ensure that shop sinks and floor drains are connected to the sanitary sewer. Check with the local sewer authority regarding permitting or other requirements.
- Post signs to prevent disposal of liquid wastes into sanitary drains.

6. Fueling Vehicles

- Clean-up minor spills, with a dry absorbent, rather than allowing them to evaporate. Dispose of the absorbent as a dry hazardous waste.
- Use a damp cloth and a damp mop to keep the area clean rather than a hose or a wet mop.



7. Removing and Storing Batteries

- Store batteries indoors, on an open rack.
- Return used batteries to a battery vendor.
- Contain cracked batteries to prevent hazardous spills.

8. Cleaning Parts

- Clean parts in a self-contained unit, solvent sink, or parts washer to prevent solvents and grease from entering a sewer or storm drain connection.



9. Metal Grinding and Finishing

- Catch metal filings in an enclosed unit or on a tarpaulin.
- Sweep filing area to prevent washing metals into floor drains.

10. Storing and Disposing of Waste

- Store recyclable and non-recyclable waste separately.
- Place liquid waste (hazardous or otherwise) within a bermed or secondary containment area.
- Cover outdoor storage areas to prevent contact with rain water.
- Collect used parts for delivery to a scrap metal dealer.

11. Selecting and Controlling Inventory

- Purchase recyclable or non-toxic materials.
- Select "closed-loop" suppliers and purchase supplies in bulk.



12. Outdoor Parking and Auto Maintenance

- Treat outdoor areas as an extension of your service bays or avoid using altogether.
- Sweep-up trash and dirt from outdoor parking and maintenance areas. Do not hose down areas. All non-storm water discharges are prohibited.
- Drain work areas to a sanitary drain rather than a storm drain. Contact the local sewer authority to determine if pretreatment is required.

13. Washing Vehicles, Cleaning Engines, and Other Steam Cleaning

- For occasional car exterior cleaning, minimize the water used and divert runoff to landscaped areas, keeping it out of the storm drain.
- Wash vehicles with biodegradable, phosphate-free detergent.
- Make sure no wastewater from engine or parts cleaning or steam cleaning is discharged where it may flow to a street, gutter, or storm drain.

14. Cleaning Work Areas

- Sweep or vacuum the shop floor frequently.
- Damp mop work areas - do not hose down work areas into the street or gutter.
- Do not pour mop water into the parking lot, street, gutter or storm drain.
- Use non-toxic cleaning products whenever possible.

Please remember:



Stormwater and the Construction Industry

Protect Natural Features



Bad

Good

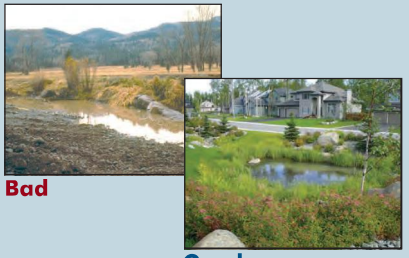
- Minimize clearing.
- Minimize the amount of exposed soil.
- Identify and protect areas where existing vegetation, such as trees, will not be disturbed by construction activity.
- Protect streams, stream buffers, wild woodlands, wetlands, or other sensitive areas from any disturbance or construction activity by fencing or otherwise clearly marking these areas.

Construction Phasing



- Sequence construction activities so that the soil is not exposed for long periods of time.
- Schedule or limit grading to small areas.
- Install key sediment control practices before site grading begins.
- Schedule site stabilization activities, such as landscaping, to be completed immediately after the land has been graded to its final contour.

Vegetative Buffers



Bad

Good

- Protect and install vegetative buffers along waterbodies to slow and filter stormwater runoff.
- Maintain buffers by mowing or replanting periodically to ensure their effectiveness.

Silt Fencing



Bad

Good

- Inspect and maintain silt fences after each rainstorm.
- Make sure the bottom of the silt fence is buried in the ground.
- Securely attach the material to the stakes.
- Don't place silt fences in the middle of a waterway or use them as a check dam.
- Make sure stormwater is not flowing around the silt fence.

Maintain your BMPs!

IN RIVERSIDE COUNTY....Call 1-800-506-2555

TO REPORT ILLEGAL STORMDRAIN DISPOSAL

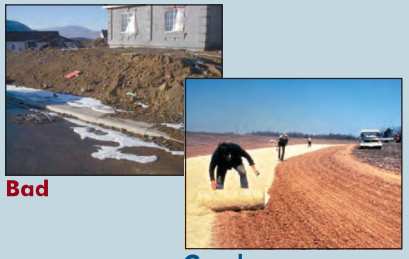
E-mail: Flood.fcnpdes@co.riverside.ca.us

Visit our website: www.floodcontrol.co.riverside.ca.us

Brought to you by the Storm Water/Clean Water Pollution Protection Program.....

REMEMBER, ONLY RAIN IN THE STORMDRAIN!

Site Stabilization



Bad

Good

- Vegetate, mulch, or otherwise stabilize all exposed areas as soon as land alterations have been completed.

Construction Entrances



Bad

Good

- Remove mud and dirt from the tires of construction vehicles before they enter a paved roadway.
- Properly size entrance BMPs for all anticipated vehicles.
- Make sure that the construction entrance does not become buried in soil.

Slopes



Bad

Good

- Rough grade or terrace slopes.
- Break up long slopes with sediment barriers, or under drain, or divert stormwater away from slopes.

Dirt Stockpiles



Bad

Good

- Cover or seed all dirt stockpiles.

Storm Drain Inlet Protection



Bad

Good

- Use rock or other appropriate material to cover the storm drain inlet to filter out trash and debris.
- Make sure the rock size is appropriate (usually 1 to 2 inches in diameter).
- If you use inlet filters, maintain them regularly.

www.epa.gov/npdes/menuofbmps

Stormwater and the Construction Industry

Planning and Implementing Erosion and Sediment Control Practices

The construction industry is a critical participant in the nation's efforts to protect streams, rivers, lakes, wetlands, and oceans. Through the use of best management practices (BMPs), construction site operators are the key defense against erosion and sedimentation.

As stormwater flows over a construction site, it picks up pollutants like sediment, debris, and chemicals. High volumes of stormwater can also cause stream bank erosion, and destroy downstream aquatic habitat. Preventing soil erosion and sedimentation is an important responsibility at all construction sites.

In addition to the environmental impact, uncontrolled erosion can have a significant financial impact on a construction project. It costs money and time to repair gullies, replace vegetation, clean sediment-clogged storm drains, replace poorly installed BMPs, and mitigate damage to other people's property or to natural resources.

Best Management Practice (BMP)
A BMP is a method used to prevent or control stormwater runoff and the discharge of pollutants, including sediment. into local waterbodies. Silt fences, inlet protection, and site-stabilization techniques are typical BMPs on a construction site.

Operator
An operator is someone who has control over and the ability to modify construction plans and specifications (e.g. owner, general contractor)

or

Someone who has control over the day-to-day operations at a site (e.g., owner, general contractor) that are necessary to ensure compliance with the permit requirements. It is the responsibility of a construction site owner or operator to contain stormwater runoff and prevent erosion during all stages of a project.

There may be more than one person at a site who meets these definitions and must apply for permit coverage. (States may have different definitions of the term "operator.")

So what's being done about polluted runoff?

The Clean Water Act includes the National Pollutant Discharge Elimination System (NPDES) permitting program. As of January 2003, 44 states and territories are authorized to issue NPDES stormwater permits. If your state isn't authorized to operate the NPDES stormwater permit program, EPA issues the permits. Permits vary from state to state, so contact your state or EPA for specific information. Your permitting authority has specific information on your state's NPDES stormwater permit program. In general, construction permits require construction operators to do all of the following:

- Develop and implement a stormwater pollution prevention plan
- Submit a permit application or notice of intent (NOI)
- Comply with the permit, including maintaining BMPs and inspecting the site

Under the NPDES program, construction activities that disturb 1 or more acres are required to obtain stormwater permit coverage. States have different names for the plans that construction operators must develop, such as

- Stormwater pollution prevention plan
- Erosion and sediment control plan
- Erosion control and stormwater management plan
- Stormwater management plan
- Water pollution control plan
- Pollution prevention plan

This document uses the term "*Plan*."

I think I need a permit... Where do I start?

All land-disturbing activities, including clearing, grading, and excavation, that disturb **1 or more acres** are required to be covered under a state or EPA-issued NPDES construction stormwater permit **prior to land disturbance.** Permit requirements vary by state. Begin by researching the specific requirements in your state. You might already be subject to local erosion and sediment control requirements, but that doesn't release you from the requirements of the NPDES program at the state or EPA level. Although you must comply with both sets of requirements, in most cases they have been designed to be complementary. Contact your permitting authority to find out exactly what you need to do. A good place to start your search is the Construction Industry Compliance Assistance web site at http://www.envcap.org/cica.

The NPDES permit requirements include small construction activities that are part of a larger common plan of development or sale, such as a single lot within a larger subdivision. For developments with multiple operators, all operators must have permit coverage for their individual parts of the larger development, no matter how large or small each operation happens to be. When there are multiple operators at one site, they're encouraged to develop and share one comprehensive Plan and obtain permit coverage as co-permitees.

Construction sites that discharge unpermitted stormwater are in violation of the Clean Water Act and may be subject to fines of up to $27,500 a day per violation.

The **owner or operator** of the construction site is responsible for complying with the requirements of the permit. Responsibilities include developing a Plan, obtaining permit coverage, implementing BMPs, and stabilizing the site at the end of the construction activity.

Determine your eligibility

All construction activity that disturbs 1 or more acres of land, as well as activity that disturbs less than 1 acre but is part of a larger common plan of development, must obtain permit coverage.

Read and understand your stormwater permit requirements

Get a copy of the permit for construction activities and a permit application (or notice of intent form) from your state or EPA permitting authority.

Develop a Plan

Most states do not require you to submit your Plan. However, you do need to keep the Plan on site. If that's impractical, you may post a notice that tells where the Plan is kept so it can be accessed by the permitting authority and other interested parties.

You'll need to post a copy of your completed application on site. Put it in a place where the public can see it so they'll know your site is covered by an NPDES permit!

Apply for permit coverage

Once you understand your permit requirements and have developed a Plan, you can submit a stormwater permit application (or notice of intent) to your permitting authority. This must be done before beginning any land disturbance on the site. Some states require a few days of lead time, so check with your permitting authority. Once you've submitted the application, you must satisfy the conditions of the permit.

Implement the Plan

Be prepared to implement the BMPs in your Plan before construction begins. Ensure that BMPs are properly maintained, and upgrade and repair them as necessary.

Developing and Implementing a Plan

You must have a Plan that includes erosion and sediment control and pollution prevention BMPs. These Plans require

- Advance planning and training to ensure proper implementation of the BMPs
- Erosion and sediment control BMPs in place until the area is permanently stabilized
- Pollution prevention BMPs to keep the construction site "clean"
- Regular inspection of the construction site to ensure proper installation and maintenance of BMPs

Fortunately, the practices and measures that must be included in your Plan are already part of the standard operating procedures at many construction sites.

Six steps are associated with developing and implementing a stormwater Plan. There's a wealth of information available on developing pollution prevention plans. Please contact your permitting authority for help in finding additional guidance materials, or visit www.epa.gov/npdes/stormwater. A sample construction plan is available at www.epa.gov/npdes/pubs/sample_swppp.pdf.

1. Site Evaluation and Design Development

- **Collect site information**
- **Develop site plan design**
- **Prepare pollution prevention site map**

The first step in preparing a Plan is to define the characteristics of the site and the type of construction that will occur. This involves collecting site information, identifying natural features that should be protected, developing a site plan design, describing the nature of the construction activity, and preparing a pollution prevention site map.

2. Assessment

- **Measure the site area**
- **Determine the drainage areas**
- **Calculate the runoff coefficient**

The next step is assessing the impact the project will have on stormwater runoff. Determine the drainage areas and estimate the runoff amounts and velocities. For more information on calculating the runoff coefficient, go to www.epa.gov/npdes/pubs/chap02_conguide.pdf, page 11.

3. Control Selection and Plan Design

- **Review and incorporate state or local requirements**
- **Select erosion and sediment controls**
- **Select other controls**
- **Select stormwater management controls**
- **Indicate the location of controls on the site map**
- **Prepare an inspection and maintenance plan**
- **Coordinate controls with construction activity**
- **Prepare sequence of major activities**

In the third step you'll actually document your procedures to prevent and control polluted stormwater runoff. You must delineate areas that will not be disturbed, including critical natural areas like streamside areas, floodplains, and trees. You must also identify the measures (or BMPs) you'll use to protect these areas.

Soil erosion control tips...

- Design the site to infiltrate stormwater into the ground and to keep it out of storm drains. Eliminate or minimize the use of stormwater collection and conveyance systems while maximizing the use of stormwater infiltration and bioretention techniques.
- Minimize the amount of exposed soil on site.
  - To the extent possible, plan the project in stages to minimize the amount of area that is bare and subject to erosion. The less soil exposed, the easier and cheaper it will be to control erosion.
  - Vegetate disturbed areas with permanent or temporary seeding immediately upon reaching final grade.
  - Vegetate or cover stockpiles that will not be used immediately.
- Reduce the velocity of stormwater both onto and away from the project area.
  - Interceptors, diversions, vegetated buffers, and check dams are a few of the BMPs that can be used to slow down stormwater as it travels across and away from the project site.
  - Diversion measures can also be used to direct flow away from exposed areas toward stable portions of the site.
  - Silt fences and other types of perimeter filters should never be used to reduce the velocity of runoff.
- Protect defined channels immediately with measures adequate to handle the storm flows expected.
  - Sod, geotextile, natural fiber, riprap, or other stabilization measures should be used to allow the channels to carry water without causing erosion. Use softer measures like geotextile or vegetation where possible to prevent downstream impacts.
- Keep sediment on site.
  - Place aggregate or stone at construction site vehicle exits to accommodate at least two tire revolutions of large construction vehicles. Much of the dirt on the tires will fall off before the vehicle gets to the street.
  - Regular street sweeping at the construction entrance will prevent dirt from entering storm drains. Do not hose paved areas.
  - Sediment traps and basins are temporary structures and should be used in conjunction with other measures to reduce the amount of erosion.
- Maintaining all BMPs is critical to ensure their effectiveness during the life of the project.
  - Regularly remove collected sediment from silt fences, berms, traps, and other BMPs.
  - Ensure that geotextiles and mulch remain in place until vegetation is well established.
  - Maintain fences that protect sensitive areas. silt fences, diversion structures, and other BMPs.

Phasing your project to minimize the amount of exposed soil at any given time is a highly effective way to prevent erosion. Erosion control measures designed to prevent soil from being mobilized include diversions to route stormwater away from exposed soils and stabilization with vegetation, mulch, and geotextiles. Sedimentation control measures designed to remove sediment from stormwater or prevent it from leaving the site include silt fences, sediment traps, and diversions.

You'll need to select erosion and sediment controls—including stabilization measures for protecting disturbed areas and structural controls for diverting run-off and removing sediment—that are appropriate for your particular site. The appropriateness of the control measures will depend on several factors, but will be influenced most directly by the site characteristics. Some stabilization measures you might consider are temporary seeding, permanent seeding, and mulching. Structural control measures include earth dikes, silt fences, and sediment traps. No single BMP will meet all of the erosion and sedimentation control needs of a construction site. A combination of BMPs is necessary. For more information on the types of BMPs appropriate for your construction site, see the BMP fact sheet series available at www.epa.gov/npdes/menuofbmps.

Other BMPs and Activities to Control Polluted Runoff

You'll need to select other controls to address potential pollutant sources on your site. Construction materials, debris, trash, fuel, paint, and stockpiles become pollution sources when it rains. Basic pollution prevention practices can significantly reduce the amount of pollution leaving construction sites. The following are some simple practices that should be included in the Plan and implemented on site:

- Keep potential sources of pollution out of the rain as practicable (e.g., inside a building, covered with plastic or tarps, or sealed tightly in a leak-proof container).
- Clearly identify a protected, lined area for concrete truck washouts. This area should be located away from streams, storm drain inlets, or ditches and should be cleaned out periodically.
- Park, refuel, and maintain vehicles and equipment in one area of the site to minimize the area exposed to possible spills and fuel storage. This area should be well away from streams, storm drain inlets, or ditches. Keep spill kits close by and clean up any spills or leaks immediately, including spills on pavement or earthen surfaces.
- Practice good housekeeping. Keep the construction site free of litter, construction debris, and leaking containers. Keep all waste in one area to minimize cleaning.
- Never hose down paved surfaces to clean dust, debris, or trash. This water could wash directly into storm drains or streams. Sweep up materials and dispose of them in the trash. Never bury trash or debris!
- Dispose of hazardous materials properly.

4. Certification and Notification

- **Certify the Plan**
- **Submit permit application or notice of intent**

Once the Plan has been developed, an authorized representative must sign it. Now is the time to submit the permit application or notice of intent. Your permit might require that the Plan be kept on site, so be sure to keep it available for the staff implementing the Plan.

Erosion and sedimentation control practices are only as good as their installation and maintenance.

5. Implementing and Maintaining a Plan

- **Implement controls**
- **Inspect and maintain controls**
- **Update/change the Plan**
- **Report releases of hazardous materials**

A Plan describes the practices and activities you'll use to prevent stormwater contamination and meet the NPDES permit requirements. Make sure that the Plan is implemented and that the Plan is updated as necessary to reflect changes on the site.

Erosion and sedimentation control practices are only as good as their installation and maintenance. Train the contractors that will install the BMPs and inspect immediately to ensure that the BMPs have been installed correctly.

Regularly inspect the BMPs (especially before and after rain events) and perform any necessary repairs or maintenance immediately. Many BMPs are designed to handle a limited amount of sediment. If not maintained, they'll become ineffective and a source of sediment pollution.

It's also important to keep records of BMP installation, implementation, and maintenance. Keep track of major grading activities that occur on the site, when construction activities cease (temporarily or permanently), and when a site is temporarily or permanently stabilized.

If construction plans change at any time, or if more appropriate BMPs are chosen for the site, update the Plan accordingly.

6. Completing the Project: Final Stabilization and Termination of the Permit

- **Final stabilization**
- **Notice of Termination**
- **Record retention**

Many states and EPA require a Notice of Termination (NOT) or other notification signifying that the construction activity is completed. An NOT is required when

- Final stabilization has been achieved on all portions of the site for which the permittee is responsible.
- Another operator has assumed control over all areas of the site that have not been finally stabilized. That operator would need to submit a new permit application to the permitting authority.
- For residential construction only, temporary stabilization of a lot has been completed prior to transference of ownership to the homeowner, with the homeowner being made aware of the need to perform final stabilization.

Permittees must keep a copy of their permit application and their Plan for at least 3 years following final stabilization. This period may be longer depending on state and local requirements.

Preconstruction Checklist

- A site description, including
  - Nature of the activity
  - Intended sequence of major construction activities
  - Total area of the site
  - Existing soil type and rainfall runoff data
  - A site map with:
    - Drainage patterns
    - Approximate slopes after major grading
    - Area of soil disturbance
    - Outline of areas which will not be disturbed
    - Location of major structural and nonstructural soil erosion controls
    - Areas where stabilization practices are expected to occur
    - Surface waters
    - Stormwater discharge locations
  - Name of the receiving water(s)
- A description of controls:
  - Erosion and sediment controls, including
    - Stabilization practices for all areas disturbed by construction
    - Structural practices for all drainage/discharge locations
  - Stormwater management controls, including
    - Measures used to control pollutants occurring in stormwater discharges after construction activities are complete
    - Velocity dissipation devices to provide nonerosive flow conditions from the discharge point along the length of any outfall channel
  - Other controls, including
    - Waste disposal practices that prevent discharge of solid materials
    - Measures to minimize offset tracking of sediments by construction vehicles
    - Measures to ensure compliance with state or local waste disposal, sanitary sewer, or septic system regulations
  - Description of the timing during the construction when measures will be implemented
- State or local requirements incorporated into the Plan
- Inspection and maintenance procedures for control measures identified in the Plan
- Contractor certification and Plan certification

Implementation Checklist

- Maintain records of construction activities, including
  - Dates when major grading activities occur
  - Dates when construction activities temporarily cease on the site or a portion of the site
  - Dates when construction activities permanently cease on the site or a portion of the site
  - Dates when stabilization measures are completed on the site
- Prepare inspection reports summarizing
  - Name of person conducting BMP inspections
  - Qualifications of person conducting BMP inspections
  - BMPs/areas inspected
  - Observed conditions
  - Necessary changes to the Plan
- Report releases of reportable quantities of oil or hazardous materials
  - Notify the National Response Center at 800-424-8802 immediately
  - Report releases to your permitting authority immediately, or as specified in your permit. You must also provide a written report within 14 days.
  - Modify the Plan to include
    - The date of release
    - Circumstances leading to the release
    - Steps taken to prevent reoccurrence of the release
- Modify Plan as necessary
  - Incorporate requests of the permitting authority to bring the Plan into compliance
  - Address changes in design, construction operation, or maintenance that affect the potential for discharge of pollutants

An ounce of prevention is worth a pound of cure! It's far more efficient and cost-effective to prevent pollution than it is to try to correct problems later. Installing and maintaining simple BMPs and pollution prevention techniques on site can greatly reduce the potential for stormwater pollution and can also save you money!

Visit www.epa.gov/npdes/stormwater for more information.

StormWater CleanWater PROTECTION PROGRAM



RIVERSIDE COUNTY
ANIMAL SERVICES LOCATIONS:

www.rcdas.org

BLYTHE
16450 West Hobson Way
Blythe, CA 92225
760-921-7857

COACHELLA VALLEY ANIMAL CAMPUS
72-050 Petland Place
Thousand Palms, CA 92276
760-343-3644

RIVERSIDE COUNTY ANIMAL SERVICES
6851 Van Buren Blvd.
Riverside, CA 92509
951-688-4340

OTHER ANIMAL SHELTERS:

ANIMAL CARE CENTER OF INDIO
45-355 Van Buren
Indio, CA 92201
760-391-4138

ANIMAL FRIENDS OF THE VALLEYS
29001 Bastron Avenue
Lake Elsinore, CA 92530
951-674-0618
(Serving incorporated Temecula, Wildomar, Lake Elsinore, Murrieta and Canyon Lake)

MARY S. ROBERTS PET ADOPTION CENTER
6185 Industrial Avenue
Riverside, CA 92504
951-688-4340

RAMONA HUMANE SOCIETY
690 Humane Way
San Jacinto 92586
951-654-8002
(Serving Sun City, Menifee, Romoland and Homeland)

Looking to adopt a pet?
This website is linked to many animal shelters.
www.petfinder.com

To report illegal storm drain disposal, call
1-800-506-2555

Or visit our website at www.rcflood.org

E-mail fcnpdes@rcflood.org

What's the Scoop?

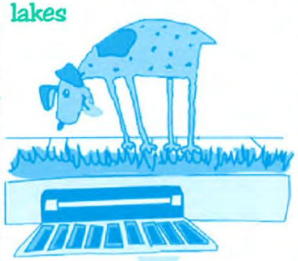


TIPS FOR A HEALTHY PET AND A HEALTHIER ENVIRONMENT

CREATE A HEALTHY ENVIRONMENT in and around your home by following these simple pet practices. Your pet, family and neighbors will appreciate their clean comfortable surroundings.

HOUSEHOLD PETS

We all love our pets, but pet waste is a subject everyone likes to avoid. Pet waste left on trails, sidewalks, streets and grassy areas can be washed into the nearest waterway when it rains. Even if you can't see streams or lakes near you, rainfall (stormwater) or sprinkler runoff can wash pet waste into the storm drains that carry runoff to the nearest streams or lakes untreated. The risk of stormwater contamination increases if pet waste is allowed to accumulate in outdoor animal pen areas or left on sidewalks, streets or driveways.





Pet waste contains nutrients and bacteria. Nutrients can promote the growth of algae in streams and lakes. Algae can cause fish kills and other environmental damage if it is fed too many nutrients. Pet Waste also contains e. Coli and fecal bacteria, which can cause disease in other animals and humans that come in contact with it when swimming or splashing in streams and lakes. Dogs also carry salmonella and giardia, which can make people sick.

Pet waste that is not picked up and properly disposed can also increase vector problems. Flies and other insects are not only attracted to and feed on pet waste, but can also be infected with diseases and spread those diseases to humans and other animals.

WHAT CAN YOU DO?

- SCOOP up pet waste and flush it down the toilet or place in trash can.
- NEVER DUMP pet waste into a storm drain or catch basin.
- USE the complimentary bags or mutt mitts offered in dispensers at local parks.
- CARRY EXTRA BAGS when walking your dog and make them available to other pet owners who are without.
- TEACH CHILDREN how to properly clean up after a pet.
- TELL FRIENDS AND NEIGHBORS about the ill effects of animal waste on the environment. Encourage them to clean up after pets.

Call 1-800-506-2555 TOLL FREE to report illegal dumping to the storm drain, find the dates and times of local Household Hazardous Waste Collection Events, obtain additional information on stormwater problems and solutions, request presentations about stormwater pollution in your child's classroom, or learn about free grasscycling and composting workshops.

SCOOP THE POOP



Many communities have "Scoop the Poop" laws that govern pet waste cleanup. Some of these laws specifically require anyone who walks an animal off their property to carry a bag, shovel, or scooper. Any waste left by the animal must be cleaned up immediately. CALL YOUR LOCAL CODE ENFORCEMENT OFFICE to find out more about pet waste regulations.

OTHER WAYS TO PROTECT YOUR PETS AND THE ENVIRONMENT

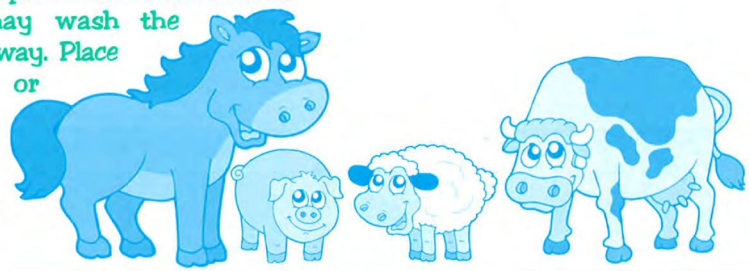
Pets are only one of many sources that contribute to water pollution. However, these other sources of water pollution cannot only harm the environment but also harm your pet. Improperly used or stored lawn fertilizers, pesticides, soaps, grease and vehicle fluids cannot only be washed into local streams and lakes, these chemicals can also harm your pet if they ingest or touch these chemicals. Call 1-800-506-2555 for information regarding how to properly dispose of household hazardous wastes such as these. You can also keep your pets and our environment healthy by properly maintaining your vehicles, and limiting use of pesticides and fertilizers to only the amount that is absolutely needed.

Make sure to not only protect your pets, but to also protect your neighbors pets. NEVER HOSE VEHICLE FLUIDS into the street or gutter. USE ABSORBENT MATERIALS such as cat litter to clean-up spills. SWEEP UP used absorbent materials and place it in the trash.

HORSES AND LIVESTOCK

Fortunate enough to own a horse or livestock? You, too, can play a part in protecting and cleaning up our water resources. The following are a few simple Best Management Practices (BMPs) specifically designed for horses and livestock.

- STORE your manure properly. Do not store unprotected piles of manure in places where stormwater runoff may wash the manure away. Place a cover or tarp over the pile to keep rainwater out.



- BUILD a manure storage facility to protect your pets, property and the environment. These structures usually consist of a concrete pad to protect groundwater and a short wall on one or two sides to make manure handling easier.
- READ the Only Rain Down the Storm Drain brochure titled "Tips for Horse Care" for additional guidance and recommendations. This brochure should be available from your local city office or for download at www.rcflood.org/stormwater.
- KEEP animals out of streams - Horses and livestock can deficate in streams causing stormwater pollution. Livestock and horses in streams can also disturb sensitive habitat and vegetation, causing additional environmental damage. Keep livestock and horses away from streams and use designated stream crossings whenever possible.
- MATERIAL STORAGE SAFETY TIPS Many of the chemicals found in barns require careful handling and proper disposal. When using these chemicals, be certain to follow these common sense guidelines:
  - Buy only what you need.
  - Treat spills of hoof oils like a fuel spill. Use kitty litter to soak up the oil and dispose of it in a tightly sealed plastic bag.
  - Store pesticides in a locked, dry, well-ventilated area.
  - Protect stored fertilizer and pesticides from rain and surface water.

RESOURCE CONSERVATION DISTRICTS CAN HELP

Call 1-800-506-2555 for assistance with locating a local conservation district that can help you properly manage your manure, re-establish healthy pastures, control weeds, or identify appropriate grasses for your soils.



Thank you for doing your part to protect your watershed, the environment, your pets and your community!

For Information:

For information on “closed-loop” suppliers and recycling/disposal vendors, contact:
County of Riverside
Health Services Agency
Department of Environmental Health
at (909) 358-5055.

SPILL RESPONSE AGENCY:
HAZ-MAT: (909) 358-5055
AFTER 5:00 P.M.: (909) 358-5245 OR 911

HAZARDOUS WASTE DISPOSAL: (909) 358-5055

RECYCLING INFORMATION: 1-800-366-SAVE

TO REPORT ILLEGAL DUMPING OR A CLOGGED STORM DRAIN: 1-800-506-2555

To order additional brochures or to obtain information on other pollution prevention activities, call: (909) 955-1111.

The Cities and County of Riverside
StormWater/CleanWater Protection Program
1-800-506-2555

StormWater CleanWater
PROTECTION PROGRAM

Riverside County gratefully acknowledges the Santa Clara Valley Nonpoint Source Pollution Control Program, Alameda Countywide Clean Water Program and the San Bernardino County Stormwater Program for information provided in this brochure.

StormWater Pollution

What you should know for...

THE FOOD SERVICE INDUSTRY



Best Management Practices (BMPS) for:

- **Restaurants**
- **Grocery Stores**
- **Delicatessens**
- **Bakeries**

StormWater Pollution . . . What You Should Know

Riverside County has two drainage systems - sanitary sewers and storm drains. The storm drain system is designed to help prevent flooding by carrying excess rainwater away from streets. Since the storm drain system does not provide for water treatment, it also 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.



Waste or washwater generated by the food service industry often contains materials such as food wastes, oil, grease, detergents, and degreasers. These materials can degrade local waters when allowed to flow into a storm drain system.

Stormwater pollution causes as much as 60% of our water pollution problem. It jeopardizes the quality of our waterways and poses a threat to groundwater resources if pollutants percolate through soil.

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 on pollution prevention activities such as the Best Management Practices (BMPs) 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 discharges from the food service industry containing food wastes, oil, grease, detergents, and degreasers.

PLEASE NOTE: A common stormwater pollution problem associated with the food service industry is the discharge of washwater into alleys and gutters, and the hosing down of outdoor areas. Often, these activities flush pollutants into the storm drain system. The discharges of pollutants is ***strictly prohibited*** by local ordinances and state and federal regulations.

A Menu of Activities . . . to Keep Our Water Clean

Cleanin' It Right . . .

Pour mop and wash water into the mop sink or down floor drains . . . not into gutters, alleys, parking lots or a storm drain. Wash greasy equipment only in designated wash areas which are properly connected to the sewer system with an appropriate oil/water separator. Also, avoid washing kitchen mats, garbage containers, and other items in areas where wastewater is likely to flow into a storm drain.



Watch Out For Spills . . .

Use dry methods for spill cleanup. Don't hose down outside spills. Use rags or absorbents such as cat litter and then dispose of in the garbage, or handle as hazardous waste as appropriate. If necessary, mop the area with a minimum amount of water.



Proper Storage and Disposal . . .

General cleaners, floor cleaners, solvents, and detergents often contain toxic substances. Read labels carefully and store and dispose of these products properly.

REMEMBER: Don't throw toxic waste into the trash or into a storm drain. To report toxic spill call 911. For information on hazardous waste pick-up call (909) 358-5055.



Grease and Oil . . .

Handle and dispose of grease properly. Save used cooking grease and oil for recycling in tallow bins or sealed containers. Never pour grease into a sink, floor drain, dumpster or storm drain. Watch out for, and report to management, overflowing grease interceptors. Call (909) 358-5172 for disposal information.



How 'Bout That Dumpster . . .

Keep dumpster and loading dock areas clean. Control litter by sweeping - don't hose down the area. Replace leaky dumpsters and keep lids closed to keep out rainwater.



Use Water-Friendly Products . . .

Whenever possible, purchase water-based cleaning products. Look for products labeled "non-toxic," "non-petroleum based," "ammonia-free," "phosphate-free," and "perfume-free," or "readily biodegradable."



Outdoor/Sidewalk Areas . . .

Sweep up food particles, cigarette butts, and trash from outdoor dining areas before rinsing or steam cleaning. Don't use toxic bleaches or detergents when you pressure wash outdoor dining areas, entrances or surrounding sidewalk areas.



***You may be** already implementing many of the BMPs prescribed in this brochure. However, if you discover any potential problem areas, please consider using one or more of the recommended BMPS.*

***Also,** please note that the Riverside County Environmental Health Department will monitor potential sources of stormwater pollution activities during regularly scheduled inspections of food service facilities. If Health Department staff observe activities which may be contributing to stormwater pollution, suggestions will be provided and/or use of prescribed BMPS listed in this brochure will be offered.*

Please remember:



Everyone contributes a little to the problem of stormwater pollution. Now it's time for all of us to become part of the solution!

StormWater Pollution . . . What You Should Know

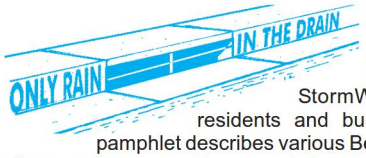
Riverside County has two drainage systems - sewers and storm drains. The storm drain system was designed to reduce flooding by carrying excess rainwater away from streets and developed areas. Since the storm drain system does not provide for water treatment, it also serves the *unintended* function of transporting pollutants directly to our local waterways.



Unlike sanitary sewers, storm drains are not connected to a wastewater treatment plant – they flow directly to our local streams, rivers and lakes.

Stormwater runoff is a part of the natural hydrologic process. However, land development and construction activities can significantly alter natural drainage processes and introduce pollutants into stormwater runoff. Polluted stormwater runoff from construction sites has been identified as a major source of water pollution in California. It jeopardizes the quality of our local waterways and can pose a serious threat to the health of our aquatic ecosystems.

The Cities and County of Riverside StormWater/CleanWater Protection Program



Because 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 on pollution prevention activities. This pamphlet describes various Best Management Practices (BMPs) that construction site operators can use to prevent stormwater pollution.

In accordance with applicable federal and state law, the Cities and County of Riverside have adopted ordinances for stormwater management and discharge control that **prohibit** the discharge of pollutants into the storm drain system or local surface water. This includes discharges from construction sites containing sediment, concrete, mortar, paint, solvents, lubricants, vehicle fluids, fuel, pesticides, and construction debris.

PLEASE NOTE: The Federal, State and local regulations strictly prohibit the discharge of sediment and pollutants into the streets, the storm drain system or waterways. As an owner, operator or supervisor of a construction site, you may be held financially responsible for any environmental damage caused by your subcontractors or employees.

STORMWATER POLLUTION FROM CONSTRUCTION ACTIVITIES

The two most common sources of stormwater pollution problems associated with construction activities are ***erosion*** and ***sedimentation***. Failure to maintain adequate erosion and sediment controls at construction sites often results in sediment discharges into the storm drain system, creating multiple problems once it enters local waterways.

Construction vehicles and heavy equipment can also track significant amounts of mud and sediment onto adjacent streets. Additionally, wind may transport construction materials and wastes into streets storm drains, or directly into our local waterways.



Resources

State Water Resources Control Board
Division of Water Quality
1001 I Street
Sacramento CA 95814
(916) 341-5455
www.swrcb.ca.gov/stormwtr/

Colorado River Basin Regional Water
Quality Control Board - Region 7
73-720 Fred Waring Drive, Suite 100
Palm Desert, CA 92260
(760) 346-7491
www.swrcb.ca.gov/~rwqcb7/

Santa Ana Regional Water
Quality Control Board - Region 8
3737 Main Street, Suite 500
Riverside, CA 92501-3348
(909) 782-4130
www.swrcb.ca.gov/~rwqcb8/

San Diego Regional Water
Quality Control Board - Region 9
9771 Clairemont Mesa Blvd., Suite A
San Diego, CA 92124
(858) 467-2952
www.swrcb.ca.gov/~rwqcb9/

To report a hazardous materials spill, call:

Riverside County Hazardous Materials
Emergency Response Team
(909) 358-5055 8:00 a.m. – 5:00 p.m.
(909) 358-5245 after 5:00 p.m.

In an emergency call: **911**

For recycling and hazardous waste disposal, call:

(909) 358-5055

To report an illegal dumping or a clogged storm drain, call:

1-800-506-2555

To order additional brochures or to obtain information on other pollution prevention activities, please call (909) 955-1200 or visit the StormWater/CleanWater Protection Program website at:
www.co.riverside.ca.us/depts/flood/waterquality/npdes.asp

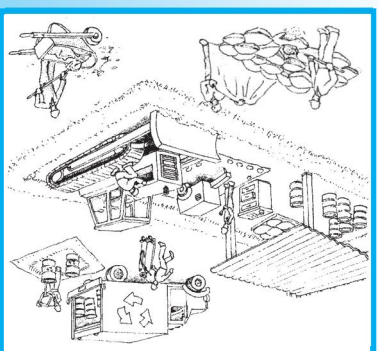
StormWater CleanWater PROTECTION PROGRAM

The StormWater/CleanWater Protection Program gratefully acknowledges the Santa Clara Valley Nonpoint Pollution Control Program, Alameda Countywide CleanWater Program and the City of Los Angeles Stormwater Management Division for information provided in this brochure.

StormWater Pollution

What you should know for...

GENERAL CONSTRUCTION & SITE SUPERVISION



Best Management Practices (BMPs) for:

- Developers
- General Contractors
- Home Builders
- Construction Inspectors
- Anyone in the construction business

What Should You Do?
Advance Planning to Prevent Pollution

- ❑ Remove existing vegetation only as needed.
- ❑ Schedule excavation, grading, and paving operations for dry weather periods, if possible.
- ❑ Designate a specific area of the construction site, well away from storm drain inlets or watercourses, for material storage and equipment maintenance.
- ❑ Develop and implement an effective combination of erosion and sediment controls for the construction site.
- ❑ Practice source reduction by ordering only the amount of materials that are needed to finish the project.
- ❑ Educate your employees and subcontractors about stormwater management requirements and their pollution prevention responsibilities.
- ❑ Control the amount of surface runoff at the construction site by impeding internally generated flows and using berms or drainage ditches to direct incoming offsite flows to go around the site. ***Note:*** *Consult local drainage policies for more information.*

Best Management Practices

The following Best Management Practices (BMPs) can significantly reduce pollutant discharges from your construction site. Compliance with stormwater regulations can be as simple as minimizing stormwater contact with potential pollutants by providing covers and secondary containment for construction materials, designating areas away from storm drain systems for storing equipment and materials and implementing good housekeeping practices at the construction site.

- ❑ Protect all storm drain inlets and streams located near the construction site to prevent sediment-laden water from entering the storm drain system.
- ❑ Limit access to and from the site. Stabilize construction entrances/exits to minimize the track out of dirt and mud onto adjacent streets. Conduct frequent street sweeping.
- ❑ Protect stockpiles and construction materials from winds and rain by storing them under a roof, secured impermeable tarp or plastic sheeting.
- ❑ Avoid storing or stockpiling materials near storm drain inlets, gullies or streams.
- ❑ Phase grading operations to limit disturbed areas and duration of exposure.
- ❑ Perform major maintenance and repairs of vehicles and equipment offsite.
- ❑ Wash out concrete mixers only in designated washout areas at the construction site.
- ❑ Set-up and operate small concrete mixers on tarps or heavy plastic drop cloths.
- ❑ Keep construction sites clean by removing trash, debris, wastes, etc. on a regular basis.
- ❑ Clean-up spills immediately using dry clean-up methods (e.g., absorbent materials such as cat litter, sand or rags for liquid spills; sweeping for dry spills such as cement, mortar or fertilizer) and by removing the contaminated soil from spills on dirt areas. .
- ❑ Prevent erosion by implementing any or a combination of soil stabilization practices such as mulching, surface roughening, permanent or temporary seeding.
- ❑ Maintain all vehicles and equipment in good working condition. Inspect frequently for leaks, and repair promptly.
- ❑ Practice proper waste disposal. Many construction materials and wastes, including solvents, water-based paint, vehicle fluids, broken asphalt and concrete, wood, and cleared vegetation can be recycled. Materials that cannot be recycled must be taken to an appropriate landfill or disposed of as hazardous waste.
- ❑ Cover open dumpsters with secured tarps or plastic sheeting. Never clean out a dumpster by washing it down on the construction site.
- ❑ Arrange for an adequate debris disposal schedule to insure that dumpsters do not overflow.

General Construction Activities Stormwater Permit
(Construction Activities General Permit)

The State Water Resources Control Board (SWRCB) adopted a new Construction Activities General Permit (WQ Order No. 99-08DWQ) on August 19, 1999, superseding the now expired SWRCB statewide General Permit (WQ Order No. 92-08DWQ). This permit is administered and enforced by the SWRCB and the local Regional Water Quality Control Boards (RWQCB). The updated Construction Activities General Permit establishes a number of new stormwater management requirements for construction site operator.

NOTE: *Some construction activies stormwater permits are issued on a regional basis. Consult your local RWQCB to find out if your project requires coverage under any of these permits.*

Frequently Asked Questions:

Does my construction site require coverage under the Construction Activities General Permit?

Yes, if construction activity results in the disturbance of five or more acres of total land area or is part of a common plan of development that results in the disturbance of five or more acres.

How do I obtain coverage under the Construction Activities General Permit?

Obtain the permit package and submit the completed Notice of Intent (NOI) form to the SWRCB prior to grading or disturbing soil at the construction site. For ongoing construction activity involving a change of ownership, the new owner must submit a new NOI within 30 days of the date of change of ownership. The completed NOI along with the required fee should be mailed to the SWRCB.

What must I do to comply with the requirements of the Construction Activities General Permit?

- ● Implement BMPs for non-stormwater discharges year-round.
- ● Prepare and implement a Stormwater Pollution Prevention Plan (SWPPP) prior to commencing construction activities.
- ● Keep a copy of the SWPPP at the construction site for the entire duration of the project.
- ● Calculate the anticipated stormwater run-off.
- ● Implement an effective combination of erosion and sediment control on all soil disturbed areas.
- ● Conduct site inspections prior to anticipated storm events, every 24-hours during extended storm events, and after actual storm event.
- ● Perform repair and maintenance of BMPs as soon as possible after storm events depending upon worker safety.
- ● Update the SWPPP as needed, to manage pollutants or reflect changes in site conditions.
- ● Include description of post construction BMPs at the construction site, including parties responsible for long-term maintenance.

NOTE: *Please refer to the Construction Activities General Permit for detailed information. You may contact the SWRCB, your local RWQCB, or visit the SWRCB website at www.swrcb.ca.gov/stormwtr/ to obtain a State Construction Activities Stormwater General Permit packet.*

How long is this Construction Activities General Permit in effect?

The Permit coverage stays in effect untilyou submit a Notice of Termination (NOT) to the SWRCB. For the purpose of submitting a NOT, all soil disturbing activities have to be completed and one of the three following criteria has to be met:

1. Change of ownership;
2. A uniform vegetative cover with 70 percent coverage has been established; or,
3. Equivalent stabilization measures such as the use of reinforced channel liners, soil cement, fiber matrices, geotextiles, etc., have been employed.



Landscaping and garden maintenance activities can be major contributors to water pollution. Soils, yard wastes, over-watering and garden chemicals become part of the urban runoff mix that winds its way through streets, gutters and storm drains before entering lakes, rivers, streams, etc. Urban runoff pollution contaminates water and harms aquatic life!

In Riverside County, report illegal discharges into the storm drain, call
1-800-506-2555
"Only Rain Down the Storm Drain"

Important Links:

Riverside County Household Hazardous Waste Collection Information
1-800-304-2226 or www.rivcowm.org

Riverside County Backyard Composting Program
1-800-366-SAVE

Integrated Pest Management (IPM) Solutions
www.ipm.ucdavis.edu

California Master Gardener Programs
www.mastergardeners.org
www.camastergardeners.ucdavis.edu

California Native Plant Society
www.cnps.org

The Riverside County "Only Rain Down the Storm Drain" Pollution Prevention Program gratefully acknowledges Orange County's Storm Water Program for their contribution to this brochure.

...Only Rain Down ...the Storm Drain

What you should know for... Landscape and Gardening

Best Management tips for:

- Professionals
- Novices
- Landscapers
- Gardeners
- Cultivators



Tips for Landscape & Gardening

This brochure will help you to get the most of your lawn and gardening efforts and keep our waterways clean. Clean waterways provide recreation, establish thriving fish habitats, secure safe sanctuaries for wildlife, and add beauty to our communities. NEVER allow gardening products or waste water to enter the street, gutter or storm drain.

General Landscaping Tips

- Protect stockpiles and materials from wind and rain by storing them under tarps or secured plastic sheeting.
- Prevent erosion of slopes by planting fast-growing, dense ground covering plants. These will shield and bind the soil.



- Plant native vegetation to reduce the amount of water, fertilizers and pesticides applied to the landscape.
- Never apply pesticides or fertilizers when rain is predicted within the next 48 hours.

Garden & Lawn Maintenance

- Do not overwater. Use irrigation practices such as drip irrigation, soaker hoses or micro-spray systems. Periodically inspect and fix leaks and misdirected sprinklers.
- Do not rake or blow leaves, clippings or pruning waste into the street, gutter or storm drain. Instead, dispose of green waste by composting, hauling it to a permitted landfill, or recycling it through your city's program.



- Consider recycling your green waste and adding "nature's own fertilizer" to your lawn or garden.
- Read labels and use only as directed. Do not over-apply pesticides or fertilizers. Apply to spots as needed, rather than blanketing an entire area.
- Store pesticides, fertilizers and other chemicals in a dry covered area to prevent exposure that may result in the deterioration of containers and packaging.
- Rinse empty pesticide containers and re-use rinse water as you would use the product. Do not dump rinse water down storm drains or sewers. Dispose of empty containers in the trash.
- When available, use non-toxic alternatives to traditional pesticides, and use pesticides specifically designed to control the pest you are targeting.
- Try natural long-term common sense solutions first. Integrated Pest Management (IPM) can provide landscaping guidance and solutions, such as:
  - **Physical Controls** - Try hand picking, barriers, traps or caulking holes to control weeds and pests.
  - **Biological Controls** - Use predatory insects to control harmful pests.
  - **Chemical Controls** - Check out www.ipm.ucdavis.edu before using chemicals. Remember, all chemicals should be used cautiously and in moderation.
- If fertilizer is spilled, sweep up the spill before irrigating. If the spill is liquid, apply an absorbent material such as cat litter, and then sweep it up and dispose of it in the trash.
- Take unwanted pesticides to a Household Waste Collection Center to be recycled.
- *Dumping toxics into the street, gutter or storm drain is illegal!*

www.bewaterwise.com Great water conservation tips and drought tolerant garden designs.

www.ourwaterourworld.com Learn how to safely manage home and garden pests.

Additional information can also be found on the back of this brochure.



Living on the Edge

Your community preserves habitat for important native plants and animals. By habitat, we mean homes; food, water, and places with space to live. The habitat is managed as part of a ***biological conservation easement*****,** a legal agreement that permanently limits its use.

Many conservation easements include a waterway or wetland because plants and animals need clean, fresh water, the most limited resource in our dry Southern California climate. A waterway (also called watercourse, arroyo, wash) conveys a flowing creek, stream, or river, which provides drinking water for local and migrating wildlife.

Not all of our waterways have visible flowing water year-round. Some creeks and streams continue to flow underground, while others flow for a short time after a storm (ephemeral). The small, and often dry washes are important to wildlife because they provide habitat and their periodic flows drain into larger waterways. It's essential that people do not degrade the quality of any water that reaches local waterways.

Water supports an abundance of vegetation and a variety of life, or *biodiversity.* Streamside vegetation, along dry or flowing waterways, is referred to as *riparian.* **Native** riparian plants provide **native** animals with suitable food, shelter, nesting sites and escape-cover from predators.

Help Your Wild Next-Door Neighbors

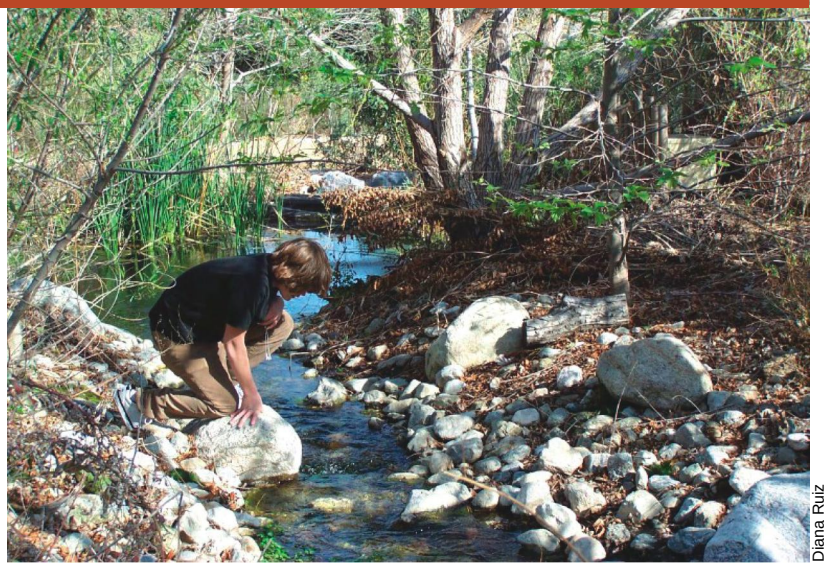
The purpose of this publication is to help homeowners become *habitat-friendly* neighbors for nearby habitat lands. The *Resources Directory*, inserted inside this booklet, provides helpful websites and contact information for agencies, organizations, gardens, and native plant nurseries.



Gerald & Buff Corsi, California Academy of Sciences

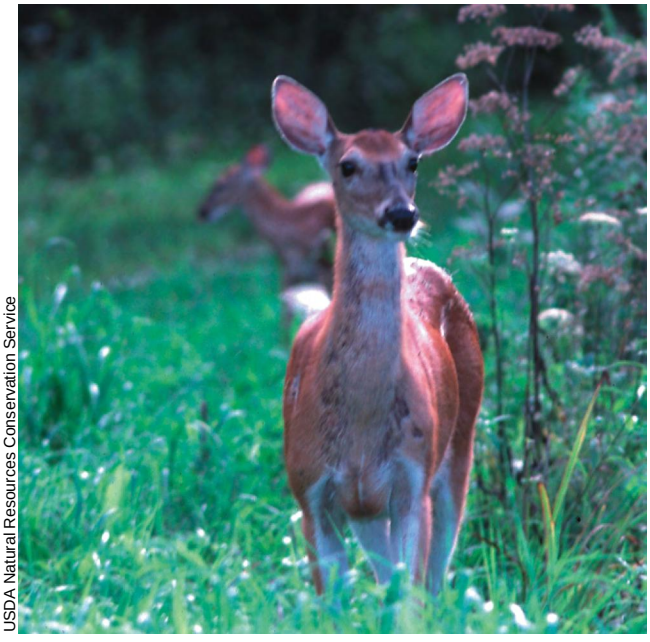
Unfortunately, our modern-day lifestyles have negative impacts on the environment around us. Human activity in, or near waterways can damage the capacity of the habitat to support some kinds of plant and animal life, especially species that do not adapt to urban/suburban conditions. Here are some ways to prevent and reduce negative impacts and help restore habitat to healthy conditions.

Reduce Impacts on Native Wildlife


Diana Ruiz

Prevent light, noise, and activity in, and adjacent to wetlands.

- If you wish to observe wildlife, please watch from afar, especially during the breeding and nesting season, from March to September. Most wild animals are naturally fearful of human contact. Human activity near a nest or den may frighten adult animals away from young and jeopardize their survival.
- When visiting natural areas, disturb as little as possible. Avoid walking or riding in a stream course or on channel banks. Heavy foot traffic, horses, and off-road vehicles may cause channel banks to collapse, accelerating erosion and increasing water-born sediment and turbidity.
- Help control entry into habitat areas. Close unessential roadways to prevent access for illegal dumping, trespass, and off-road vehicle use.
- Leave nothing behind.
- Focus necessary lighting downward and inward toward your home, yard, and buildings.
- To report poaching or polluting call CalTIP, Californians Turn In Poachers and Polluters, a confidential secret witness program. The toll free telephone number operates 24 hours a day, 7 days a week. (See the *Resources Directory* insert for contact information.)


USDA Natural Resources Conservation Service

Do not allow pets to roam in habitat land where they will disturb and hunt native wildlife. Keep pets on a leash and droppings out of waterways. Cats and dogs stress or kill wildlife and prevent natural ecosystems from supporting their own predators, such as hawks, coyotes, foxes, and bobcats. Conversely, domesticated animals face hazards in wild areas. Pets may be attacked by predators, such as coyotes and rattlesnakes, or may contract disease, fleas, and ticks.

Do not release unwanted animals into the wild. Abandoned cats, dogs, birds, reptiles and fish can have significant impacts on populations of native species, either through disease, predation or competition for food and space.



Lee Karney/ U.S. Fish and Wildlife Service

Brown-headed Cowbird

- Exotic invaders crowd out native species both on land and in water. Do not place fish, frogs, crayfish, turtles, or aquatic plants into creeks, streams or lakes. Some non-native species are not only able to survive, but also reproduce explosively due to a lack of natural predators. For example, the brown-headed cowbird is overwhelming riparian habitats. The cowbird lays its eggs in another bird's nest to the detriment of the host's young.



Mark A. Chappell

The endangered Least Bell's Vireo is threatened by the Brown-headed Cowbird.

- Pets are usually unable to survive in wildlands. They starve to death or are eaten. If you cannot find a home for a pet, contact animal control, your local animal shelter, or the Humane Society.

Respect and protect wild animals by keeping them wild. In some instances, being a good neighbor means protecting your living area by excluding certain kinds of wildlife, mainly mammals. The *human habitat* includes home sites, buildings, yards, gardens, and regularly used outdoor areas. Install fencing around the human habitat portion of your property and secure enclosures to protect children, pets, and farm animals.

- Do not take small animals, such as tortoises, tadpoles, frogs, snakes, birds, lizards or eggs from the wild. Never attempt to "adopt" or domesticate a wild animal.

- Discourage dangerous predators from penetrating human habitat areas. Install fencing that will exclude predators. Place sensors that trigger sprinklers and lights to deter predators and mammals from entering areas of human activity.

- Prevent mammals from living in and near your home by closing entries, filling holes, and removing brush, junk, and woodpiles near buildings.

- Don't feed human food to wildlife. Do not leave pet food outside. Prevent garbage from becoming a food source for wild mammals by sealing trash can lids. If you compost, use closed-containers or turn piles regularly. Compost plant material only; meat scraps should not be mixed in a compost pile.



R. H. Barrett/ U. S. Fish and Wildlife Service

For more information, contact the California Department of Fish and Game.
(See the *Resources Directory* insert for contact information.)

Reduce Impacts on Native Plants

Remove invasive, non-native plants from home landscaping and adjacent habitat lands, especially those that quickly spread through waterways, displacing important native species.


Diana Ruiz

Invasive Giant Reed (*Arrundo donax)* is being removed from Temescal Creek.

DO NOT PLANT

Giant reed	*Arundo donax*
Salt Cedar	*Tamarix chinensis*
Tree of Heaven	*Ailanthus altissima*
Red apple, heartleaf iceplant	*Aptenia cordifolia*
Fountain grass (yellow)	*Pennisetum setaceum*
Castor bean	*Ricinus communis*
Periwinkle	*Vinca major*
Peruvian (Calif.) pepper tree	*Schinus molle*
Brazilian pepper tree	*Schinus terebinthifolius*
Mexican fan palm	*Washingtonia robusta*
Sweet fennel	*Foeniculum vulgare*
Pampas grass/Jubata grass	*Cortaderia jubata/selloana*
Common iceplant	*Mesembryanthemum crystallinum*
Myoporum species	

Contact your local Resource Conservation District for help identifying invasive species and for removal of exotic weeds from waterways. Visit the California Invasive Plant Council web site for suggested plants to replace invasives. (See the *Resources Directory* insert for contact information.)

Protect Water Quality


Diana Ruiz

Make sure that the water that flows off your property is clean.

- Prevent trash, debris, and waste of any kind from washing off homesites and streets into gutters, storm drains, and dry washes. These drainage-ways empty into streams that flow to the Santa Ana River, and ultimately, the ocean.
- Evaluate the flow of runoff over your property. Place manure, barnyard bedding, and debris in areas where water does not pool or flow, or reuse the waste as fertilizer or mulch. Check with your local municipality for ordinances concerning the disposal of manure and bedding.
- Use care when applying fertilizers, pesticides, and herbicides on your property. Read labels “before you buy and before you apply” for directions, application rates, and disposal. Apply the correct amount at the proper time, for example, not during plant dormancy.



Praying mantis



Ladybird beetle



Lacewing

Photos by Greg Balmer

- Reduce or eliminate the use of pesticides by using “beneficial insects” (ladybugs, praying mantids, lacewings, etc.) If you must use a pesticide, use one with a *least-toxic* rating, such as insecticidal soaps, horticultural oils, pyrethrin-based insecticides, and insect growth regulators.
- Control erosion to prevent sediment from entering runoff.
- If you have a septic system, inspect and maintain it. Poorly placed and neglected septic systems contaminate groundwater and streams.

Pollutants that flow from residential and urban areas contaminate surface water and the water that percolates into underground water basins (aquifers). Much of our local water supply is pumped from underground aquifers, so keeping runoff clean is essential.

To report any non-emergency crime, such as dumping, please call your City Police or County Sheriff Departments. To report illegal grading or dumping in waterways, contact your City or County Code Enforcement Department. (See the *Resources Directory* insert for contact numbers.)

Dispose of waste in its proper place.

- Read product labels, and dispose of household hazardous wastes (oil based paints, pesticides, antifreeze, motor oil, batteries, flourescent bulbs, etc.) in prescribed ways and at designated disposal sites or community collection events, not on the ground or in a storm drain inlet. Whenever possible, reduce the use of hazardous materials in and around your home. Call the *Only Rain Down the Storm Drain* program for disposal dates and locations. (See the *Resources Directory* insert for contact numbers.) You can also recycle automotive fluids, tires, and batteries at car repair businesses.
- Dispose of trash at sanitary landfills.
- Compost yard and other organic wastes.

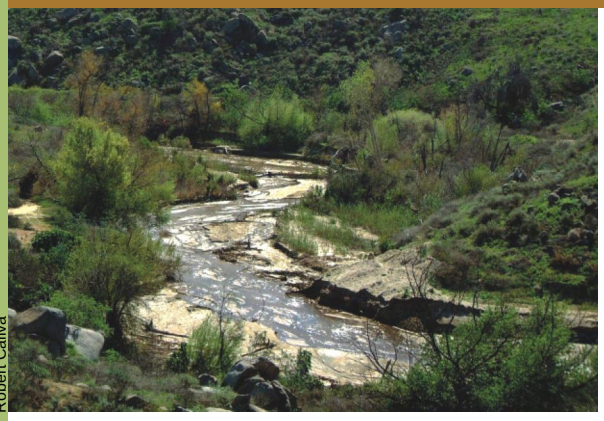


Diana Ruiz

Better yet:

Reduce,
Reuse,
Recycle.

Provide Space for Habitat, Fire, and Flood Protection



Robert Calvo

Siting Homes Near Waterways
If you are building next to a waterway, leave a buffer between the waterway and your *human habitat* area of graded pads, structures, and ornamental landscaping. *Wildlife habitat* land includes areas beyond buildings, yards, and defensible space (fire safety zones), generally to be left undisturbed for wildlife. A buffer between the human habitat and a waterway provides space for habitat, flood waters, and for wildlife escape during high water.

The buffer or "setback" distance will vary according to site conditions, however a minimum 100-foot setback from the **top edge** of a waterway, not from the water itself, is recommended. This allows space for creek/stream meander and high water flows. The banks of creeks and streams "meander", which means they are constantly "wandering" or relocating. Meander naturally occurs when flows cause erosion of channel banks and deposition of sediment.

As land is converted to urban uses, the volume of flow in waterways increases. Impervious surfaces from streets, roofs, and parking lots increase the amount of runoff, erosion and pollutants that degrade water quality.



Frank Heyming

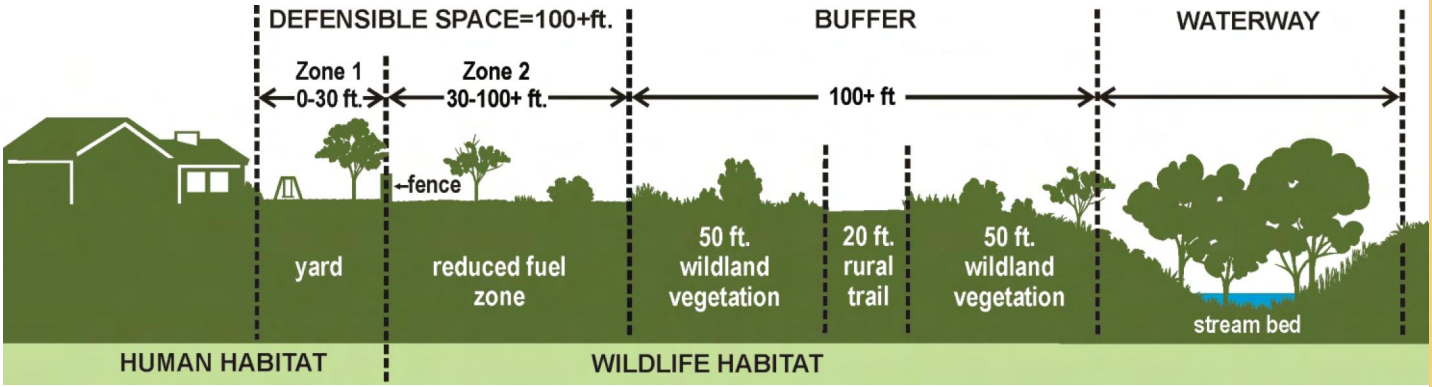
A house pad fills an important tributary to an waterway.

Many people are not aware of the vulnerability of natural ecosystems, nor are they aware that it is illegal to grade or alter a waterway without an assessment and permits from resource agencies and municipalities. If you propose an activity that will impact a stream, river, or lake, the California Department of Fish and Game (DFG) requires completion of a Streambed Alteration Agreement. Depending on the activity you are proposing, you may need to obtain a permit, agreement, or other authorization from one or more government agencies. Notify DFG, U.S. Army Corps of Engineers, and the Santa Ana Regional Water Quality Control Board during early planning, prior to beginning a project that will:

- use material from a streambed;
- divert, obstruct, or change the natural flow or the bed, channel, or bank of any river, stream, or lake;
- result in the disposal or deposition of debris, waste, or other natural material where it can pass into any river, stream, or lake.

A Streambed Alteration Agreement is also required for streams that flow intermittently, such as dry washes and waterways with subsurface flow.

It is essential that landowners do not confine, or encroach on waterways. Keep buildings, septic systems, horses, livestock, fencing, agricultural and ornamental plantings out of waterways and away from channel banks.



When building homes In fire-prone areas, avoid ridge tops and canyons. Set buildings back from the edge of steep slopes. Create a minimum distance of 100-feet of *defensible space,* a managed area around a home, where the amount of fuel (dead plants, dry leaves, wood) has been reduced. Consult with your local fire department or the California Department of Forestry and Fire Protection for fire safety and weed abatement information.
(Please see *Resources Directory* insert).

Habitat-friendly Yards


Len Nunney

Landscape with Locals. Not just any California native plant is suitable for landscapes near habitat lands. Local native plants are the safest because they have unique characteristics that have helped them survive in their specific environments. Gardening with local flora helps maintain the *genetic integrity* of local plants and ecosystems. It helps maintain regional variation in vegetation and wildlife.

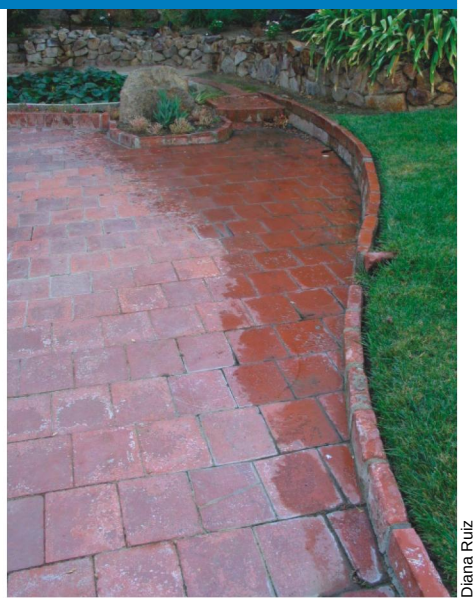
Why is regional variation important? If plants from other areas crossbreed with local natives, scientists fear that local populations would lose some of the unique characteristics that are important for success in this region. Their genetic material would no longer be unique and regionally identifiable. Plant interbreeding could reduce biological diversity, *biodiversity*, in the gene pool. There are important interactions between native plants, microorganisms, and the animals that use them, some of which are critical to the reproduction and survival of native plants and animals.

Create habitat in your yard for urban-adapted wildlife. Even if you live in the heart of a city, consider gardening for urban-adapted wildlife by providing a reliable water source and **local** native plants that provide food, shelter, and nesting sites. Each small patch of yard provides a stepping-stone of habitat from wildlands across the city. A patchwork of *habitat-yards* creates an urban ecosystem that more closely mimics our predevelopment, native landscape. When linked together, those patches cumulatively support biodiversity. To host a variety of native birds and butterflies in your yard, select plants that flower and fruit at different times of the year. Prune trees and shrubs in fall and early winter, rather than spring, to avoid destroying bird nests.

Benefits of landscaping with local native plants:

- **Most native plants are drought tolerant, so they require less water.**
- **Natives rarely require fertilizers.**
- **Patches of habitat support urban-adapted wildlife, such as birds, bats and insects that help pollinate plants.**
- **Natives rarely require pesticides. Native plants provide their own natural pest control by attracting beneficial insects that prey on troublesome bugs.**
- **Local natives help preserve *genetic diversity* and the integrity of local ecosystems.**

Water-wise Landscapes Conserve Water



Diana Ruiz

Reduce water-use by replacing unnecessary lawn areas with native or drought-tolerant plants and with hardscape (hard surfaces), such as walkways and patios of concrete, brick, stone, decomposed granite, and permeable paving. For places where you do need a lawn, such as play areas, plant a low water-use turf variety.

When selecting a plant, find out:

- Is it water-thirsty or drought-tolerant?
- When is its growing season; when will it need water?

Most* local native plants are dormant or slow-growing during the hot, dry summers; their growth occurs during our rainy season. Once established, many survive with rainfall alone. This is the opposite for non-native, ornamental landscapes that grow slowly, or not at all during winter, but require irrigation throughout the summer.

- Group plants with similar watering needs together, and install water-saving irrigation systems (drip, micro-sprayers) to apply the correct amount for each *hydro-zone* or plant grouping. Trees require deep irrigation and may need separate irrigation lines.
- Readjust your irrigation schedule for season and weather conditions. Turn off automatic systems when it's raining. Don't run sprinklers when the wind is blowing. Water deeply and only when needed. Water plants in the early morning or evening. Adjust irrigation systems to water soil, not concrete and pavement.
- Apply mulch (bark, compost, sawdust, gravel) to reduce evaporation from the soil surface and to control weeds.

For information about conserving water in landscapes and using native and drought tolerant plants, refer to plant databases, such as the one at bewaterwise.com. The website will also help you create a customized watering schedule for your yard. (See the *Resources Directory* insert for booklist and websites.)

*Not all native plants are dormant during summer: local riparian plants are the exception. They need water year round, as they are suited for waterways. Streamside vegetation, along dry or flowing waterways, is referred to as riparian.

Fire-wise Landscaping

Create a minimum distance of 100 ft. of *defensible space*, a landscape that deprives fire of fuel. Use fire-resistant plants and remove plants that are highly volatile.

Zone 1: Lean, Clean and Green

Zone 1 is from 0-30 ft. out from buildings. (See diagram on prior page.)
Grow plants that are small or succulent, such as irrigated lawns or ground covers and low growing, high-moisture shrubs. If you use native plants, use those that can be trimmed back during the dry season or that stay small with little trimming. Native plants that tolerate summer watering (see native plant lists) should be kept well hydrated.*

- Keep plants well hydrated to help them resist fire. Well-trimmed and watered plants are less likely to ignite than desiccated plants that have a buildup of dry stems and leaves.
- Fire needs fuel to burn, so remove any unnecessary plant materials. Prune dead wood and clean the landscape of dead plants, dry leaves, dry brush, firewood, and combustibles.
- Strategically place hard surfaces in your landscape, such as concrete, brick, or stone patios, driveways, pools, walls, and non-flammable decks, to interrupt the spread of fire to buildings.

Zone 2: Reduced Fuel

Create the reduced fuel zone beginning 30 ft. from buildings and extending 100 ft. or more, depending on steepness of slope and type/density of vegetation.

- Selectively remove large shrubby plants and dense groupings. Thin overcrowded plants. Mow grasses and weedy vegetation while they are green.
- Carefully remove excess plants without disturbing the soil; mow instead of disc, to prevent erosion and invasion of non-native plants.
- In chaparral plant communities, after thinning, reduce old, woody growth by cutting plants to their bases every few years, during the summer dormancy. Young plant tissues have higher moisture content and are less flammable. The heavy pruning eliminates mature, highly flammable vegetation but maintains root systems to protect the soil from erosion.
- Low branches and plants growing under trees create “ladders” for fire to climb. Eliminate ladder fuels, plants that serve as a link between grass and treetops. Prune the lower branches from the lower 1/3 of trees and shrubs. For trees or shrubs taller than 18 feet, prune the lower branches 6 feet above the ground. Remove dead leaves, twigs, and branches.
- In general, remove shrubs that are growing below trees, unless there is a space between the top of the shrub to the lowest branch of the tree that is three times the height of the shrub.

Remove plants that ignite easily and burn hot, such as those with volatile oils (sages) and those that accumulate fine woody branches or many small, dry leaves (chamise). In Zone 1, remove highly volatile plants (partial list below). In Zone 2, remove or widely space volatile plant types, including:

Chamise, *Adenostoma fasciculata*
Brittlebrush, *Encelia farinosa*
California buckwheat, *Eriogonum fasciculatum*
White sage, *Salvia apiana*
Some Eucalyptus and Acacia

Black sage, *Salvia mellifera*
Woolly blue curls, *Trichostema lanatum*
Mountain blue curls, *Trichostema parishii*
Red Shank, *Adenostoma sparsifolium*
All Pine, Cypress, Juniper, and Cedar species.

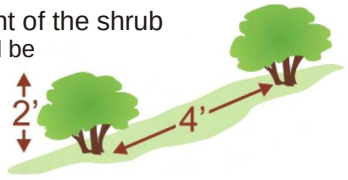
*For best results with native plants, water on overcast days during summer and fall.

Create Space Between Plants

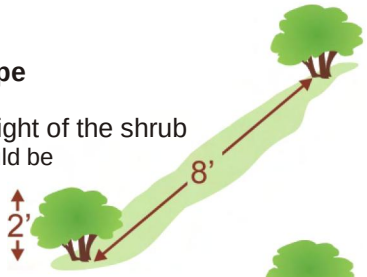
Shrubs

From edge of one shrub to the edge of the next.

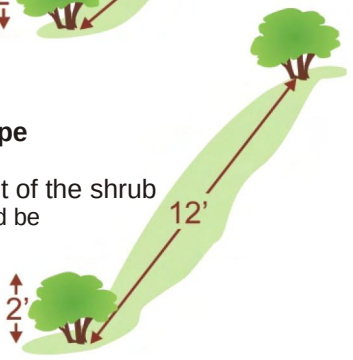
Flat to mild slope
(0% to 20% slope)
Two times (2x) the height of the shrub
(Two shrubs 2' high should be spaced 4' apart)



Mild to moderate slope
(20% to 40% slope)
Four times (4x) the height of the shrub
(Two shrubs 2' high should be spaced 8' apart)



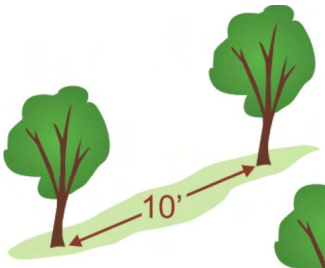
Moderate to steep slope
(greater than 40% slope)
Six times (6x) the height of the shrub
(Two shrubs 2' high should be spaced 12' apart)



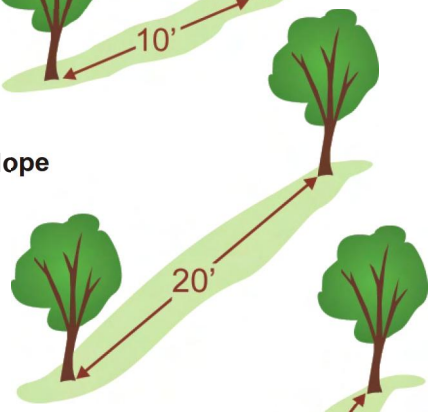
Trees

From edge of one tree canopy to the edge of the next.

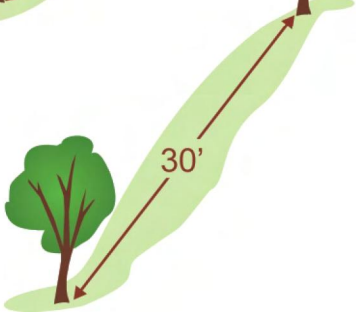
Flat to mild slope
(0% to 20% slope)



Mild to moderate slope
(20% to 40% slope)



Moderate to steep slope
(greater than 40% slope)



Horizontal clearance information from the California Department of Forestry and Fire Protection.

Prevent erosion and stabilize eroding areas. If you have exposed soil surfaces, cover with mulch, and landscape as soon as possible. (Plants break the impact of falling rain, and their roots hold soil in place.) Eroding soil becomes sediment in runoff water, which pollutes waterways. Disturbed soil also encourages the growth of non-native weed species.

Retain thinned, deep-rooted native plants to anchor the soil and maintain slope stability. Generally, tall plants have deep, broad root systems. A goal of fire-wise landscaping is to maximize rooting depth while minimizing fuel volume.


Diana Ruiz

For site-specific advice, contact your local Resource Conservation District (RCD) or the USDA Natural Resources Conservation Service (NRCS). For recommendations of native grasses for erosion control, contact the California Native Grasslands Society. (See the *Resources Directory* insert for contact information.)

Native Plants for Defensible Space Landscaping in the Inland Empire

If you prefer to create a landscape of native, low water-use plants, use these lists to design a yard that is fire-wise. Maintenance is essential; dead and dry plant material must be removed during dry, summer dormancy. Some native plants cannot tolerate irrigation during their summer dormancy, so may die if watered too frequently. Some need only infrequent, deep watering to remain hydrated during the dry summer and fall. The low-growing, low-fuel volume plants are suitable for Zone 1 (0-30 ft.) and beyond. Larger shrubs and trees, for Zone 2 (30-100+ ft.), must be widely spaced (see diagram on previous page).

Shrubs for Zone 2

Shrubs that need or tolerate water during summer.

Carpenteria, *Carpenteria californica*
Western redbud, *Cercis occidentalis*
Toyon, *Heteromeles arbutifolia*
Nevin's barberry, *Mahonia nevinii*
Coffeeberry, *Rhamnus californica*
Golden current, *Ribes aureum.*
California wild rose, *Rosa californica*
Western bridalwreath, *Spiraea douglasii*
Squawbush, *Rhus trilobata*


UDSA-NRCS PLANTS Database
Coffeeberry

Shrubs that do not usually tolerate water during summer.

Low shrubs

Bladder pod, *Isomeris arborea*
Bush monkeyflower, *Mimulus aurantiacus*
Chaparral honeysuckle, *Lonicera subspicata*
Hollyleaf redberry, *Rhamnus illicifolia*
Redberry, *Rhamnus crocea*
Yellow bush-penstemon, *Keckiella antirrhinoides*


Paul Aigner
Yellow bush-penstemon

Tall, deep-rooted shrubs that stay green during summer.

Bigberry manzanita, *Arctostaphylos glauca*
Thick-leaved lilac, *Ceanothus crassifolius*
Buck brush, *Ceanothus cuneatus*
Hairy California lilac, *Ceanothus oliganthus*
Mountain mahogany, *Cercocarpus betuloides*
Laurel sumac, *Malosma laurina*
Scrub oak, *Quercus berberidifolia*
Sugarbush, *Rhus ovata*
Lemonade berry, *Rhus integrifolia*
California Flannel bush, *Fremontodendron californicum*


Arlee M.Montalvo
Sugarbush

Trees for Zone 2

Trees that tolerate occasional water during summer.

Catalina cherry, *Prunus illicifolia* ssp. *Lyonii*
Coast live oak, *Quercus agrifolia*
Valley oak, *Quercus lobata*
Engelman oak, *Quercus engelmannii*

Trees that need water during summer.

Big leaf maple, *Acer macrophyllum*
White alder, *Alnus rombifolia*
So. California walnut, *Juglans californica*
California sycamore, *Platanus racemosa*
California black oak, *Quercus kelloggii*
Canyon live oak, *Quercus chrysolepis*
Willows: *Salix laevigata, S. gooddingii*
California bay laurel, *Umbellularia californica*


J. S. Peterson @ UDSA-NRCS
Big leaf maple

Low-growing, (low fuel volume) Plants for Zones 1 and 2

Perennial herbs that tolerate or need water during summer

Yarrow, *Achillea millifolium*
Columbine, *Aquilegia formosa*
Douglas iris, *Iris douglasiana*
Deer grass, *Muhlenbergia rigens*
Calif. blue-eyed grass, *Sisyrinchium bellum*
Meadow rue, *Thalictrum fendleri* var. *polycarpum*
Yerba mansa, *Anemopsis californica*
Coral bells, *Heuchera* ssp.
Common monkey flower, *Mimulus guttatus*
Scarlet bugler, *Penstemon centranthifolius*
California goldenrod, *Solidago californica*
Hedge nettle, *Stachys bullata*
Slender sedge, *Carex praegracilis*
Narrow-leaved milkweed, *Asclepias fascicularis*


Arlee M.Montalvo
Narrow-leaved milkweed

Succulents, Ground Covers, and Low Shrubs

Keep hydrated; if needed, water monthly during summer.

San Diego sedge, *Carex spissa*
Wild lilac, *Ceanothus griseus 'horizontalis'*
California fuchsia, *Epilobium canum =Zauschneria*
Golden yarrow, *Eriophyllum confertiflorum*
Lance-leaved live-forever, *Dudleya lanceolata*
Chalk dudleya, *Dudleya pulverulenta*
Parry's nolina, *Nolina parryi*
Creeping sage, *Salvia sonomensis*
Creeping snowberry, *Symphoricarpos mollis*
Chaparral yucca, *Yucca whipplei = Hesperoyucca whipplei*
Valley cholla, *Opuntia parryi*
Coastal prickly pear, *Opuntia littoralis*


Arlee M.Montalvo
Chaparral yucca

Annuals or summer-dormant perennials

No need for water during summer. There is little, if any, plant material above ground to burn.

California poppy, *Eschscholzia californica*
Larkspurs, delphinium, *Delphinium parryi, D.cardinale*
Wild Canterbury-bell, *Phacelia minor*
California figwort, *Scrophularia californica*
Baby blue eyes, *Nemophila menziesii*
Royal penstemon, *Penstemon spectabilis*
Lupine, *Lupinus* species *(L. bicolor, L. succulentus, L. truncatus, L. sparsiflorus*)


Arlee M.Montalvo
Baby blue eyes

Habitat Land Stewards

If you live near conservation easement land or a waterway, there are ways that you can help. Be observant of activities that might be harmful to your nearby habitat lands, or form a *habitat-watch* group in your neighborhood. Like a neighborhood-watch, property owners help look out for neighborhood habitat and waterways, report illegal activity, and help educate neighbors about human impacts. For help forming a *habitat-watch* group, contact your local Resource Conservation District or the Riverside Land Conservancy.

RCRCD
RIVERSIDE-CORONA RESOURCE CONSERVATION DISTRICT

This publication was developed by the Riverside-Corona Resource Conservation District. www.RCRCD.com
1-07

All programs and services are provided without regard for race, religion, gender, national origin, and handicap.
Printed on recycled paper



KEEP RIVERSIDE CLEAN & BEAUTIFUL

teaching, serving and conserving

WARD 2 BEAUTIFICATION PROJECT

Volunteer for Litter Cleanups and Graffiti Abatement



SATURDAY • FEB 6 • 2010

From 8:00 a.m. to 11:00 a.m.

LINCOLN PARK

4261 Park Ave. Riverside, CA 92507

B.Y.O.W.B. - Bring Your Own Water Bottle

… KRCB will provide refills, & all project tools

No sandals or flip-flops; must wear long pants

Receive community service hours

MUST RSVP! SIGN UP NOW TO VOLUNTEER:

Keep Riverside Clean & Beautiful • 3985 University Ave. • Riverside, CA 92501 • fax 951.683.2670

Business/Organization: _____

Name: _____

Address: _____

City: _____ **Zip:** _____

Phone: _____ **Fax:** _____

Email: _____

# of Total Volunteers: _____ **# of Volunteers Under 18:** _____

For project information contact Tijana: 951.683.7100 x212, or tquilici@riverside-chamber.com

For Connections, Information & Access to Business Opportunities

Contact the Greater Riverside Chambers of Commerce at: **951.683.7100**

Keep Riverside Clean & Beautiful is a community program sponsored by the City of Riverside Public Works Department and the Greater Riverside Chambers of Commerce

Our Mission… To instill a sense of community pride by creating partnerships that work toward the beautification of the City

Helpful telephone numbers and links:

Riverside County Water Agencies

City of Banning	(951) 922-3130
City of Beaumont/Cherry Valley	(951) 845-9581
City of Blythe	(760) 922-6161
City of Coachella	(760) 398-3502
City of Corona	(951) 736-2263
City of Hemet	(951) 765-3710
City of Norco	(951) 270 5607
City of Riverside Public Works	(951) 351-6140
City of San Jacinto	(951) 654-4041
Coachella Valley Water District	(760) 398-2651
Desert Water Agency (Palm Springs)	(760) 323-4971
Eastern Municipal Water District	(951) 928-3777
Elsinore Valley Municipal Water District	(951) 674 3146
Elsinore Water District	(951) 674-2168
Farm Mutual Water Company	(951) 244-4198
Idyllwild Water District	(951) 659-2143
Indio Water Authority	(760) 391-4129
Jurupa Community Services District	(951) 685-7434
Lee Lake Water	(951) 658-3241
Mission Springs Water	(760) 329-6448
Rancho California Water District	(951) 296-6900
Ripley, CSA #62	(760) 922-4951
Riverside Co. Service Area #51	(760) 227-3203
Rubidoux Community Services District	(951) 684-7580
Valley Sanitary District	(760) 347-2356
Western Municipal Water District	(951) 789-5000
Yucaipa Valley Water District	(909) 797-5117

REPORT ILLEGAL STORM DRAIN DISPOSAL

1-800-506-2555 or e-mail us at
fcnpdes@rcflood.org

- Riverside County Flood Control and Water Conservation District
  www.rcflood.org

Online resources include:

- California Storm Water Quality Association
  www.casqa.org
- State Water Resources Control Board
  www.waterboards.ca.gov
- Power Washers of North America
  www.thepwna.org

Stormwater Pollution

What you should know for...

Outdoor Cleaning Activities and Professional Mobile Service Providers



Storm drain pollution prevention information for:

- Car Washing / Mobile Detailers
- Window and Carpet Cleaners
- Power Washers
- Waterproofers / Street Sweepers
- Equipment cleaners or degreasers and all mobile service providers

Do you know where street flows actually go?

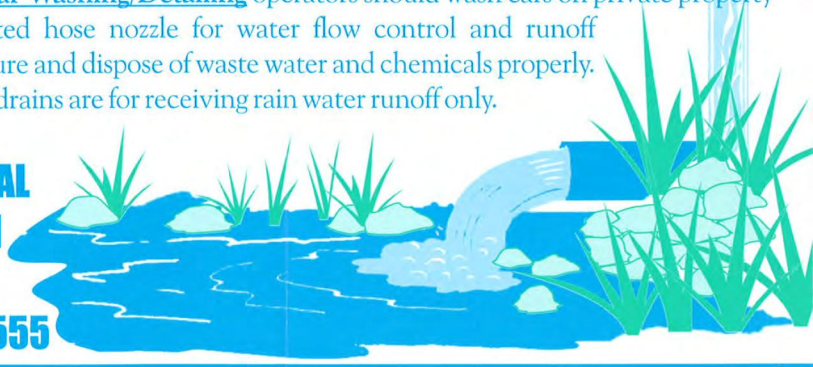
Storm drains are NOT connected to sanitary sewer systems and treatment plants!



The primary purpose of storm drains is to carry rain water away from developed areas to prevent flooding. Pollutants discharged to storm drains are transported directly into rivers, lakes and streams. Soaps, degreasers, automotive fluids, litter and a host of materials are washed off buildings, sidewalks, plazas and parking areas. Vehicles and equipment must be properly managed to prevent the pollution of local waterways.

Unintentional spills by mobile service operators can flow into storm drains and pollute our waterways. **Avoid mishaps.** *Always* have a **Spill Response Kit** on hand to clean up unintentional spills. Only emergency **Mechanical** repairs should be done in City streets, using drip pans for spills. **Plumbing** should be done on private property. Always store chemicals in a leak-proof container and keep covered when not in use. **Window/Power Washing** waste water shouldn't be released into the streets, but should be disposed of in a sanitary sewer, landscaped area or in the soil. Soiled **Carpet Cleaning** wash water should be filtered before being discharged into the sanitary sewer. Dispose of all filter debris properly. **Car Washing/Detailing** operators should wash cars on private property and use a regulated hose nozzle for water flow control and runoff prevention. Capture and dispose of waste water and chemicals properly. Remember, storm drains are for receiving rain water runoff only.

REPORT ILLEGAL STORM DRAIN DISPOSAL 1-800-506-2555



Help Protect Our Waterways!

Use these guidelines for Outdoor Cleaning Activities and Wash Water Disposal

Did you know that disposing of pollutants into the street, gutter, storm drain or body of water is *PROHIBITED* by law and can result in stiff penalties?

Best Management Practices

Waste wash water from Mechanics, Plumbers, Window/Power Washers, Carpet Cleaners, Car Washing and Mobile Detailing activities may contain significant quantities of motor oil, grease, chemicals, dirt, detergents, brake pad dust, litter and other materials.

Best Management Practices, or BMPs as they are known, are guides to prevent pollutants from entering the storm drains. ***Each of us*** can do our part to keep storm water clean by using the suggested BMPs below:

Simple solutions for both light and heavy duty jobs:

Do...consider dry cleaning methods first such as a mop, broom, rag or wire brush. Always keep a spill response kit on site.

Do...prepare the work area before power cleaning by using sand bags, rubber mats, vacuum booms, containment pads or temporary berms to keep wash water away from the gutters and storm drains.

Do...use vacuums or other machines to remove and collect loose debris or litter before applying water.

Do...obtain the property owner's permission to dispose of ***small amounts*** of power washing waste water on to landscaped, gravel or unpaved surfaces.

Do...check your local sanitary sewer agency's policies on wash water disposal regulations before disposing wash water to the sewer. (See list on reverse side)

Do...be aware that if discharging to landscape areas, soapy wash water may damage landscaping. Residual wash water may remain on paved surfaces to evaporate. Sweep up solid residuals and dispose of properly. Vacuum booms are another option for capturing and collecting wash water.

Do...check to see if local ordinances prevent certain activities.

Do not let...wash or waste water from sidewalk, plaza or building cleaning go into a street or storm drain.



Report illegal storm drain disposal,
Call Toll Free
1-800-506-2555

Using Cleaning Agents

Try using biodegradable/phosphate-free products. They are easier on the environment, but don't confuse them for being toxic free. Soapy water entering the storm drain system can impact the delicate aquatic environment.



When cleaning surfaces with a ***high-pressure washer*** or ***steam cleaner***, additional precautions should be taken to prevent the discharge of pollutants into the storm drain system. These two methods of surface cleaning can loosen additional material that can contaminate local waterways.

Think Water Conservation

Minimize water use by using high pressure, low volume nozzles. Be sure to check all hoses for leaks. Water is a precious resource, don't let it flow freely and be sure to shut it off in between uses.

Screening Wash Water

Conduct thorough dry cleanup before washing exterior surfaces, such as buildings and decks ***with loose paint***, sidewalks or plaza areas. Keep debris from entering the storm drain after cleaning by first passing the wash water through a "20 mesh" or finer screen to catch the solid materials, then dispose of the mesh in a refuse container. Do not let the remaining wash water enter a street, gutter or storm drain.

Drain Inlet Protection & Collection of Wash Water

- Prior to any washing, block all storm drains with an impervious barrier such as sandbags or berms, or seal the storm drain with plugs or other appropriate materials.
- Create a containment area with berms and traps or take advantage of a low spot to keep wash water contained.
- Wash vehicles and equipment on grassy or gravel areas so that the wash water can seep into the ground.
- Pump or vacuum up all wash water in the contained area.

Concrete/Coring/Saw Cutting and Drilling Projects

Protect any down-gradient inlet by using dry activity techniques whenever possible. If water is used, minimize the amount of water used during the coring/drilling or saw cutting process. Place a barrier of sandbags and/or absorbent berms to protect the storm drain inlet or watercourse. Use a shovel or wet vacuum to remove the residue from the pavement. Do not wash residue or particulate matter into a storm drain inlet or watercourse.

Helpful telephone numbers and links:

WATER AGENCY LIST in Riverside County

City of Banning	(951) 922-3130
City of Beaumont	(951) 769-8520
City of Blythe	(760) 922-6161
City of Coachella	(760) 398-3502
Coachella Valley Water District	(760) 398-2651
City of Corona	(951) 736-2259
Desert Center, CSA #51	(760) 227-3203
Eastern Municipal Water District	(951) 928-3777
Elsinore Valley MWD	(951) 674-3146
Farm Mutual Water Company	(951) 244-4198
City of Hemet	(951) 765-3712
Idyllwild Water District	(951) 659-2143
Jurupa Community Services District	(951) 360-8795
Lake Hemet MWD	(951) 658-3241
Lee Lake Water District	(951) 277-1414
March Air Force Base	(951) 656-7000
Mission Springs Water District	(760) 329-6448
City of Palm Springs	(760) 323-8253
Rancho Caballero	(951) 780-9272
Rancho California Water District	(951) 296-6900
Ripley, CSA #62	(760) 922-4951
City of Riverside	(951) 351-6170
Rubidoux Services District	(951) 684-7580
Silent Valley Club, Inc	(951) 849-4501
Valley Sanitary District	(760) 347-2356
Western Municipal Water District	(951) 789-5000
Yucaipa Valley Water District	(909) 797-5117

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  www.casqa.org
- State Water Resources Control Board
  www.swrcb.ca.gov/
- Power Washers of North America
  www.thepwna.org

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OUTDOOR CLEANING ACTIVITIES AND PROFESSIONAL MOBILE SERVICE PROVIDERS



Storm drain pollution prevention information for:

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- **Power Washers**
- **Waterproofers / Street Sweepers**
- **Equipment cleaners or degreasers and all mobile service providers**

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REPORT ILLEGAL STORM DRAIN DISPOSAL 1-800-506-2555



Help Protect Our Waterways!

Use These Guidelines For Outdoor Cleaning Activities and Wash Water Disposal

Did you know that disposing of pollutants into the street, gutter, storm drain or nearest body of water is ***PROHIBITED*** by law and can bring about stiff penalties.

Best Management Practices

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Best Management Practices, or BMPs as they are known, are guides to prevent pollutants from entering the storm drains. *Each of us* can do our part to keep storm water clean by using the suggested BMPs below:

Simple solutions for both light and heavy duty jobs:

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Do...prepare the work area before power cleaning by using sand bags, rubber mats, vacuum booms, containment pads or temporary berms to keep wash water away from the gutters and storm drains.

Do...use vacuums or other machines to remove and collect loose debris or litter before applying water.

Do...obtain the property owner's permission to dispose *small amounts* of power washing waste water to landscaped, gravel or unpaved surfaces.

Do...check with your local sanitary sewer agency's policies on wash water disposal regulations. (See list on reverse side).

Do...be aware that if discharging to landscape areas, soapy wash water may damage landscaping. Residual wash water may remain on paved surfaces to evaporate. Sweep up solid residuals and dispose of properly. Vacuum booms are another option for capturing and collecting wash water.

Do not let...wash or waste water from sidewalk, plaza or building cleaning go into a street or storm drain.



Report illegal storm drain disposal, Call Toll Free
1-800-506-2555

Using Cleaning Agents

Try using biodegradable/phosphate-free products. They are easier on the environment, but don't confuse them for being toxic free. Soapy water entering the storm drain system can impact the delicate aquatic environment.



When cleaning surfaces with a *high-pressure washer* or *steam cleaner*, additional precautions should be taken to prevent the discharge of pollutants into the storm drain system. These two methods of surface cleaning can loosen additional material that can contaminate local waterways.

Think Water Conservation

Minimize water use by using high pressure, low volume nozzles. Be sure to check all hoses for leaks.

Screening Wash Water

A thorough dry cleanup before washing exterior surfaces, such as buildings and decks *without loose paint*, sidewalks, or plaza areas should be sufficient to protect receiving waters. Keep debris from entering the storm drain after cleaning by first passing the wash water first through a “20 mesh” or finer screen to catch the solid materials, then disposing the mesh in a refuse container.

Drain Inlet Protection & Collection of Wash Water

- Prior to any washing, block all storm drains with an impervious barrier such as sandbags or berms, or seal the storm drain with plugs or rubber mats.
- Create a containment area with berms and traps or take advantage of a low spot to keep wash water contained.
- Wash vehicles and equipment on grassy or gravel areas so that the wash water can seep into the ground.
- Pump or vacuum up all wash water in the contained area.

Equipment and Supplies

For special materials, equipment and supplies:

- New Pig — (800) 468-4647
- Lab Safety Supply — (800) 356-0783
- C&H — (800) 558-90966
- W.W. Grainger — (800) 994-9174
- Cleaning Equipment Trade Association — (800) 441-0111

For Information:

For more information on the General Industrial Storm Water Permit contact:

State Water Resources Control Board (SWRCB)
(916) 657-1146 or www.swrcb.ca.gov/ or, at your Regional Water Quality Control Board (RWQCB).

Santa Ana Region (8)
California Tower
3737 Main Street, Ste. 500
Riverside, CA 92501-3339
(909) 782-4130

San Diego Region (9)
9771 Clairemont Mesa Blvd., Ste. A
San Diego, CA 92124
(619) 467-2952

Colorado River Basin Region (7)
73-720 Fred Waring Dr., Ste. 100
Palm Desert, CA 92260
(760) 346-7491

SPILL RESPONSE AGENCY:
HAZ-MAT: (909) 358-5055
HAZARDOUS WASTE DISPOSAL: (909) 358-5055
RECYCLING INFORMATION: 1-800-366-SAVE
TO REPORT ILLEGAL DUMPING OR A CLOGGED STORM DRAIN: 1-800-506-2555

To order additional brochures or to obtain information on other pollution prevention activities, call: (909) 955-1111.

StormWater CleanWater
PROTECTION PROGRAM

Riverside County gratefully acknowledges the State Water Quality Control Board and the American Public Works Association, Storm Water Quality Task Force for the information provided in this brochure.

DID YOU KNOW . . .

YOUR FACILITY MAY NEED A STORM WATER PERMIT?



Many industrial facilities and manufacturing operations must obtain coverage under the Industrial Activities Storm Water General Permit

FIND OUT
IF YOUR FACILITY MUST OBTAIN A PERMIT

StormWater Pollution . . . What you should know

Riverside County has two drainage systems - sanitary sewers and storm drains. The storm drain system is designed to help prevent flooding by carrying excess rainwater away from streets. Since the storm drain system does not provide for water treatment, it also 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.



In recent years, awareness of the need to protect water quality has increased. As a result, federal, state, and local programs have been established to reduce polluted stormwater discharges to our waterways. The emphasis of these programs is to prevent stormwater pollution since it's much easier, and less costly, than cleaning up "after the fact."

National Pollutant Discharge Elimination System (NPDES)

In 1987, the Federal Clean Water Act was amended to establish a framework for regulating industrial stormwater discharges under the NPDES permit program. In California, NPDES permits are issued by the State Water Resources Control Board (SWRCB) and the nine (9) Regional Water Quality Control Boards (RWQCB). In general, certain industrial facilities and manufacturing operations must obtain coverage under the Industrial Activities Storm Water General Permit if the type of facilities or operations falls into one of the several categories described in this brochure.

How Do I Know If I Need A Permit?

Following are ***general descriptions*** of the industry categories types that are regulated by the Industrial Activities Storm Water General Permit. Contact your local Region Water Quality Control Board to determine if your facility/operation requires coverage under the Permit.

➜ Facilities such as cement manufacturing; feedlots; fertilizer manufacturing; petroleum refining; phosphate manufacturing; steam electric power generation; coal mining; mineral mining and processing; ore mining and dressing; and asphalt emulsion;

➜ Facilities classified as lumber and wood products (except wood kitchen cabinets); pulp, paper, and paperboard mills; chemical producers (except some pharmaceutical and biological products); petroleum and coal products; leather production and products; stone, clay and glass products; primary metal industries; fabricated structural metal; ship and boat building and repairing;

➜ Active or inactive mining operations and oil and gas exploration, production, processing, or treatment operations;

➜ Hazardous waste treatment, storage, or disposal facilities;

➜ Landfills, land application sites and open dumps that receive or have received any industrial waste; unless there is a new overlying land use such as a golf course, park, etc., and there is no discharge associated with the landfill;

➜ Facilities involved in the recycling of materials, including metal scrap yards, battery reclaimers, salvage yards, and automobile junkyards;

➜ Steam electric power generating facilities, facilities that generate steam for electric power by combustion;

➜ Transportation facilities that have vehicle maintenance shops, fueling facilities, equipment cleaning operations, or airport deicing operations. This includes school bus maintenance facilities operated by a school district;

➜ Sewage treatment facilities;

➜ Facilities that have areas where material handling equipment or activities, raw materials, intermediate products, final products, waste materials, by-products, or industrial machinery are exposed to storm water.

How do I obtain coverage under the Industrial Activities Storm Water General Permit?

Obtain a permit application package from your local Regional Water Quality Control Board listed on the back of this brochure or the State Water Resources Control Board (SWRCB). Submit a completed Notice of Intent (NOI) form, site map and the appropriate fee ($250 or $500) to the SWRCB. Facilities must submit an NOI thirty (30) days prior to beginning operation. Once you submit the NOI, the State Board will send you a letter acknowledging receipt of your NOI and will assign your facility a waste discharge identification number (WDID No.). You will also receive an annual fee billing. These billings should roughly coincide with the date the State Board processed your original NOI submittal.

What are the requirements of the Industrial Activities Storm Water General Permit?

The basic requirements of the Permit are:

1. The facility must eliminate any non-stormwater discharges or obtain a separate permit for such discharges.

2. The facility must develop and implement a Storm Water Pollution Prevention Plan (SWPPP). The SWPPP must identify sources of pollutants that may be exposed to stormwater. Once the sources of pollutants have been identified, the facility operator must develop and implement Best Management Practices (BMPs) to minimize or prevent polluted runoff.

   Guidance in preparing a SWPPP is available from a document prepared by the California Storm Water Quality Task Force called the California Storm Water Best Management Practice Handbook.

3. The facility must develop and implement a Monitoring Program that includes conducting visual observations and collecting samples of the facility's storm water discharges associated with industrial activity. The General Permit requires that the analysis be conducted by a laboratory that is certified by the State of California.

4. The facility must submit to the Regional Board, every July 1, an annual report that includes the results of its monitoring program.

A Non-Storm Water Discharge is... *any discharge to a storm drain system that is not composed entirely of storm water. The following non-storm water discharges are authorized by the General Permit: fire hydrant flushing; potable water sources, including potable water related to the operation, maintenance, or testing of potable water systems; drinking fountain water; atmospheric condensates including refrigeration, air conditioning, and compressor condensate; irrigation drainage; landscape watering; springs; non-contaminated ground water; foundation or footing drainage; and sea water infiltration where the sea waters are discharged back into the sea water source.*

A BMP is . . . *a technique, process, activity, or structure used to reduce the pollutant content of a storm water discharge. BMPs may include simple, non-structural methods such as good housekeeping, staff training and preventive maintenance. Additionally, BMPs may include structural modifications such as the installation of berms, canopies or treatment control (e.g. setting basins, oil/water separators, etc.)*



WARNING*: There are significant penalties for non-compliance: a minimum fine of $5,000 for failing to obtain permit coverage, and, up to $10,000 per day, per violation plus $10 per gallon of discharge in excess of 1,000 gallons.*

Saltwater Pools

- Salt water pools, although different from regular pools, are in fact, sanitized using chlorine. A salt-chlorine generator separates the chlorine and sodium molecules in salt and reintroduces them into the pool water. The same harmful effects of chlorine still apply.
- A salt water pool is still maintained with chemicals such as Muriatic acid, soda ash and sodium carbonate to help keep a proper pH, total Alkalinity, Calcium Hardness and Stabilizer levels.



- It may be illegal to discharge salt water to land. The salt may kill plants and the build-up of salt in soil puts animals, plants, and groundwater at risk. Consult your city representatives to determine local requirements regarding salt water drainage.

NEVER put unused chemicals into the trash, onto the ground or down a storm drain.

IMPORTANT: The discharge of pollutants into the street, gutter, storm drain system or waterways - without a permit or waiver - is strictly prohibited by local ordinances, state and federal law. Violations may result in monetary fines and enforcement actions.

Helpful telephone numbers and links

Riverside County Water Agencies:

City of Banning	(951) 922-3130
City of Beaumont/Cherry Valley	(951) 845-9581
City of Blythe	(760) 922-6161
City of Coachella	(760) 398-3502
City of Corona	(951) 736-2263
City of Hemet	(951) 765-3710
City of Norco	(951) 270 5607
City of Riverside Public Works	(951) 351-6140
City of San Jacinto	(951) 654-4041
Coachella Valley Water District	(760) 398-2651
Desert Water Agency (Palm Springs)	(760) 323-4971
Eastern Municipal Water District	(951) 928-3777
Elsinore Valley Municipal Water District	(951) 674 3146
Elsinore Water District	(951) 674-2168
Farm Mutual Water Company	(951) 244-4198
Idyllwild Water District	(951) 659-2143
Indio Water Authority	(760) 391-4129
Jurupa Community Services District	(951) 685-7434
Lee Lake Water	(951) 658-3241
Mission Springs Water	(760) 329-6448
Rancho California Water District	(951) 296-6900
Ripley, CSA #62	(760) 922-4951
Riverside Co. Service Area #51	(760) 227-3203
Rubidoux Community Services District	(951) 684-7580
Valley Sanitary District	(760) 347-2356
Western Municipal Water District	(951) 789-5000
Yucaipa Valley Water District	(909) 797-5117

CALL 1-800-506-2555 to:

- Report clogged storm drains or illegal storm drain disposal from residential, industrial, construction and commercial sites into public streets, storm drains and/or water bodies.
- Find out about our various storm drain pollution prevention materials.
- Locate the dates and times of Household Hazardous Waste (HHW) Collection Events.
- Request adult, neighborhood, or classroom presentations.
- Locate other County environmental services.
- Receive grasscycling information and composting workshop information.

Or visit our
Riverside County Flood Control and Water Conservation District
website at: www.rcflood.org

Other links to additional storm drain pollution information:

- County of Riverside Environmental Health: www.rivcoeh.org
- State Water Resources Control Board: www.waterboards.ca.gov
- California Stormwater Quality Association: www.casqa.org
- United States Environmental Protection Agency (EPA): www.epa.gov/compliance/assistance (compliance assistance information)

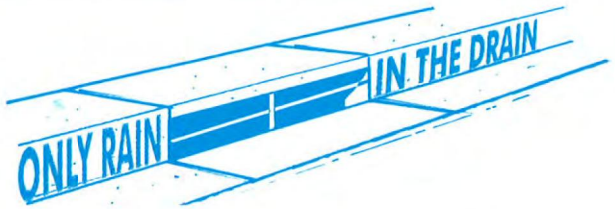
Riverside County's, "Only Rain Down the Storm Drain" Pollution Prevention Program gratefully acknowledges the Bay Area Stormwater Management Agencies Association and the Cleaning Equipment Trade Association for information provided in this brochure.

Guidelines for Maintaining your...



Swimming Pool, Jacuzzi and Garden Fountain

Where does the water go?



Pool, Jacuzzi and Fountain wastewater and rain water runoff (also called stormwater) that reach streets can enter the storm drain and be conveyed directly into local streams, rivers and lakes.



A storm drain's purpose is to prevent flooding by carrying rain water away from developed areas. Storm drains are not connected to sanitary sewers systems and treatment plants!

Wastewater, from residential swimming pools, Jacuzzis, fishponds and fountains, often contains chemicals used for sanitizing or cleansing purposes. Toxic chemicals (such as chlorine or copper-based algaecides) may pollute the environment when discharged into a storm drain system.

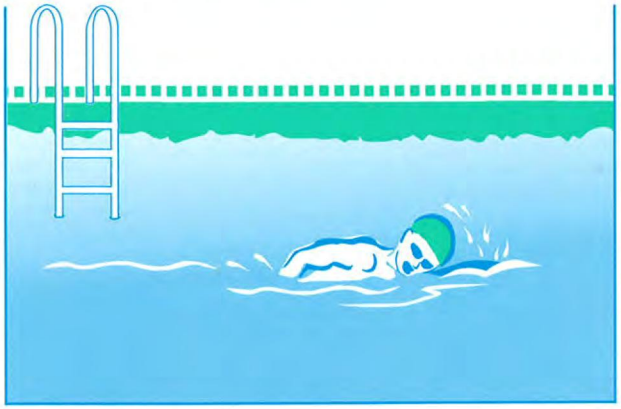
The Cities and County of Riverside have adopted ordinances that prohibit the discharge of wastewater to the street and storm drain system.



Discharge Regulations

Regulatory requirements for discharging wastewater from your pool may differ from city to city. Chlorinated water should not be discharged into the street, storm drain or surface waters. Check with your water agency to see if disposal to the sanitary sewer line is allowed for pool discharges (see reverse for Riverside County sewer agencies).

If allowed, a hose can be run from the pool Jacuzzi, or fountain to the private sewer cleanout, washing machine drain or a sink or bathtub.



If you cannot discharge to the sewer, you may drain your fountain, pool, or jacuzzi to your landscaping by following these guidelines:

First, reduce or eliminate solids (e.g. debris, leaves or dirt) in the pool water and allow the chemicals in the pool water to dissipate before draining the pool (this could take up to 7 days, verify using a home pool test kit).

Second, slowly drain to a landscaped area away from buildings or structures. Control the flow to prevent soil erosion; it may take more than one day to empty. Do not allow sediment to enter the street, gutter or storm drain.

Maintenance & Chemicals



Cleaning Filters

Filter rinse water and backwash must be discharged to the sanitary sewer, on-site septic tank and drain field system (if properly designed and adequately sized), or a seepage pit. Alternatively, rinse water or backwash may be diverted to landscaped or dirt areas. Filter media and other non-hazardous solids should be picked up and disposed of in the trash.

Algaecides

Avoid using copper-based algaecides unless absolutely necessary. Control algae with chlorine, organic polymers or other alternatives to copper-based pool chemicals. Copper is a heavy metal that can be toxic to aquatic life when you drain your pool.

Chemical Storage and Handling

- Use only the amount indicated on product labels
- Store chlorine and other chemicals in a covered area to prevent runoff. Keep out of reach of children and pets.
- Chlorine kits, available at retail swimming pool equipment and supply stores, should be used to monitor the chlorine and pH levels before draining your pool.
- Chlorine and other pool chemicals should never be allowed to flow into the gutter or storm drain system.

Take unwanted chemicals to a Household Hazardous Waste (HHW) Collection Event. There's no cost for taking HHW items to collection events – it's FREE! Call **1-800-506-2555** for a schedule of HHW events in your community.





For more information,
please call the
Riverside County's
"Only Rain Down the Storm Drain"
Pollution Prevention Program
at 1-800-506-2555 or
www.rcflood.org

or

To Report A Sewage Spill:

During normal business hours
(8:00 a.m to 5:00 p.m), call
Riverside County Department of
Environmental Health
at 951-358-5172 or 1-800-304-2226
www.rivcoeh.org

After business hours, on weekends
or holidays, call toll free
1-800-506-2555

For emergencies, dial 911.

www.NOWRA.ORG - A website providing resources and education on the design and maintenance of septic tank systems.

www.epa.gov/owm/septic - Including septic tank information, the Environmental Protection Agency has a large E-vault of environmental information and resources.

The Riverside County "Only Rain Down the Storm Drain" Pollution Prevention Program gratefully acknowledges Orange County's Storm Water Program for their contribution to this brochure.

Stormwater Pollution

What you should know...

Tips for Maintaining a Septic Tank System



Water quality responsibility begins at YOUR front door.

Tips for Maintaining a Septic Tank System

Households that are not served by public sewers usually depend on a septic tank system* to treat and dispose of wastewater. A well designed, installed and regularly maintained septic system can provide years of reliable service. However, when these systems fail to operate properly, significant damage can occur to property and the environment. The homeowner is responsible for these damages and may be subject to fines. Therefore, it is important to follow these simple tips when using a septic tank system:

Conserve Water

The more wastewater produced, the more the soil must absorb. By conserving water, the life of the drain field will be extended and the chance of a system failure is decreased.

Reduce your water use by:

- Using water saving devices
- Repairing leaky faucets and plumbing fixtures
- Reducing toilet reservoir volume or flow
- Taking shorter showers
- Washing only full loads of dishes and laundry
- Limit the number of highwater use activities done at the same time.

Never Flush Harmful Materials Into The Septic Tank

Grease, cooking oils, newspaper, paper towels, rags, coffee grounds, sanitary napkins and cigarettes do not easily decompose in the tank. Chemicals such as solvents, soils, unused prescriptions, over-the-counter medications, paints and pesticides are harmful to the system's operation and may pollute the groundwater. For information on the proper disposal of household hazardous waste, call toll free 1-800-506-2555. Also, never use septic tank additives, commercial septic tank cleaners, yeast, sugar, etc. These products are not necessary and some may be harmful to your system.

Keep Runoff Away From The System

Water from surfaces such as roofs, driveways or patios should be diverted away from the septic tank and drain field area.

Protect The System From Damage

Don't park, pave or put livestock or heavy objects, equipment or machinery over the drainfield. The pressure can compact the soil or damage pipes. Also check your septic system map prior to constructing buildings or a pool on the property. The area over the absorption field and tank should be left undisturbed with only grass on top. Trees or shrubs, which may clog and damage the drain, should be removed from the area.

Keep Records

Chart the location of your septic tank and keep up-to-date service and repair records for future reference.

Inspect The System

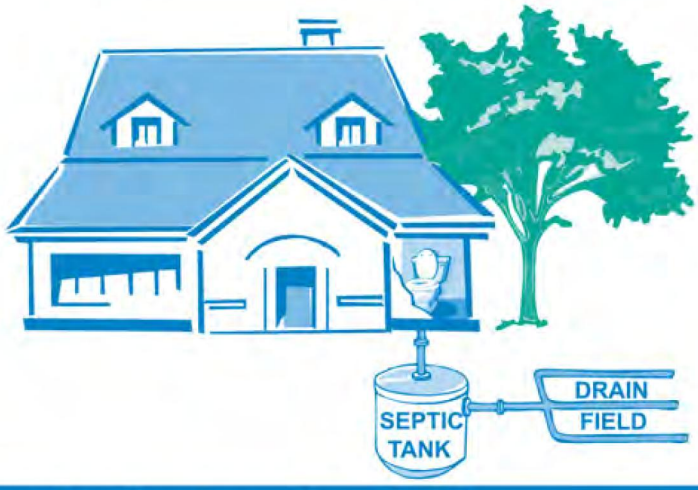
Monitor the system yearly to ensure it is not at an "early warning level." Inspect the drain field and down slope areas for odors, wet spots, or surfacing of sewage. This may be an early indication of a problem with the system. Also, have the system inspected by a licensed septic tank professional every three to five years.

Pump The Tank When Needed

Routine pumping can prevent failures, such as clogging and backup into the home. Never pump full or failing septic systems to the street or storm drain.

Never Enter The Septic Tank

Poisonous gases or the lack of air can be fatal. A certified professional should complete any work to the tank.



* Contact your local collection agency or city for assistance in determining if your home is served by a septic tank.

Stormwater Pollution Found in Your Area!

This is not a citation.

This is to inform you that our staff found the following pollutants in the storm sewer system in your area. This storm sewer system leads directly to

_____ .

- ❑ Motor oil
- ❑ Oil filters
- ❑ Antifreeze/ transmission fluid
- ❑ Paint
- ❑ Solvent/degreaser
- ❑ Cooking grease
- ❑ Detergent
- ❑ Home improvement waste (concrete, mortar)
- ❑ Pet waste
- ❑ Yard waste (leaves, grass, mulch)
- ❑ Excessive dirt and gravel
- ❑ Trash
- ❑ Construction debris
- ❑ Pesticides and fertilizers
- ❑ Other





_____

For more information or to report an illegal discharge of pollutants, please call:

Riverside County Residents, Call . . .
1-800-506-2555

WHEN IT RAINS
IT DRAINS

EPA
United States
Environmental Protection
Agency

www.epa.gov/npdes/stormwater

EPA 833-F-03-002
April 2003

Stormwater runoff is precipitation from rain or snowmelt that flows over the ground. As it flows, it can pick up debris, chemicals, dirt, and other pollutants and deposit them into a storm sewer system or waterbody.

Anything that enters a storm sewer system is discharged untreated into the waterbodies we use for swimming, fishing, and providing drinking water.

Remember: Only Rain Down the Drain

To keep the stormwater leaving your home or workplace clean, follow these simple guidelines:



- Use pesticides and fertilizers sparingly
- Repair auto leaks.
- Dispose of household hazardous waste, used auto fluids (antifreeze, oil, etc.), and batteries at designated collection or recycling locations.
- Clean up after your pet.
- Use a commercial car wash or wash your car on a lawn or other unpaved surface.
- Sweep up yard debris rather than hosing down areas. Compost or recycle yard waste when possible.
- Clean paint brushes in a sink, not outdoors. Properly dispose of excess paints through a household hazardous waste collection program.
- Sweep up and properly dispose of construction debris like concrete and mortar.



STREAM STABILIZATION FACTS

for Home and Property Owners in Riverside County

Homeowners living adjacent to streams, lakes and rivers may be impacted by bank erosion or sediment deposition that can occur due to natural processes or man-made causes. Homeowner efforts to mitigate impacts to their property from erosion or sedimentation can negatively affect native plants and animals, lessen a watercourse's ability to convey storm flows, cause erosion or sedimentation problems on other properties and/or cause flooding. Below is some guidance regarding actions a homeowner should take before attempting to protect their property:

- In some cases, any alteration of a watercourse may be prohibited by local land-use regulations, e.g., a "drainage easement", "flowage easement", "floodplain" or "Environmental Constraint Sheet". You should contact your local City or County building or grading department to determine if these limitations apply to watercourses in or adjacent to your property.

- In cases where alterations are not expressly prohibited, grading, filling or otherwise altering a watercourse - even those that flow intermittently, such as dry washes that only flow when it rains – may require approval from one or more of the following regulating agencies:

REGULATING AGENCY	POTENTIAL REGULATORY PERMIT	WHERE TO CONTACT
Local (City, County) land use authority *	• Grading Permit • Floodplain Review	White pages under City/County Government
California Department of Fish and Game*	• Fish and Game Section 1602 Agreements	www.dfg.ca.gov
US Army Corps of Engineers*	• Clean Water Act Section 404 Permit	www.usace.army.mil
California State Water Resources Control Board*	• Clean Water Act Section 401 Water Quality Certification or Waste Discharge Requirements	www.swrcb.ca.gov

*Fees may be applicable.

- Property owners should **CONTACT EACH REGULATING AGENCY** (listed above) for the necessary approval(s) **BEFORE**:

1. ***Removing*** soil, rock or plant material from a streambed or the bank of a stream;

(over)

More on Stream Stabilization

2. ***Placing*** any waste, material (dirt, rubble) or structures (dams, revetments) on a stream bank or within a stream;

3. ***Diverting, obstructing, or otherwise modifying*** the bed, channel, or bank of any river, stream or lake;

4. ***Dumping*** *or* ***depositing*** debris, liquid or solid waste, soil, manure or other material that may be conveyed into a wash, stream, river or lake; or

5. ***Armoring*** *or* ***stabilizing*** a stream bank against stream bank erosion.

Some other examples of regulated stream alteration activities include vegetation removal or construction of road crossings or corrals. Property owners are responsible for obtaining all necessary approvals prior to commencing any of the aforementioned activities.

- *The Natural Resources Conservation Service (NRCS)* makes onsite recommendations (currently free of charge) to private land owners for effective erosion control. For help in protecting your property from stream erosion please contact:

NATURAL RESOURCES CONSERVATION SERVICE (NRCS)	CONTACT	PHONE NO.
Riverside County (West of the San Jacinto Mtns.)	Robert Hewitt	(951) 654-7139
Beaumont and Banning Area	Jim Earsom	(909) 799-7407
Desert Area	Sam Aslam	(760) 347-7658
Blythe	Sam Cobb	(760) 922-3446

- ***YOU*** **can help protect water quality**:
  Prevent trash, debris, manure and waste of any kind from washing off home sites and streets into gutters, storm drains and dry watercourses. During storms, these watercourses can convey pollution into more sensitive streams and rivers.

County-wide Service Information

- Household hazardous wastes (oil-based paints, pesticides, antifreeze, motor oil, batteries and fluorescent bulbs) must never be disposed of in or near watercourses. You may find your nearest household hazardous waste disposal site by calling **(800) 304-2226 or on the web at www.rivcowm.org**



- Report illegal grading or dumping in watercourses by contacting your City or County Code Enforcement Department, or call **(800) 506-2555.**

- Report a non-emergency crime such as dumping by contacting your City Police or County Sherriff's Department, or call **(800) 506-2555.**

Clean and healthy creeks, river, lakes and streams are important to Riverside County. However, equestrian enthusiasts and common outdoor equestrian activities can lead to water pollution, if owners are not careful.

Horse waste and equestrian care products can be washed into streets and storm drains, when residents are not careful. Unlike sanitary sewers (from sinks and toilets), storm drains flow directly (untreated) to our creeks, rivers, lakes and streams.

You would never put animal waste or products into our creeks, river, lakes or streams, so don't let them enter the storm drains. Follow these easy tips to help prevent water pollution while grooming or feeding horses, or constructing a stable.

Resources

Contact your city's storm water representative for any applicable local ordinances.

For more information,
please call the Riverside County's
"Only Rain Down the Storm Drain"
1-800-506-2555
or visit the website at
www.rcflood.org

- Report a spill, an illegal storm drain disposal or clogged storm drains.
- Obtain pollution prevention information for Riverside County Residents, Businesses, Developers, Industries and Municipalities.
- Schedule pollution prevention education for adults, groups, or school presentations.
- Locate Household Hazardous Waste Collection Centers.

**FOR SPILL EMERGENCIES,
PLEASE CALL 911**

Riverside County gratefully acknowledges the Orange County Storm Water Program for the information provided in this brochure.

StormWater Pollution

What you should know...



...ONLY RAIN...
DOWN THE STORM DRAIN

Environmental responsibility begins with YOU.

Never allow horse waste or care products to enter the street or storm drain.

Grooming

- Use less-toxic alternatives for grooming. Even biodegradable products can be harmful to humans, marine life and the environment. Follow instructions on the products and clean up spills.
- When washing horses, either allow wash water to seep into the ground or wash in an area that is routed to the sanitary sewer. Do not let wash water enter the storm drain or any bodies of water.
- Conserve water by using a spray nozzle with an automatic shut-off. Turn off the water or kink the hose when not in use.

Pasture Management

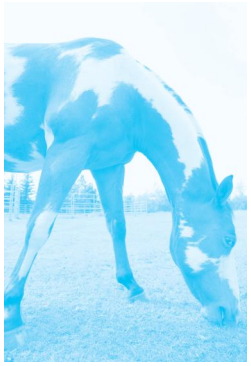
- Horse holding areas should be swept or shoveled at least once per day. Never hose down these areas! The waste could end up in a stream or storm drain.



- Paddocks should be cleaned at least twice per week during the rainy season and once per week the rest of the year.

Grazing

- Establish healthy and vigorous pastures with at least three inches of leafy material.
- During rainfall, consider indoor feeding, a practice that keeps manure under a roof and away from runoff.



Collection and Storage

- Store animal waste in a sturdy, seepage-free unit that is enclosed or under cover.
- Line waste pits or trenches with an impermeable layer.
- Do not store manure on-site for more than one week.

Use and Disposal

- Compost soiled bedding and manure. See http://compostingcouncil.org for more information.
- Donate composted material to local greenhouses, nurseries and botanical parks.
- Transport manure to topsoil companies or composting centers.

Facility Design

- If you are constructing or re-building a stable, have your engineer check the County's website at www.ocwatersheds.com for information about facility design.

Remember, good land management protects horse health and water quality. A horse property that is managed well can also prevent disputes with neighbors, attract wildlife and make horse care more enjoyable.



FLEXSTORM INLET FILTERS

POWERED BY filtrexx TECHNOLOGY

HYDROWORKS

STORMEXX® CLEAN CATCH BASIN FILTER



FlexStorm has partnered with Filtrexx to offer the latest in compost filter technology. The StormExx Clean Catch Basin Filter utilizes an enhanced cartridge filter for the capture and removal of sediment, hydrocarbons, heavy metals, nutrients and bacteria from stormwater runoff. The filter insert sits below the grate and will fit any round or rectangular storm drain using FlexStorm engineered framing systems.

FEATURES & BENEFITS:

- Easy to install, maintain and replace
- Treats stormwater at the street/inlet level
- Patented multi-stage filtration system
- Option for double units
- Overflow bypass of 500+ gpm



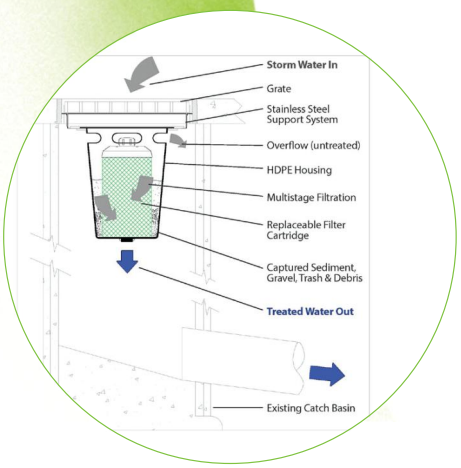
REMOVAL RATES:

- TSS: 90%
- Total Phosphorous: 59%
- Soluble Phosphorous: 94%
- Ammonium Nitrate: 41%
- Chromium: 24%
- E. Coli: 93%
- pH (low) neutralized to 6.62
- Oil/Hydrocarbons: 99%
- Copper: 75%
- Zinc: 58%
- Cadmium: 99%
- Arsenic: 18%
- Total Coliform: 79%
- pH (high) neutralized to 8.31
- Turbidity: 76%
- Nickel: 58%
- TKN: 22%
- Lead: 60%
- Selenium: 25%
- Fecal Coliform: 71%



Values are total efficiency removal percentage of typical standard input stormwater concentrations over 10 run-off events. All pollutants are common stormwater pollutants and part of industrial and municipal stormwater permit effluent limit guideline regulations. For methodology, reference Filtrexx TechLink Research Summary #3338.







*THE MOST **ADVANCED** NAME IN WATER MANAGEMENT SOLUTIONS™*

STORMEXX CLEAN CATCH BASIN FILTER

SUMMARY

StormExx inserts are for use at stormwater catch basins in roadways, parking lots and paved areas as indicated on the plans and specifications. The inserts remove sediment, hydrocarbons, heavy metals, nutrients and bacteria from stormwater run-off. Installer must provide size and type as required upon placing order. Inserts shall include all components required for a complete installation at each catch basin as indicated on drawings. Each insert shall include a stainless steel framing system and a replaceable filter/absorber cartridge with filter media having a combined total volume of approximately 1,200 cubic inches.

CATCH BASIN INSERT FEATURES AND CHARACTERISTICS

1. Filter Cartridge Size: Nominal 10" in diameter by 18" high with center perforated HDPE tube. Stormwater flows through media horizontally on a downward path through the filter/absorber cartridge before exiting the perforated tube. The cartridge shall slip over a perforated internal drain tube that exits through the bottom of the housing. The cartridge shall contain approximately 1,200 cubic inches of various absorbent material arranged primarily in layers. The outer surface of the cartridge shall be covered with a poly strainer fabric. Cartridge shall be easily removable for replacement. Drain tube with perforations may extend above filter/absorber portion to allow a minimum flow rate to deter standing water if unit becomes plugged or blinded.
2. Nominal Flow Rate: 15-40 gpm through clean filter/absorber cartridge. Unit features a large overflow opening area and space between housing, deflector and catch basin that allows for high overflow rates with minimum restriction during storm conditions. Overflow capable of passing several hundred gpm.
3. Nominal Flow Rate with Pre-Strainer: Where leaves and other surface material are anticipated, a pre-strainer can be used. Flow restriction can occur when pre-strainer is restricted or plugged.
4. Filter Housing: HDPE solid housing suitable for full height sediment containment and shall be nominal 15 gallons retention size. Smaller size capacity may be used on shallow catch basins. A perforated tube shall be incorporated within the housing to allow the filter/absorber cartridge to slip on for easy replacement. A locking screw-on-cap keeps cartridge in place during use. Use modified or shorter housing (with less storage, flow and filtration) where depth of catch basin is shallow or to suit basin.
5. Frame/Deflector: Each insert shall be fitted with a custom frame that directs incoming water from the grate inlet to the housing. Materials include HDPE or poly sheet and/or Type 304 SS sheet and frame.

OPERATION AND MAINTENANCE GUIDELINES

StormExx catch basin inserts are used to intercept stormwater as it passes through the grate. Heavy sediment items settle to the bottom of the housing and the collected water starts to rise and pass through the filter cartridge. As the rainfall rate increases, the water level may rise to the top of the cartridge. During high rainfall flow events excess untreated water will overflow the housing. **Note**: The most concentrated contaminants in stormwater generally occur at the beginning of each rain event. Stormwater treatment devices are frequently sized to treat this "first flush" event. Each site and installation may vary widely as to exposure to sediment, construction debris, landscaping and other pollutants.

With periodic site inspections, the proper care and maintenance frequency may be determined for a proper service schedule. The StormExx inserts should be inspected during each season before and after rain events to ensure that the insert filter assembly is ready to accept and treat stormwater run-off. Keep the grate and area within 6' of the grate clean and free of leaves, grass clippings, sediment and debris to minimize these contaminants from entering the unit housing. This is especially important during leaf fall season as decaying leaves on the filter cartridge can shorten filter life. Periodic visual inspections involve looking through the grate to see if any standing water exists. The collected water should drain through the filter cartridge that is designed for deep bed loading. As it becomes blinded or plugged with sediment, the flow rate capability will be reduced. Replace filter cartridge if standing water is in the housing. Maintenance schedules will vary with rainfall and pollutant concentration levels. Typical post-construction installations will require cartridge change-outs once or twice per year. If sediment reaches a height of 6" to 8" above bottom of the 24" housing, the sediment should be dumped and the filter cartridge inspected and replaced if necessary. Collected leaves, grass clippings, sediment, debris and spent filter cartridges that are not considered hazardous may be disposed of in on-site trash bins if approved by client. Cartridge disposal shall be in accordance with applicable rules and regulations.

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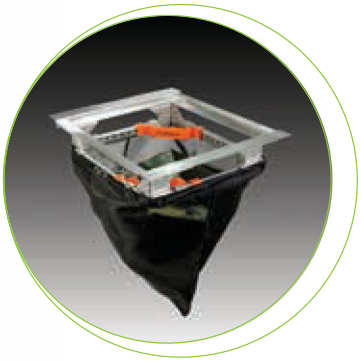
FLEXSTORM® PURE PERMANENT INLET PROTECTION



SPECIFY WITH CONFIDENCE

State DOTs and Municipalities across the country now have a universal structural BMP to address the issue of storm sewer inlet protection: FLEXSTORM PURE Inlet Filters.

The FLEXSTORM PURE system is the preferred choice for permanent inlet protection and storm water runoff control. Constructed of versatile stainless steel, FLEXSTORM PURE Inlet Filters will fit any drainage structure and are available with site-specific filter bags providing various levels of filtration. Whether you're the specifier or the user, it's clear to see how FLEXSTORM PURE Inlet Filters outperform the competition.

APPLICATIONS:

Car Washes	Gas Stations
Commercial	Parking Lots
Loading Ramps	Dock Drains
Industrial	Maintenance

FEATURES:

- Stainless Steel filter framing is custom configured to fit perfectly into any drainage structure, whether a standard design or obstructed inlet opening
- Filtered Flow Rates and Ultimate Bypass Rates are designed to meet your specific inlet requirements
- Multiple Filter Bags are available targeting site specific removal of trash, litter, leaves, or small particles, oil and grease
- Filters work below grade with an ultimate bypass allowing inlet area to drain with a full bag
- Units install in seconds and are easily maintained with the FLEXSTORM Universal Removal Tool (no heavy machinery required)

BENEFITS:

- Receive payback on your investment: durable stainless steel framing provides extended service life while replaceable filter bags handle loads with a safety factor of 5
- Meet stringent removal requirements:
  - –FX filter bags are rated for > 80% removal efficiency of street sweep-size particles
  - –PC/PC+ filter bags have been tested to 99% TSS removal of OK-110 US Silica Sand and 97% TPH (total petroleum hydrocarbon) removal
- Help prevent fines: FLEXSTORM Inlet Filters comply with EPA NPDES initiatives as a temporary or permanent BMP
- Available through 5,000 ADS distributors nationwide
- If not in stock, orders up to 100 pcs can ship within 48 hours



ADS Service: ADS representatives are committed to providing you with the answers to all your questions, including selecting the proper filter, specifications, installation and more. Also try the ADS FLEXSTORM Online Product Condfigurator at *www.inletfilters.com*

*The Most **Advanced** Name in Drainage Systems®*

FLEXSTORM PURE INLET FILTERS SPECIFICATION

IDENTIFICATION

The installer shall inspect the plans and/or worksite to determine the quantity of each drainage structure casting type. The foundry casting number, exact grate size and clear opening size, or other information will be necessary to finalize the FLEXSTORM part number and dimensions. The units are shipped to the field configured precisely to fit the identified drainage structure.

MATERIAL AND PERFORMANCE

The FLEXSTORM Inlet Filter system is comprised of a corrosion resistant steel frame and a replaceable geotextile filter bag attached to the frame with a stainless steel locking band. The filter bag hangs suspended at a distance below the grate that shall allow full water flow into the drainage structure if the bag is completely filled with sediment. The standard Woven Polypropylene FX filter bags are rated for 200 gpm/sqft with a removal efficiency of 82% when filtering a USDA Sandy Loam sediment load. The Post Construction PC filter bags are rated for 137 gpm/sqft and have been 3rd party tested at 99% TSS removal to 110 micron and 97% TPH removal of used motor oil hydrocarbon mix.

INSTALLATION

Remove the grate from the casting or concrete drainage structure. Clean the ledge (lip) of the casting frame or drain- age structure to ensure it is free of stone and dirt. Drop in the FLEXSTORM Inlet Filter through the clear opening and be sure the suspension hangers rest firmly on the inside ledge (lip) of the casting. Replace the grate and confirm it is elevated no more than 1/8", which is the thickness of the steel hangers. For wall mount units, follow instructions for attaching the stainless steel mounting brackets using the provided concrete fasteners.

INSPECTION FREQUENCY

Construction site inspection should occur following each 1⁄2" or more rain event. Post Construction inspections should occur three times per year (every four months) in areas with mild year round rainfall and four times per year (every three months Feb–Nov) in areas with summer rains before and after the winter snowfall season. Industrial application site inspections (loading ramps, wash racks, maintenance facilities) should occur on a regularly scheduled basis no less than three times per year.

MAINTENANCE GUIDELINES

Empty the filter bag if more than half filled with sediment and debris, or as directed by the Engineer. Remove the grate, engage the lifting bars or handles with the FLEXSTORM Removal Tool, and lift from the drainage structure. Dispose of the sediment or debris as directed by the Engineer or Maintenance Contract in accordance with EPA guidelines.

As an alternative, an industrial vacuum may be used to collect the accumulated sediment. Remove any caked on silt from the sediment bag and reverse flush the bag with medium spray for optimal filtration. Replace the bag if torn or punctured to 1⁄2" diameter or greater on the lower half of the bag. Post Construction PC/PC+ Bags should be maintained prior to 50% oil saturation. The average 2' x 2' PC filter bag will retain approx. 96 oz (5.4 lbs) of oil at which time it should be serviced or replaced. It can be centrifuged or passed through a wringer to recover the oils, and the fabric reused with 85% to 90% efficacy. It may also be recycled for its fuel value through waste to energy incineration. When utilizing the MyCelx Skimmer Pouches in the + bags, note that the skimmers start yellow in color and will gradually turn brown as they become saturated, indicating time for replacement. Each MyCelx skimmer pouch will absorb approximately 89 oz (5 lbs) of oil before requiring replacement. It may also be recycled for its fuel value through waste to energy incineration. Dispose of all oil contaminated products in accordance with EPA guidelines.

FILTER BAG REPLACEMENT

Remove the bag by loosening or cutting off the clamping band. Take the new filter bag, which is equipped with a stainless steel worm drive clamping band, and use a screw driver to tighten the bag around the frame channel. Ensure the bag is secure and that there is no slack around the perimeter of the band.

Lift Handles ease installation and maintenance



Replaceable Sediment Bag

1/8" thick steel hangers& channels; precision stampings **configured to fit each individual casting**



CAD drawings, work instructions and test reports on website: ***www.inletfilters.com***



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Infiltration Basin TC-11



Design Considerations

- Soil for Infiltration
- Slope
- Aesthetics

Targeted Constituents

☑	Sediment	■
☑	Nutrients	■
☑	Trash	■
☑	Metals	■
☑	Bacteria	■
☑	Oil and Grease	■
☑	Organics	■

Legend ***(Removal Effectiveness)***

- ● Low ■ High
- ▲ Medium

Description

An infiltration basin is a shallow impoundment that is designed to infiltrate stormwater. Infiltration basins use the natural filtering ability of the soil to remove pollutants in stormwater runoff. Infiltration facilities store runoff until it gradually exfiltrates through the soil and eventually into the water table. This practice has high pollutant removal efficiency and can also help recharge groundwater, thus helping to maintain low flows in stream systems. Infiltration basins can be challenging to apply on many sites, however, because of soils requirements. In addition, some studies have shown relatively high failure rates compared with other management practices.

California Experience

Infiltration basins have a long history of use in California, especially in the Central Valley. Basins located in Fresno were among those initially evaluated in the National Urban Runoff Program and were found to be effective at reducing the volume of runoff, while posing little long-term threat to groundwater quality (EPA, 1983; Schroeder, 1995). Proper siting of these devices is crucial as underscored by the experience of Caltrans in siting two basins in Southern California. The basin with marginal separation from groundwater and soil permeability failed immediately and could never be rehabilitated.

Advantages

- Provides 100% reduction in the load discharged to surface waters.
- The principal benefit of infiltration basins is the approximation of pre-development hydrology during which a

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significant portion of the average annual rainfall runoff is infiltrated and evaporated rather than flushed directly to creeks.

- If the water quality volume is adequately sized, infiltration basins can be useful for providing control of channel forming (erosion) and high frequency (generally less than the 2-year) flood events.

Limitations

- May not be appropriate for industrial sites or locations where spills may occur.
- Infiltration basins require a minimum soil infiltration rate of 0.5 inches/hour, not appropriate at sites with Hydrologic Soil Types C and D.
- If infiltration rates exceed 2.4 inches/hour, then the runoff should be fully treated prior to infiltration to protect groundwater quality.
- Not suitable on fill sites or steep slopes.
- Risk of groundwater contamination in very coarse soils.
- Upstream drainage area must be completely stabilized before construction.
- Difficult to restore functioning of infiltration basins once clogged.

Design and Sizing Guidelines

- Water quality volume determined by local requirements or sized so that 85% of the annual runoff volume is captured.
- Basin sized so that the entire water quality volume is infiltrated within 48 hours.
- Vegetation establishment on the basin floor may help reduce the clogging rate.

Construction/Inspection Considerations

- Before construction begins, stabilize the entire area draining to the facility. If impossible, place a diversion berm around the perimeter of the infiltration site to prevent sediment entrance during construction or remove the top 2 inches of soil after the site is stabililized. Stabilize the entire contributing drainage area, including the side slopes, before allowing any runoff to enter once construction is complete.
- Place excavated material such that it can not be washed back into the basin if a storm occurs during construction of the facility.
- Build the basin without driving heavy equipment over the infiltration surface. Any equipment driven on the surface should have extra-wide ("low pressure") tires. Prior to any construction, rope off the infiltration area to stop entrance by unwanted equipment.
- After final grading, till the infiltration surface deeply.
- Use appropriate erosion control seed mix for the specific project and location.

Performance

As water migrates through porous soil and rock, pollutant attenuation mechanisms include precipitation, sorption, physical filtration, and bacterial degradation. If functioning properly, this approach is presumed to have high removal efficiencies for particulate pollutants and moderate removal of soluble pollutants. Actual pollutant removal in the subsurface would be expected to vary depending upon site-specific soil types. This technology eliminates discharge to surface waters except for the very largest storms; consequently, complete removal of all stormwater constituents can be assumed.

There remain some concerns about the potential for groundwater contamination despite the findings of the NURP and Nightingale (1975; 1987a,b,c; 1989). For instance, a report by Pitt et al. (1994) highlighted the potential for groundwater contamination from intentional and unintentional stormwater infiltration. That report recommends that infiltration facilities not be sited in areas where high concentrations are present or where there is a potential for spills of toxic material. Conversely, Schroeder (1995) reported that there was no evidence of groundwater impacts from an infiltration basin serving a large industrial catchment in Fresno, CA.

Siting Criteria

The key element in siting infiltration basins is identifying sites with appropriate soil and hydrogeologic properties, which is critical for long term performance. In one study conducted in Prince George's County, Maryland (Galli, 1992), all of the infiltration basins investigated clogged within 2 years. It is believed that these failures were for the most part due to allowing infiltration at sites with rates of less than 0.5 in/hr, basing siting on soil type rather than field infiltration tests, and poor construction practices that resulted in soil compaction of the basin invert.

A study of 23 infiltration basins in the Pacific Northwest showed better long-term performance in an area with highly permeable soils (Hilding, 1996). In this study, few of the infiltration basins had failed after 10 years. Consequently, the following guidelines for identifying appropriate soil and subsurface conditions should be rigorously adhered to.

- Determine soil type (consider RCS soil type 'A, B or C' only) from mapping and consult USDA soil survey tables to review other parameters such as the amount of silt and clay, presence of a restrictive layer or seasonal high water table, and estimated permeability. The soil should not have more than 30% clay or more than 40% of clay and silt combined. Eliminate sites that are clearly unsuitable for infiltration.

- Groundwater separation should be at least 3 m from the basin invert to the measured ground water elevation. There is concern at the state and regional levels of the impact on groundwater quality from infiltrated runoff, especially when the separation between groundwater and the surface is small.

- Location away from buildings, slopes and highway pavement (greater than 6 m) and wells and bridge structures (greater than 30 m). Sites constructed of fill, having a base flow or with a slope greater than 15% should not be considered.

- Ensure that adequate head is available to operate flow splitter structures (to allow the basin to be offline) without ponding in the splitter structure or creating backwater upstream of the splitter.

- Base flow should not be present in the tributary watershed.

Secondary Screening Based on Site Geotechnical Investigation

- At least three in-hole conductivity tests shall be performed using USBR 7300-89 or Bouwer-Rice procedures (the latter if groundwater is encountered within the boring), two tests at different locations within the proposed basin and the third down gradient by no more than approximately 10 m. The tests shall measure permeability in the side slopes and the bed within a depth of 3 m of the invert.

- The minimum acceptable hydraulic conductivity as measured in any of the three required test holes is 13 mm/hr. If any test hole shows less than the minimum value, the site should be disqualified from further consideration.

- Exclude from consideration sites constructed in fill or partially in fill unless no silts or clays are present in the soil boring. Fill tends to be compacted, with clays in a dispersed rather than flocculated state, greatly reducing permeability.

- The geotechnical investigation should be such that a good understanding is gained as to how the stormwater runoff will move in the soil (horizontally or vertically) and if there are any geological conditions that could inhibit the movement of water.

Additional Design Guidelines

(1) Basin Sizing - The required water quality volume is determined by local regulations or sufficient to capture 85% of the annual runoff.

(2) Provide pretreatment if sediment loading is a maintenance concern for the basin.

(3) Include energy dissipation in the inlet design for the basins. Avoid designs that include a permanent pool to reduce opportunity for standing water and associated vector problems.

(4) Basin invert area should be determined by the equation:

$$A = \frac{WQV}{kt}$$

where A = Basin invert area (m^2)

WQV = water quality volume (m^3)

k = 0.5 times the lowest field-measured hydraulic conductivity (m/hr)

t = drawdown time (48 hr)

(5) The use of vertical piping, either for distribution or infiltration enhancement shall not be allowed to avoid device classification as a Class V injection well per 40 CFR146.5(e)(4).

Maintenance

Regular maintenance is critical to the successful operation of infiltration basins. Recommended operation and maintenance guidelines include:

- Inspections and maintenance to ensure that water infiltrates into the subsurface completely (recommended infiltration rate of 72 hours or less) and that vegetation is carefully managed to prevent creating mosquito and other vector habitats.
- Observe drain time for the design storm after completion or modification of the facility to confirm that the desired drain time has been obtained.
- Schedule semiannual inspections for beginning and end of the wet season to identify potential problems such as erosion of the basin side slopes and invert, standing water, trash and debris, and sediment accumulation.
- Remove accumulated trash and debris in the basin at the start and end of the wet season.
- Inspect for standing water at the end of the wet season.
- Trim vegetation at the beginning and end of the wet season to prevent establishment of woody vegetation and for aesthetic and vector reasons.
- Remove accumulated sediment and regrade when the accumulated sediment volume exceeds 10% of the basin.
- If erosion is occurring within the basin, revegetate immediately and stabilize with an erosion control mulch or mat until vegetation cover is established.
- To avoid reversing soil development, scarification or other disturbance should only be performed when there are actual signs of clogging, rather than on a routine basis. Always remove deposited sediments before scarification, and use a hand-guided rotary tiller, if possible, or a disc harrow pulled by a very light tractor.

Cost

Infiltration basins are relatively cost-effective practices because little infrastructure is needed when constructing them. One study estimated the total construction cost at about $2 per ft (adjusted for inflation) of storage for a 0.25-acre basin (SWRPC, 1991). As with other BMPs, these published cost estimates may deviate greatly from what might be incurred at a specific site. For instance, Caltrans spent about $18/ft^3 for the two infiltration basins constructed in southern California, each of which had a water quality volume of about 0.34 ac.-ft. Much of the higher cost can be attributed to changes in the storm drain system necessary to route the runoff to the basin locations.

Infiltration basins typically consume about 2 to 3% of the site draining to them, which is relatively small. Additional space may be required for buffer, landscaping, access road, and fencing. Maintenance costs are estimated at 5 to 10% of construction costs.

One cost concern associated with infiltration practices is the maintenance burden and longevity. If improperly maintained, infiltration basins have a high failure rate. Thus, it may be necessary to replace the basin with a different technology after a relatively short period of time.

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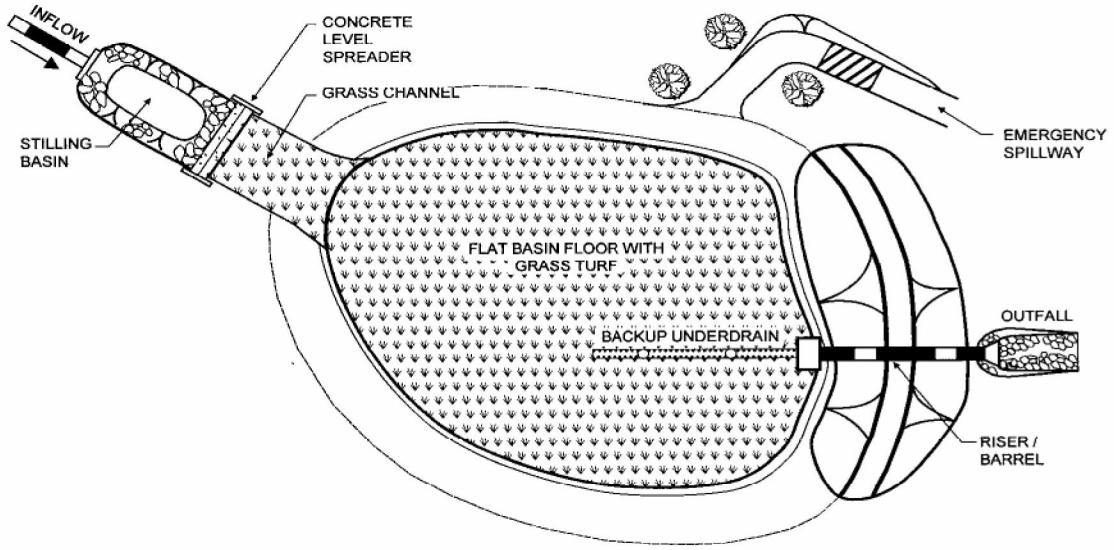

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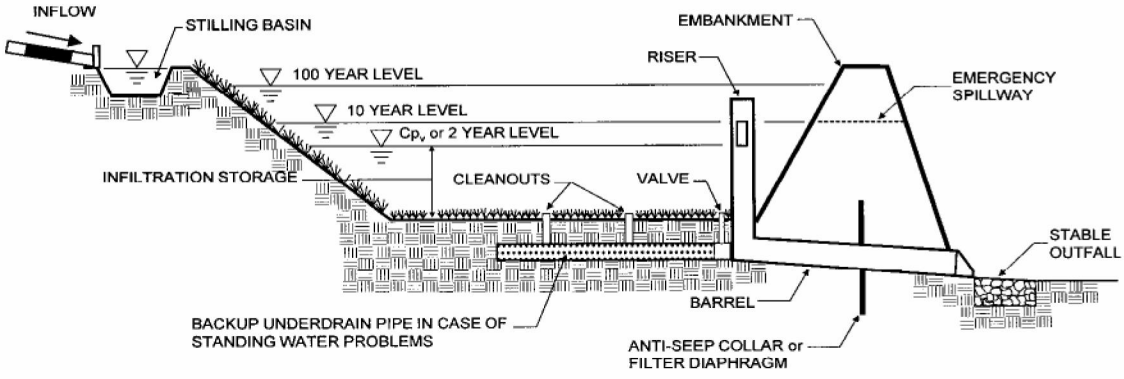

PROFILE

Hydrology Analysis
Tract Map No. 31194
Tank Site
Golden Meadows

Prepared for

Richland Communities, Inc.






June 2021

Hunsaker & Associates

SUPPLEMENTAL HYDROLOGY ANALYSIS
FOR THE "GOLDEN MEADOWS" DEVELOPMENT
TRACT 31194 EMWD TANK SITE

PREPARED FOR

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PREPARED UNDER THE SUPERVISION OF BRIAN R. LOWELL, R.C.E. 74550
JUNE 2021

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SECTION 1 - Project Description

Introduction

The purpose of this report is to present the backup hydrology that will be used for the final engineering and design of the potable water tank site of the 'Golden Meadows' project. Furthermore, this report is supplemental to the previous overall "Hydrology Study for Tract 31194" prepared by Hunsaker & Associates in May 2021. Please refer to the underlying overall report for Tract 31194 for analysis pertaining to mitigation and basin sizing.

Project Description

The proposed tank site is located on a 9.0 acre portion of the larger 206.8 acre residential development, Tract 31194, known as "Golden Meadows". The proposed project site is located within the San Jacinto watershed portion Santa Ana River, within the City of Menifee, in the County of Riverside, California. The project site is bounded by Daniel Roan to the north, Ascot Way to the east, Wickerd Road to the south and Evans Road to the west (see included vicinity map).

Existing Conditions

The site is currently in a natural condition, containing grasses and brush. Topographically, the site is generally hilly, with a mild slope toward the northwest. Site topographic relief is on the order of 300 feet. The lowest elevation of approximately 1,500 feet above mean sea level (msl) is located in the northwest corner of the site. The highest elevation of approximately 1,800 feet (msl) is located along the westerly property line. The existing drainage pattern divides the site into three distinct drainage areas, DMA 'A', 'B' and 'C'. DMA 'A' consists of the eastern most portion of the site, approximately 174.9 acres and drains northwesterly. DMA 'B' consists of the western most portion of the site, approximately 35.1 acres and drains northerly. DMA 'C' consists of the southeast corner of the site and is approximately 18.6 acres and drains south easterly. All three drainage areas generally drain as sheet flow or in small natural gullies directly into natural creeks throughout the site.

Proposed Drainage Facilities

The underlying residential development, Tract 31194, divides the site into eight on and off-site drainage areas, 'A' through 'H'. The proposed Eastern Municipal Water Tank facility is situated on 9.0 acres within Drainage Management Area 'A' (DMA 'A'). This analysis will focus on only the facilities associated with the development of the tank site. Run-off from the site will be collected by catch basin which are connected to a municipal storm drain system within the tank site pad and access road, flowing south and westerly. Ultimately connecting to the municipal storm drain with in 'T' street and outletting into the proposed extended detention basin 'A' located in the northwesterly most corner of the overall project.

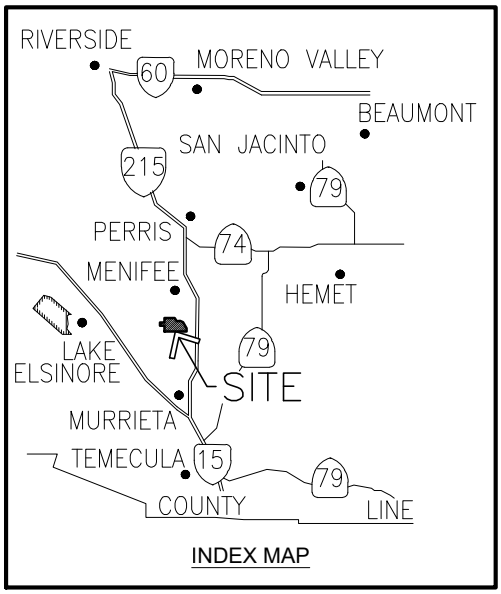
The backbone facilities have been designed to convey the 100-year storm event (see previous master drainage study), therefore we have analyzed the proposed improvements associated with the tank site based on the developed conditions for the 2-year, 10-year, and 100-year storm events. RCFC&WCD rational method was utilized to determine developed flow rates.

Methodology

This hydrology report is to be used only to analyze flow to, through and out of the site using the Riverside County Rational Method. In regard to pipe sizing, the hydrology programs were utilized only as a tool for obtaining preliminary sizing of the storm drain facilities by allowing the program to determine minimum pipe sizes. The actual storm drain system and pipe sizes shall be designed per Riverside County Flood Control District criteria. Civil Design Version 7.0 Computer Software Program and AES Engineering Software 2011 version were used in generating the hydrological and hydraulic analysis for this report.

Conclusion

Based upon the results of this report, it is concluded that drainage facilities discussed above will adequately protect the site area from flood damage associated with the 100-year storm event. The proposed facilities, with ultimate development and adequate maintenance, will convey flows safely through the site area in accordance with Riverside County requirements.



INDEX MAP

RAILROAD CANYON ROAD

NEWPORT ROAD

MURRIETA ROAD

EVANS ROAD

SITE

MENIFEE ROAD

215

GARBANI ROAD

WICKERD ROAD

SCOTT ROAD

15

N

W HUNSAKER E

S

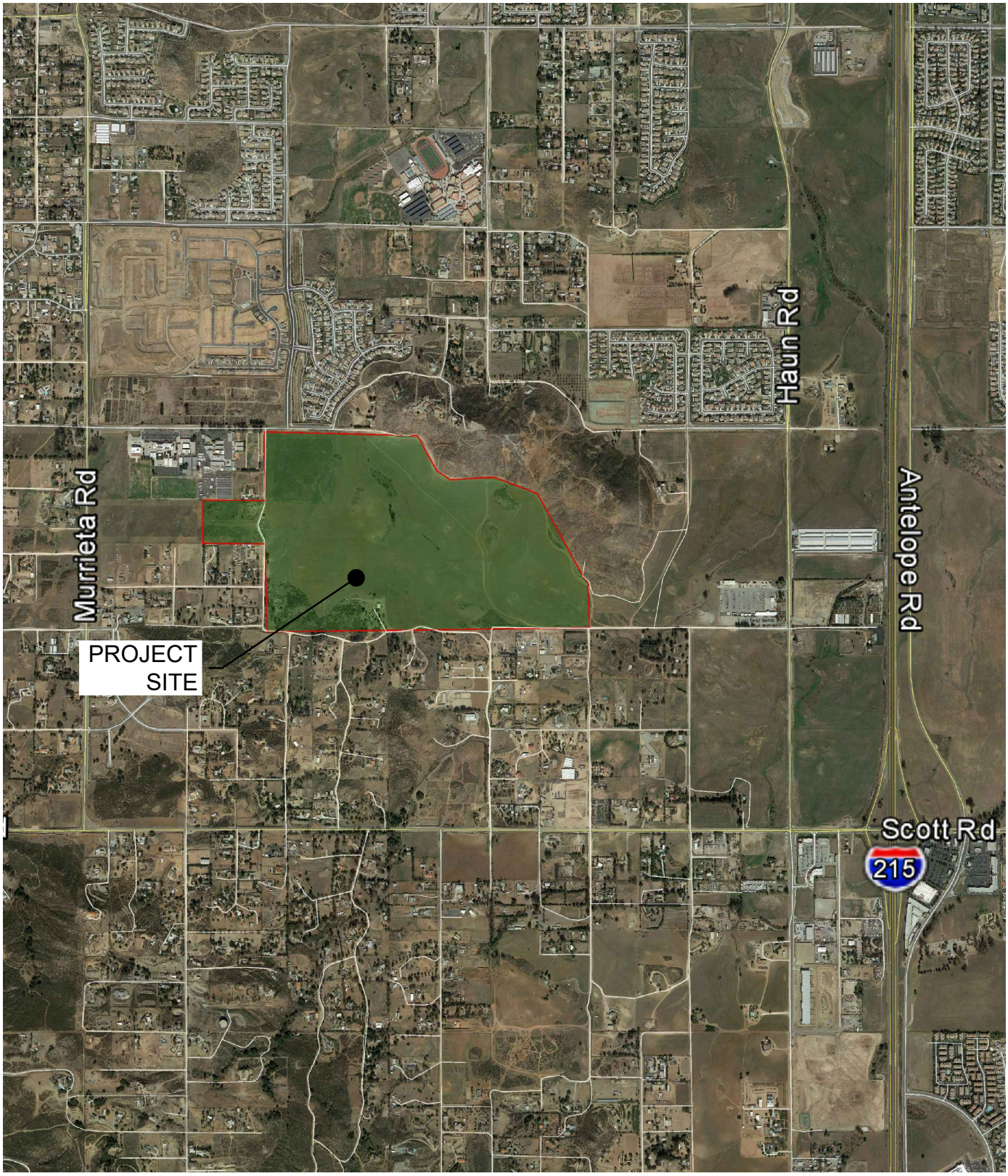
NOT TO SCALE

HUNSAKER & ASSOCIATES
IRVINE, INC
INLAND EMPIRE REGION
2900 ADAMS STREET, SUITE A-15
RIVERSIDE CA 92504 (951)352-7200
PLANNING/ENGINEERING/SURVEYING/GOVERNMENT RELATIONS

FIGURE 1: VICINITY MAP

THOMAS BROTHERS MAPS:
PAGE 868, GRID B-6, B-7, C-6, C-7, D-6 & D-7

H:\00546\Engineering\Hydrology\Parts\Maps\00546-Vicinity-Fig-1.dwg



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PLANNING/ENGINEERING/SURVEYING/GOVERNMENT RELATIONS

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W HUNSAKER E
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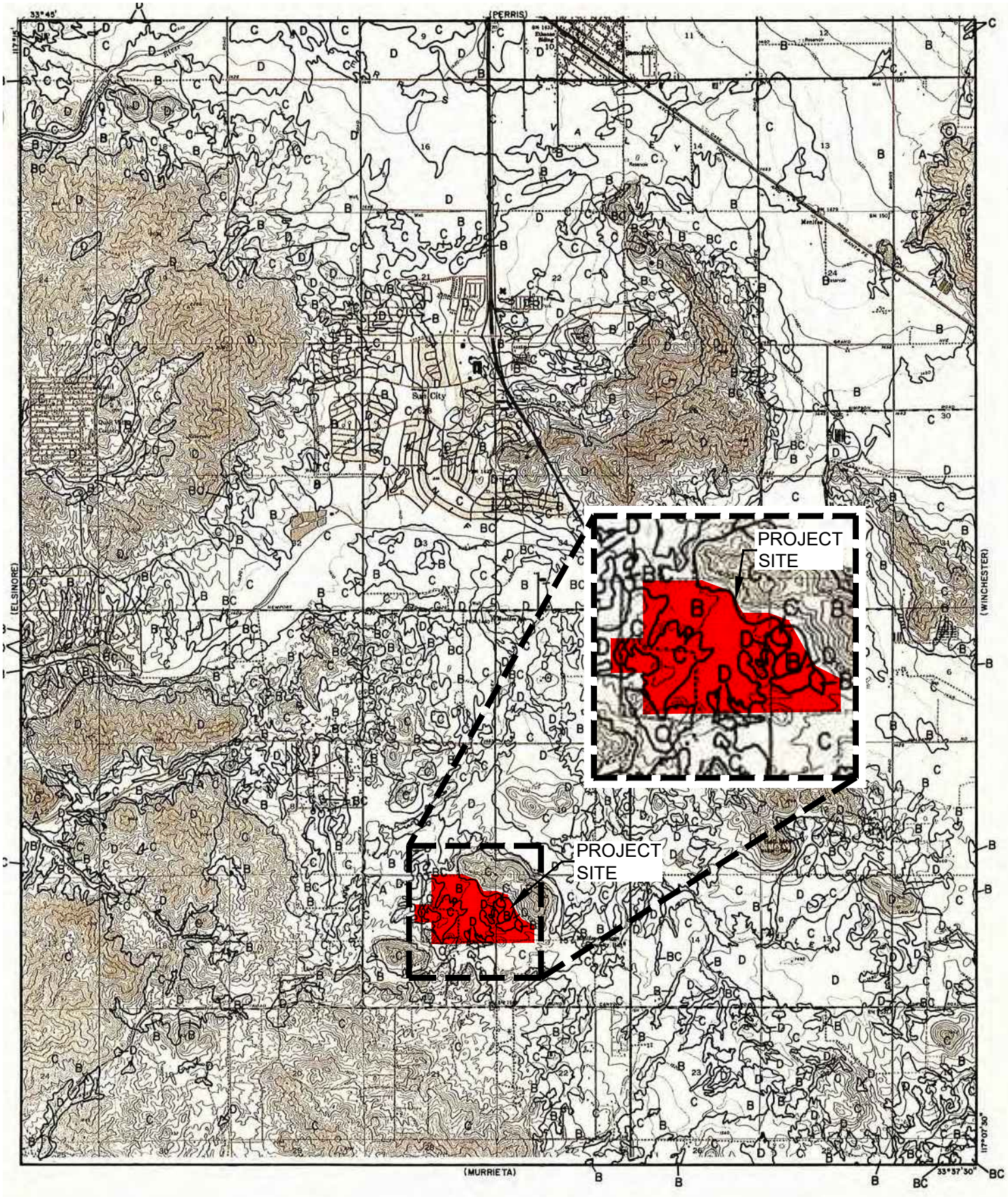
FIGURE 2: AERIAL PHOTOGRAPH

H:\00546\Engineering\Hydrology\Parts\00546-Vicinity-Fig-2-Aerial.dwg

SECTION 2 - Riverside County Flood Control Data

Hydrologic Soils Group Map

Precipitation Intensity Data



LEGEND

—— SOILS GROUP BOUNDARY

A SOILS GROUP DESIGNATION

RCFC & WCD

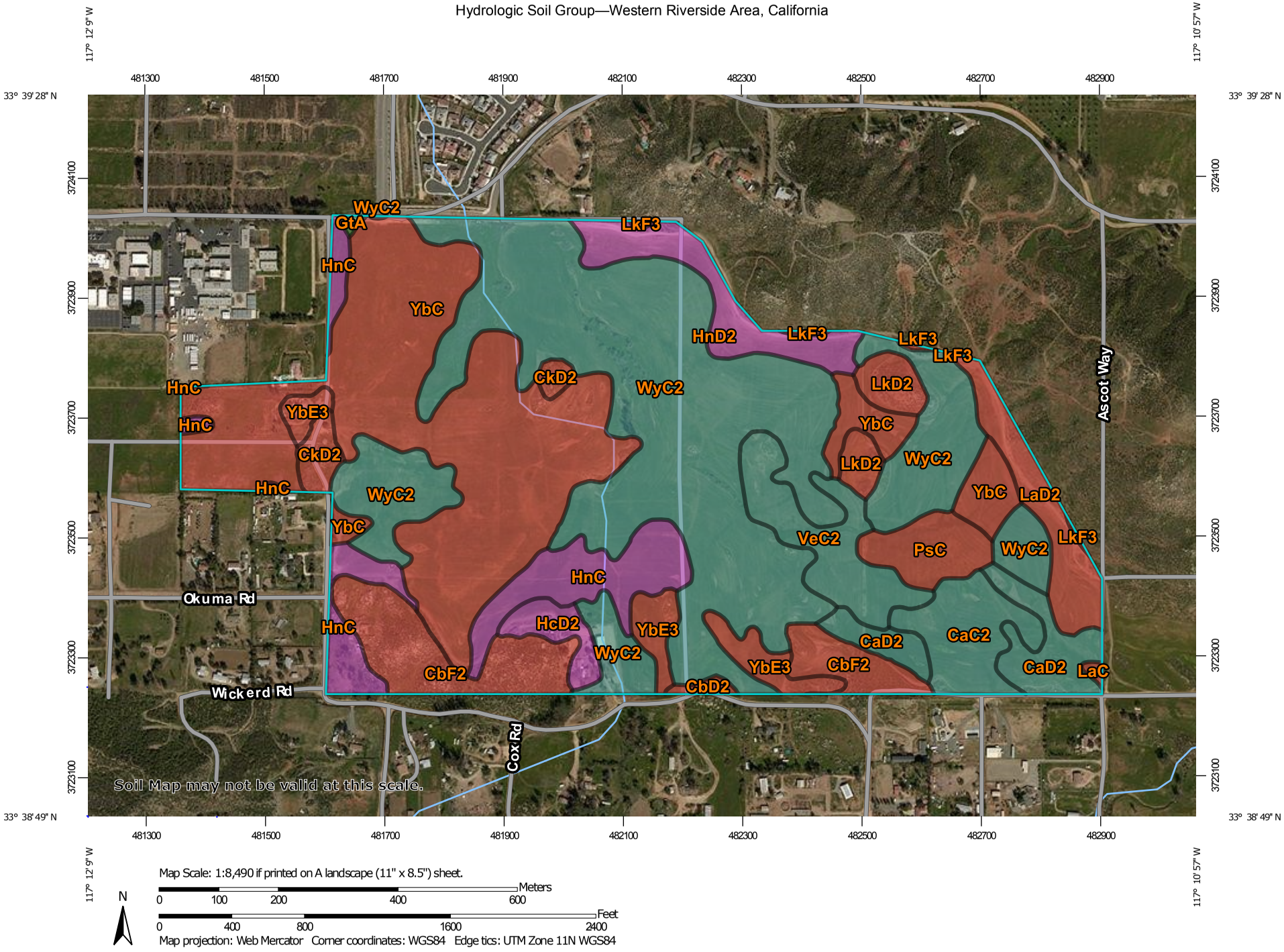
HYDROLOGY MANUAL

N

0 FEET 5000

HYDROLOGIC SOILS GROUP MAP FOR ROMOLAND

PLATE C-I.42



Map Scale: 1:8,490 if printed on A landscape (11" x 8.5") sheet.

N

Meters: 0 100 200 400 600

Feet: 0 400 800 1600 2400

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 11N WGS84

MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Rating Polygons

A

A/D

B

B/D

C

C/D

D

Not rated or not available

Soil Rating Lines

A

A/D

B

B/D

C

C/D

D

Not rated or not available

Soil Rating Points

A

A/D

B

B/D

C

C/D

D

Not rated or not available

Water Features

Streams and Canals

Transportation

Rails

Interstate Highways

US Routes

Major Roads

Local Roads

Background

Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:15,800.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Western Riverside Area, California
Survey Area Data: Version 11, Sep 12, 2018

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Feb 24, 2015—Feb 26, 2015

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
CaC2	Cajalco fine sandy loam, 2 to 8 percent slopes, eroded	C	7.5	3.3%
CaD2	Cajalco fine sandy loam, 8 to 15 percent slopes, eroded	C	7.3	3.3%
CbD2	Cajalco rocky fine sandy loam, 5 to 15 percent slopes, eroded	D	0.6	0.3%
CbF2	Cajalco rocky fine sandy loam, 15 to 50 percent slopes, eroded	D	13.6	6.1%
CkD2	Cieneba rocky sandy loam, 8 to 15 percent slopes, eroded	D	2.5	1.1%
GtA	Grangeville fine sandy loam, drained, 0 to 2 percent sl opes	A/D	0.2	0.1%
HcD2	Hanford coarse sandy loam, 8 to 15 percent slopes, eroded	A	2.8	1.2%
HnC	Honcut sandy loam, 2 to 8 percent slopes	A	13.6	6.1%
HnD2	Honcut sandy loam, 8 to 15 percent slopes, eroded	A	7.6	3.4%
LaC	Las Posas loam, 2 to 8 percent slopes	D	0.2	0.1%
LaD2	Las Posas loam, 8 to 15 percent slopes, eroded	D	6.7	3.0%
LkD2	Las Posas rocky loam, 8 to 15 percent slopes, eroded	D	3.8	1.7%
LkF3	Las Posas rocky loam, 15 to 50 percent slopes, severely eroded	D	0.4	0.2%
PsC	Porterville clay, moderately deep, 2 to 8 percent slopes	D	4.8	2.2%
VeC2	Vallecitos loam, thick solum variant, 2 to 8 percent slopes, eroded	C	9.1	4.1%

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
WyC2	Wyman loam, 2 to 8 percent slopes, eroded	C	79.8	35.7%
YbC	Yokohl loam, 2 to 8 percent slopes	D	57.0	25.5%
YbE3	Yokohl loam, 8 to 25 percent slopes, severely eroded	D	5.9	2.6%
Totals for Area of Interest			**223.4**	**100.0%**

Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

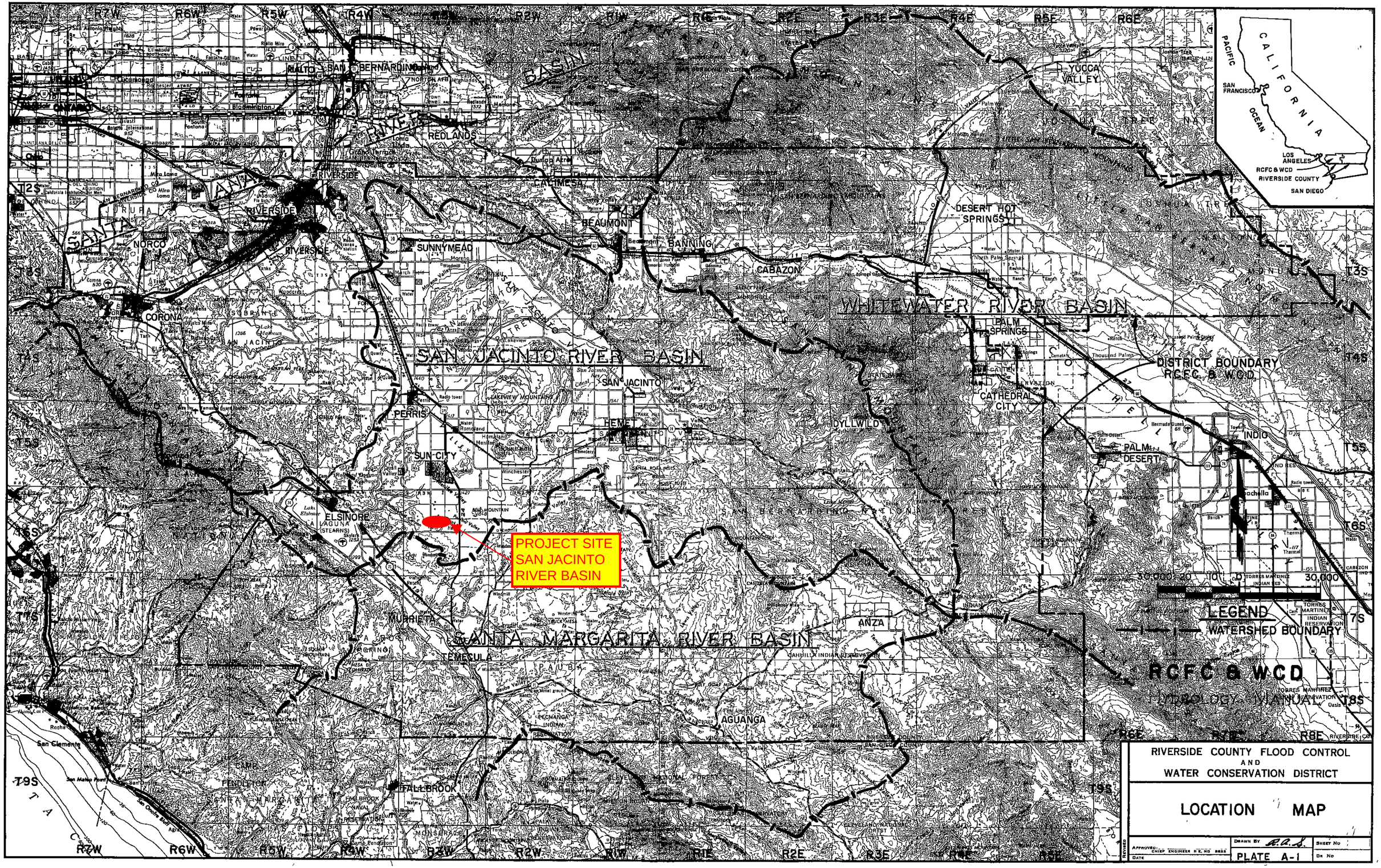
If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher


R7W
R6W
R5W
R4W
R3W
R2W
R1W
R1E
R2E
R3E
R4E
R5E
R6E
T2S
T3S
T4S
T5S
T6S
T7S
T8S
T9S
SANTA ANA RIVER BASIN
SAN JACINTO RIVER BASIN
SANTA MARGARITA RIVER BASIN
WHITEWATER RIVER BASIN
RIALTO
SAN BERNARDINO
REDLANDS
YUCCA VALLEY
RIVERSIDE
CRESTMORE
CALIMESA
BEAUMONT
DESERT HOT SPRINGS
NORCO
SUNNYMEAD
BANNING
CABAZON
CORONA
PALM SPRINGS
CATHEDRAL CITY
DISTRICT BOUNDARY
RCFC & WCD
SAN JACINTO
PERRIS
HEMET
IDYLLWILD
INDIO
SUN CITY
PALM DESERT
ELSINORE
LAGUNA
(STEARNS)
MURRIETA
TEMECULA
ANZA
AGUANGA
FALLBROOK
PENDLETON
CAMP
San Clemente
San Mateo Point
PROJECT SITE
SAN JACINTO
RIVER BASIN
CALIFORNIA
PACIFIC
OCEAN
SAN FRANCISCO
LOS ANGELES
RCFC & WCD
RIVERSIDE COUNTY
SAN DIEGO
30,000 0 10 20 30,000
LEGEND
WATERSHED BOUNDARY
RCFC & WCD
HYDROLOGY MANUAL
RIVERSIDE COUNTY FLOOD CONTROL
AND
WATER CONSERVATION DISTRICT
LOCATION MAP
DRAWN BY A.A.S.
SHEET NO
PLATE A-1
APPROVED: CHIEF ENGINEER R.E. NO 6855
DATE
DR NO
Revised

PROJECT SITE
SLOPE=0.53

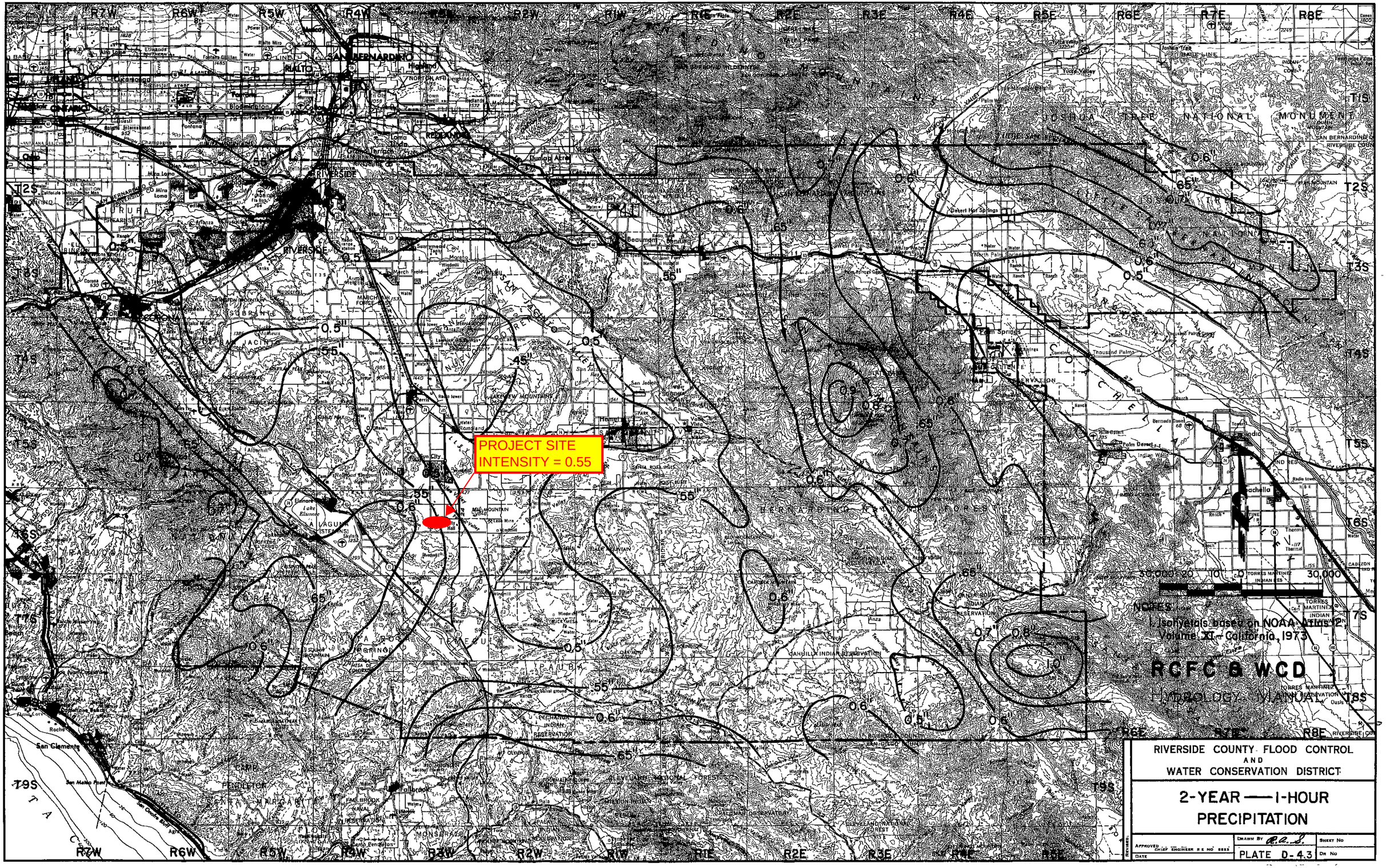
NOTES:
1. Slope of Intensity-Duration Curve based on District analysis of automatic recording rain gage records

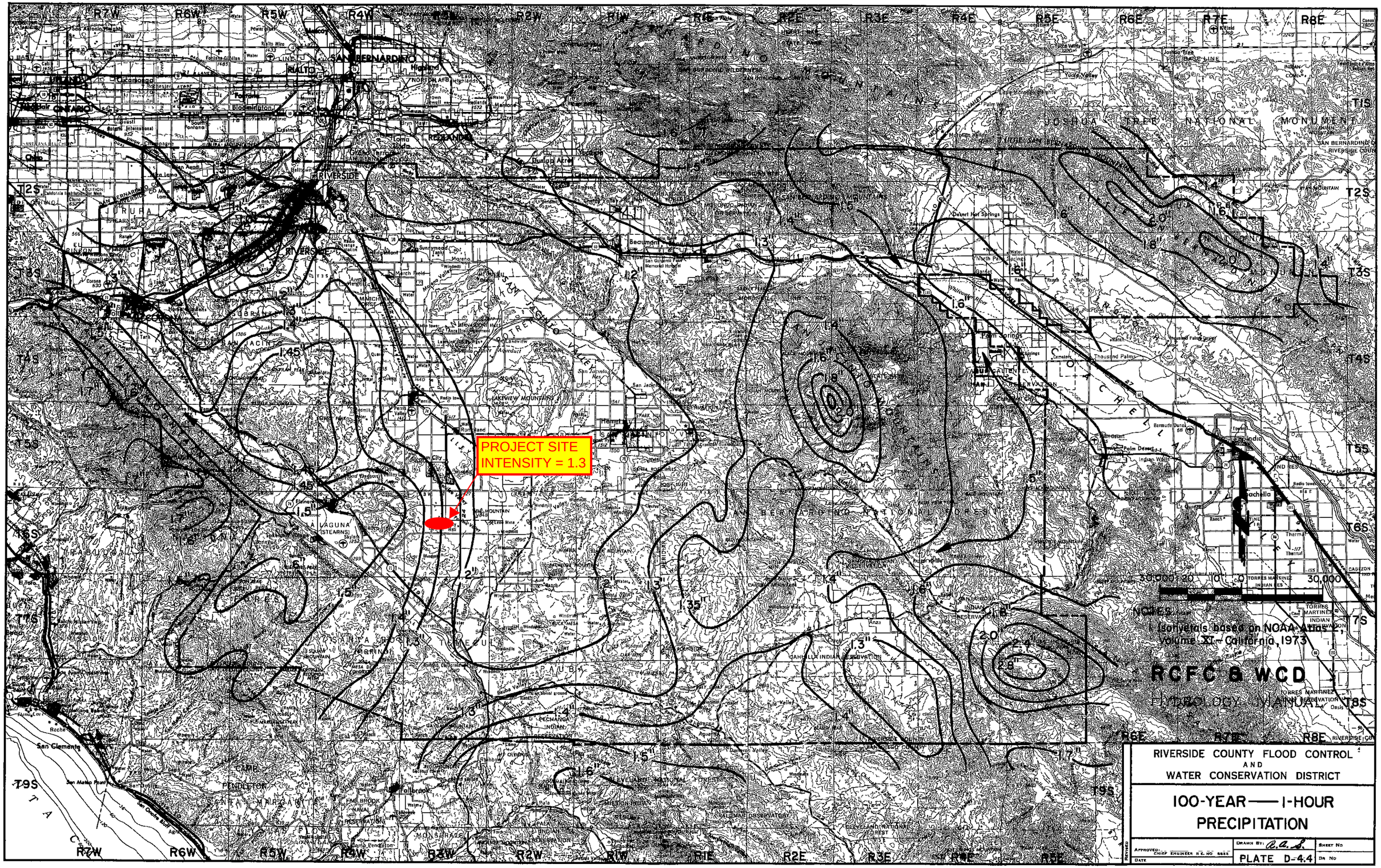
RCFC & WCD
HYDROLOGY MANUAL

RIVERSIDE COUNTY FLOOD CONTROL
AND
WATER CONSERVATION DISTRICT

SLOPE OF INTENSITY DURATION CURVE

APPROVED CHIEF ENGINEER R.E. NO. 8824	DRAWN BY R.A.S.	SHEET NO
DATE	PLATE D-4.6	DR NO


PROJECT SITE
INTENSITY = 0.55
R7W
R6W
R5W
R4W
R3W
R2W
R1W
R1E
R2E
R3E
R4E
R5E
R6E
R7E
R8E
T2S
T3S
T4S
T5S
T6S
T7S
T8S
T9S
SAN BERNARDINO
RIVERSIDE
RIALTO
COLTON
REDLANDS
SAN JACINTO
HEMET
BANNING
BEAUMONT
PALM SPRINGS
Desert Hot Springs
Cabazon
Indio
JOSHUA TREE NATIONAL MONUMENT
SAN BERNARDINO COUNTY
RIVERSIDE COUNTY
SAN JACINTO MOUNTAINS
SAN GABRIEL MOUNTAINS
SAN JACINTO FAULT
SAN ANDREAS FAULT
SAN JACINTO VALLEY
SAN TIMOTEO CANYON
SAN GORGONIO PASS
MORONGO INDIAN RESERVATION
AGUA CALIENTE INDIAN RESERVATION
SOBOBA INDIAN RESERVATION
TORRES MARTINEZ INDIAN RESERVATION
CAHUILLA INDIAN RESERVATION
CLEVELAND NATIONAL FOREST
CAMP PENDLETON
SANTA MARGARITA
SAN MATEO POINT
SAN CLEMENTE
0.5"
0.6"
0.7"
0.8"
0.9"
1"
45"
55"
65"
30,000
0
30,000
NOTES
Isohyetals based on NOAA Atlas 2, Volume XI - California, 1973
RCFC & WCD
HYDROLOGY MANUAL
RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT
2-YEAR — 1-HOUR PRECIPITATION
APPROVED
CHIEF ENGINEER R.E. NO. 8882
DATE
DRAWN BY R.A.S.
SHEET NO
PLATE D-4.3
DR NO
REVISED


PROJECT SITE
INTENSITY = 1.3
NOTES:
1. Isohyetals based on NOAA Atlas 2, Volume XI - California, 1973
RCFC & WCD
HYDROLOGY MANUAL
RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT
100-YEAR — 1-HOUR PRECIPITATION
PLATE D-4.4
SAN BERNARDINO
RIVERSIDE
JOSHUA TREE NATIONAL MONUMENT
SAN JACINTO MOUNTAINS
SAN BERNARDINO NATIONAL FOREST
CLEVELAND NATIONAL FOREST
SANTA ROSA PLATEAU
SAN JACINTO WILDERNESS
LAKEVIEW MOUNTAINS
PERRIS VALLEY
SAN JACINTO VALLEY
SANTA ANA RIVER
SAN JACINTO FAULT
SAN ANDREAS FAULT
SOUTH FORK
SAN JACINTO RIVER
SANTA ANA MOUNTAINS
SAN JACINTO MOUNTAINS
SAN GORGONIO MOUNTAIN
SAN GORGONIO PASS
COACHELLA VALLEY
MARCH AFB
NORTON AFB
CAMP PENDLETON
MARINE CORPS BASE
TWENTYNINE PALMS
SAN CLEMENTE
SAN MATEO POINT
SAN ONOFRE BLUFF
MORONGO INDIAN RESERVATION
SOBOBA INDIAN RESERVATION
AGUANGA INDIAN RESERVATION
PECHANGA INDIAN RESERVATION
TORRES MARTINEZ INDIAN RESERVATION
SANTA ROSA INDIAN RESERVATION
AGUA CALIENTE INDIAN RESERVATION
CABAZON INDIAN RESERVATION
SAN MANUEL INDIAN RESERVATION
SAN TIMOTEO CANYON
SAN GABRIEL MOUNTAINS
SAN GABRIEL RIVER
SAN GABRIEL WILDERNESS
SAN GABRIEL FAULT
SAN GABRIEL RESERVOIR
SAN GABRIEL VALLEY

PROJECT SITE
INTENSITY = 0.85

Notes:
Isohyetals based on NOAA Atlas 2
Volume XI - California, 1973.

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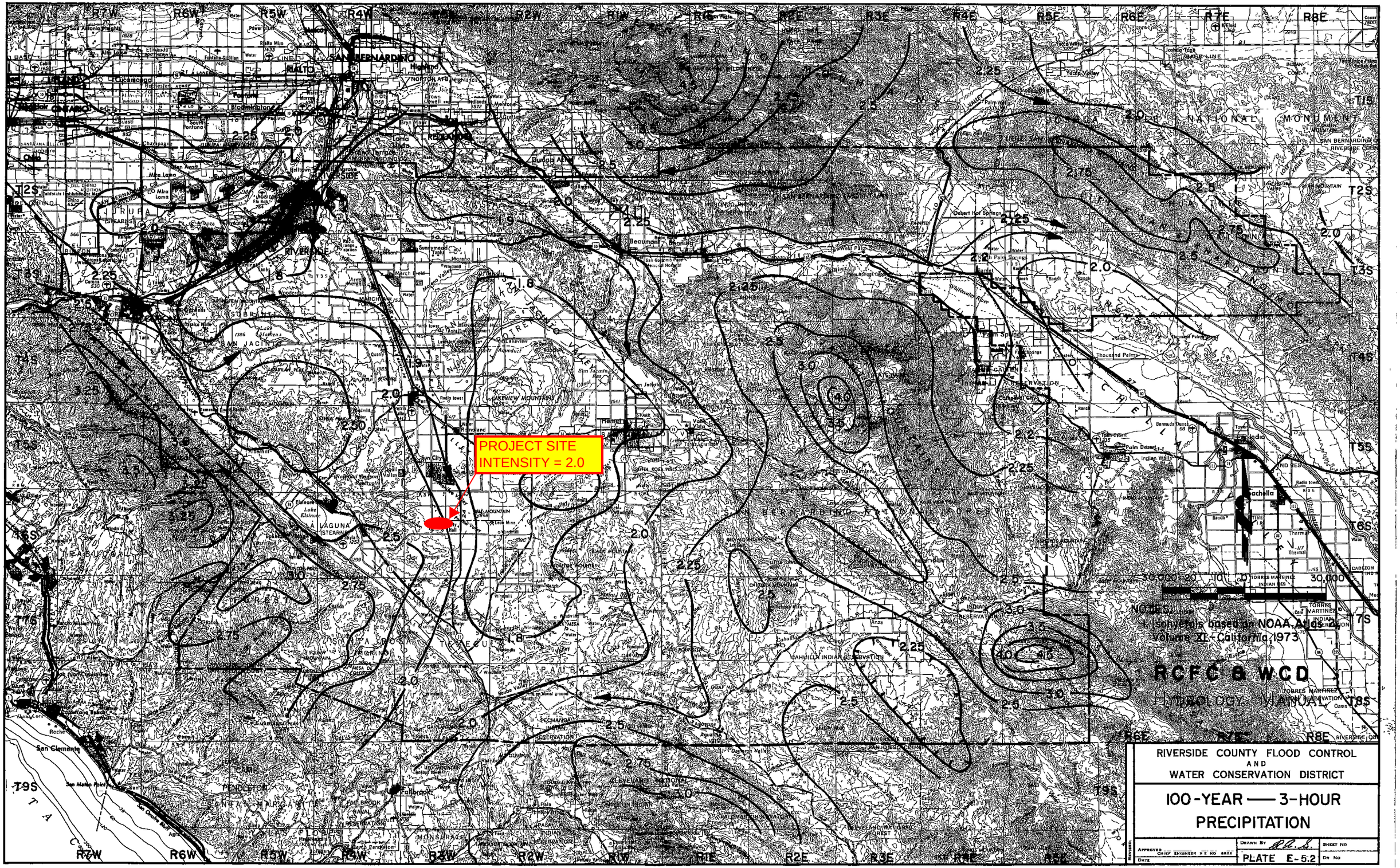
RIVERSIDE COUNTY FLOOD CONTROL
AND
WATER CONSERVATION DISTRICT

2-YEAR — 3-HOUR
PRECIPITATION

APPROVED CHIEF ENGINEER R.E. NO. 6825	DRAWN BY R.A.S.	SHEET NO
DATE	PLATE E-5.1	DR NO


PROJECT SITE
INTENSITY = 2.0
NOTES:
1. Isohyetals based on NOAA Atlas 2
Volume XI - California, 1973
RCFC & WCD
HYDROLOGY MANUAL
RIVERSIDE COUNTY FLOOD CONTROL
AND
WATER CONSERVATION DISTRICT
100-YEAR — 3-HOUR
PRECIPITATION
PLATE E-5.2

PROJECT SITE
INTENSITY = 1.2

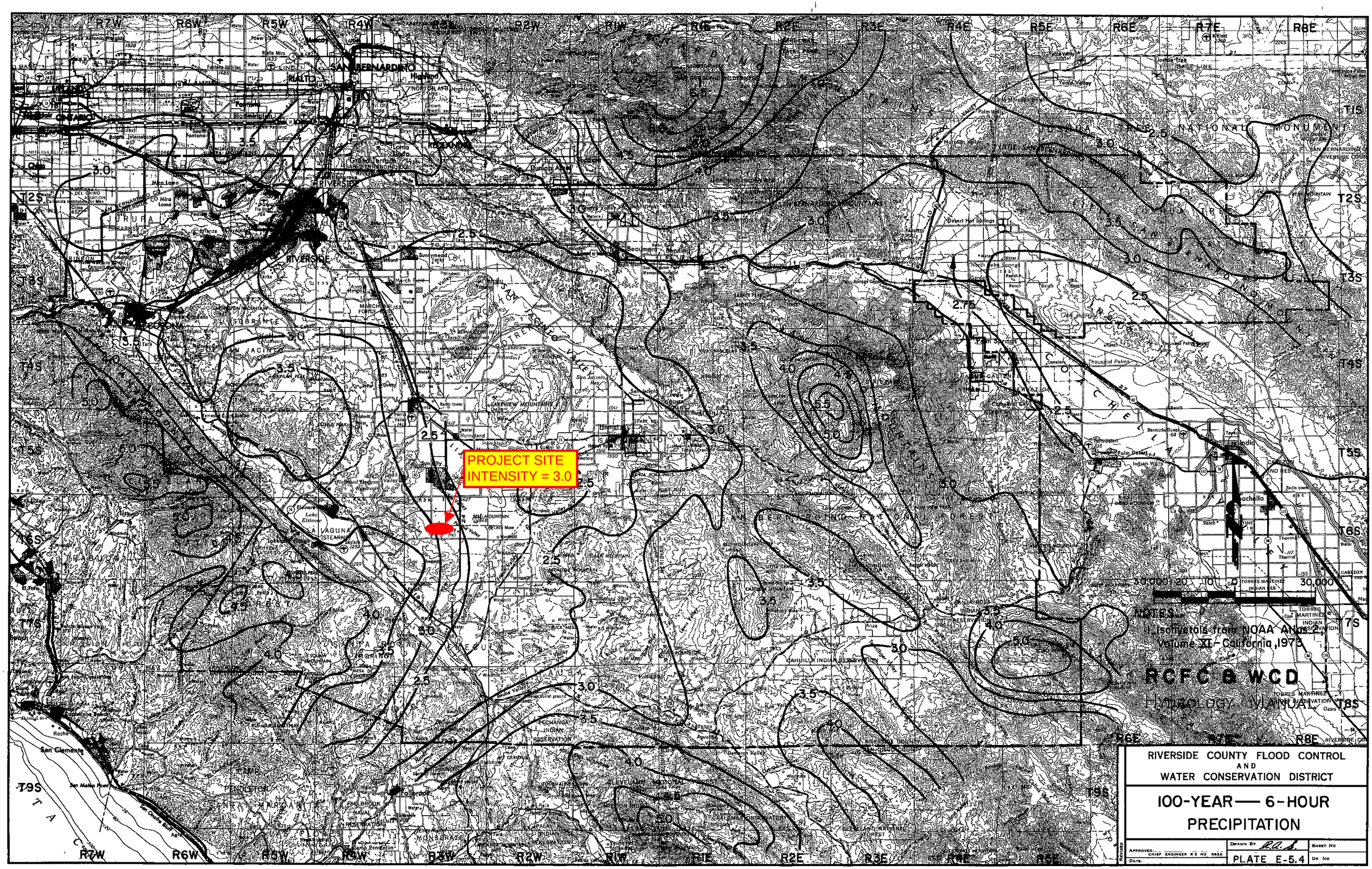
NOTES
1. Isohyetals from NOAA Atlas 2, Volume XI - California, 1973

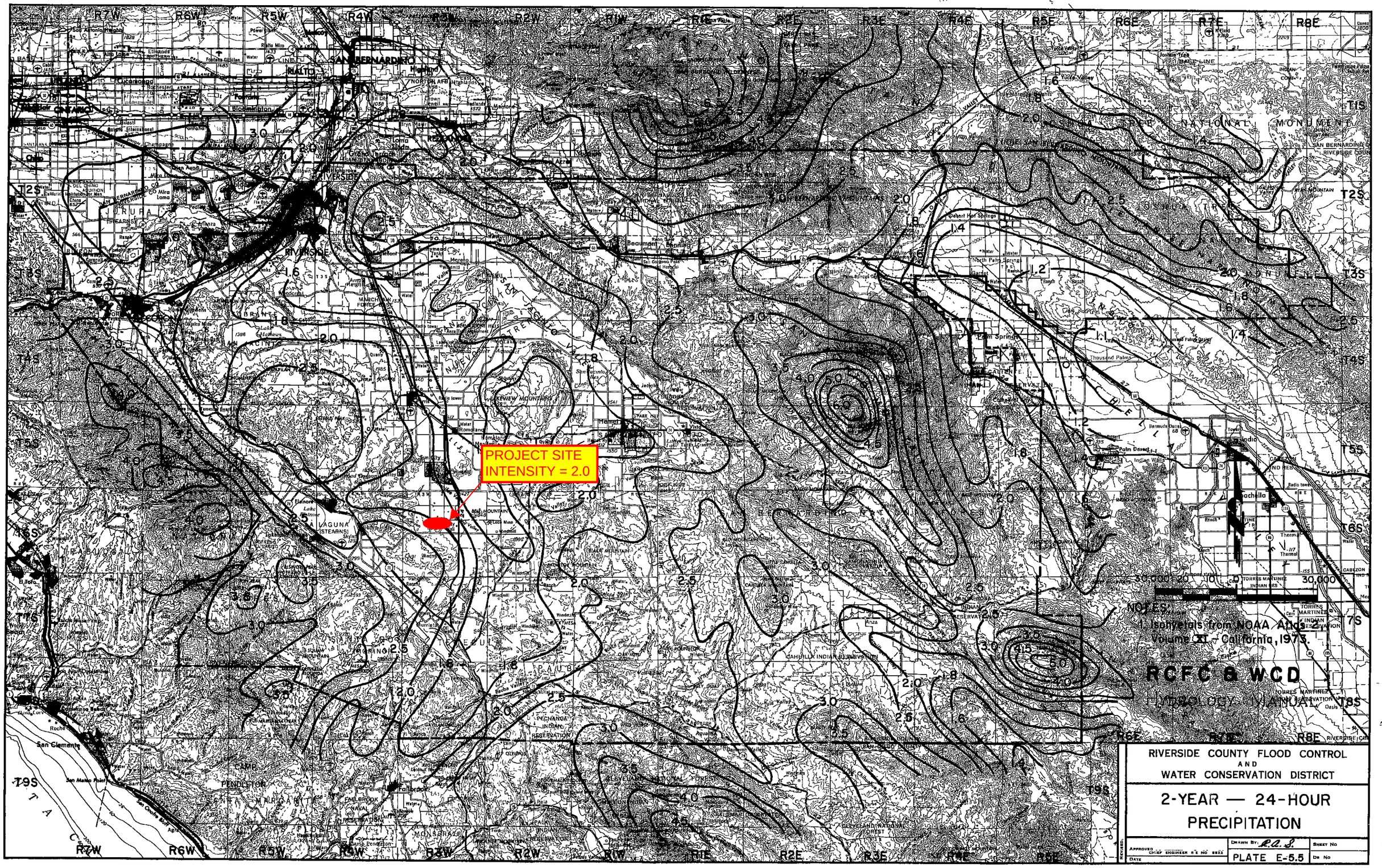
RCFC & WCD
HYDROLOGY MANUAL

RIVERSIDE COUNTY FLOOD CONTROL
AND
WATER CONSERVATION DISTRICT

2-YEAR — 6-HOUR
PRECIPITATION

APPROVED CHIEF ENGINEER R.E. NO. 6822	DRAWN BY:	SHEET NO
DATE	PLATE E-5.3	DR NO


PROJECT SITE
INTENSITY = 3.0
Isohyetals from NOAA Atlas 2,
Volume XI - California, 1973
RCFC & WCD
HYDROLOGY MANUAL
RIVERSIDE COUNTY FLOOD CONTROL
AND
WATER CONSERVATION DISTRICT
100-YEAR — 6-HOUR
PRECIPITATION
PLATE E-5.4

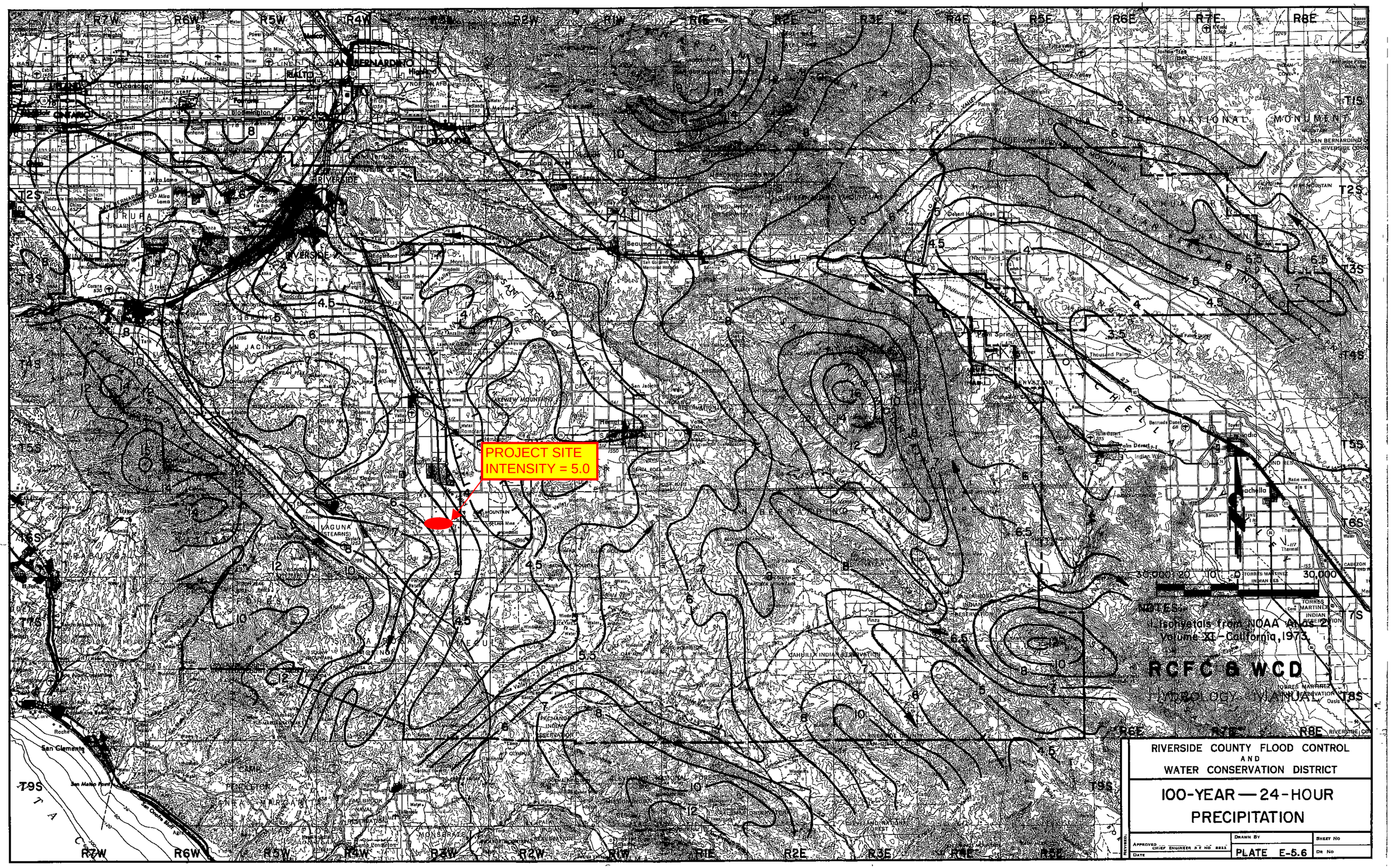


RIVERSIDE COUNTY FLOOD CONTROL
AND
WATER CONSERVATION DISTRICT

2-YEAR — 24-HOUR PRECIPITATION

APPROVED CHIEF ENGINEER R.E. NO. 8822	DRAWN BY: R.C.S.	SHEET NO
DATE	PLATE E-5.5	DR NO

REVISED


PROJECT SITE
INTENSITY = 5.0
Isohyetals from NOAA Atlas 2
Volume XI - California, 1973
RCFC & WCD
HYDROLOGY MANUAL
RIVERSIDE COUNTY FLOOD CONTROL
AND
WATER CONSERVATION DISTRICT
100-YEAR — 24-HOUR
PRECIPITATION
PLATE E-5.6
SHEET NO
DR NO
DRAWN BY
APPROVED CHIEF ENGINEER R.C.F.C. & W.C.D.
DATE
REVISED

SECTION 3 - Hydrology Calculations

Drainage Management Area 'A'

- 2, 10 & 100 Year Proposed Development Rational Method

Area A

- **Area 'A' – 2 Year Proposed Condition – Rational Method**

```
                Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2014 Version 9.0
        Rational Hydrology Study        Date: 06/02/21  File:PR002.out
------------------------------------------------------------------------
TRACT 31194 - 'GOLDEN MEADOWS' SUPPLEMENTAL HYDROLOGY STUDY – TANK SITE
DEVELOPED CONDITION RATIONAL METHOD - 2 YEAR STORM
HUNSAKER & ASSOCIATES, JUNE 2021
BY: BRIAN LOWELL, PE
------------------------------------------------------------------------
 *********   Hydrology Study Control Information **********

 English (in-lb) Units used in input data file

------------------------------------------------------------------------


Program License Serial Number 6407

------------------------------------------------------------------------
Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) =    2.00 Antecedent Moisture Condition = 1

2 year, 1 hour precipitation =  0.550(In.)
100 year, 1 hour precipitation =  1.300(In.)

Storm event year =   2.0
Calculated rainfall intensity data:
1 hour intensity =  0.550(In/Hr)
Slope of intensity duration curve = 0.5300




++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      900.000 to Point/Station      901.000
**** INITIAL AREA EVALUATION ****
________________________________________________________________________
Initial area flow distance =   183.000(Ft.)
Top (of initial area) elevation =  1717.700(Ft.)
Bottom (of initial area) elevation =  1659.000(Ft.)
Difference in elevation =    58.700(Ft.)
Slope =    0.32077  s(percent)=      32.08
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    5.346 min.
Rainfall intensity =      1.981(In/Hr) for a     2.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.626
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 1)  =  60.60
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =      1.414(CFS)
Total initial stream area =        1.140(Ac.)
Pervious area fraction = 1.000


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      900.000 to Point/Station      901.000
**** CONFLUENCE OF MINOR STREAMS ****
________________________________________________________________________
Along Main Stream number: 1 in normal stream number 1
Stream flow area =      1.140(Ac.)
Runoff from this stream =      1.414(CFS)
```

```
Time of concentration =    5.35 min.
Rainfall intensity =     1.981(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      902.000 to Point/Station      901.000
**** INITIAL AREA EVALUATION ****
------------------------------------------------------------------------------
Initial area flow distance =   183.000(Ft.)
Top (of initial area) elevation =  1660.000(Ft.)
Bottom (of initial area) elevation =  1659.000(Ft.)
Difference in elevation =     1.000(Ft.)
Slope =    0.00546  s(percent)=       0.55
TC = k(0.300)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    6.833 min.
Rainfall intensity =      1.740(In/Hr) for a     2.0 year storm
COMMERCIAL subarea type
Runoff Coefficient = 0.848
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 1)  =  36.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Initial subarea runoff =      0.634(CFS)
Total initial stream area =        0.430(Ac.)
Pervious area fraction = 0.100


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      902.000 to Point/Station      901.000
**** CONFLUENCE OF MINOR STREAMS ****
------------------------------------------------------------------------------
Along Main Stream number: 1 in normal stream number 2
Stream flow area =      0.430(Ac.)
Runoff from this stream =      0.634(CFS)
Time of concentration =    6.83 min.
Rainfall intensity =     1.740(In/Hr)
Summary of stream data:

Stream   Flow rate      TC            Rainfall Intensity
 No.       (CFS)       (min)                (In/Hr)


1        1.414      5.35                1.981
2        0.634      6.83                1.740
Largest stream flow has longer or shorter time of concentration
Qp =      1.414 + sum of
          Qa          Tb/Ta
           0.634 *    0.782 =      0.496
Qp =      1.910

Total of 2 streams to confluence:
Flow rates before confluence point:
       1.414       0.634
Area of streams before confluence:
        1.140        0.430
Results of confluence:
Total flow rate =      1.910(CFS)
Time of concentration =     5.346 min.
Effective stream area after confluence =      1.570(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      901.000 to Point/Station      903.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------------
Upstream point/station elevation =  1653.000(Ft.)
Downstream point/station elevation =  1651.000(Ft.)
Pipe length  =   165.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     1.910(CFS)
```

```
Nearest computed pipe diameter  =     12.00(In.)
Calculated individual pipe flow  =     1.910(CFS)
Normal flow depth in pipe =    5.91(In.)
Flow top width inside pipe =   12.00(In.)
Critical Depth =    7.07(In.)
Pipe flow velocity =      4.96(Ft/s)
Travel time through pipe =    0.55 min.
Time of concentration (TC) =     5.90 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      901.000 to Point/Station      903.000
**** CONFLUENCE OF MINOR STREAMS ****
------------------------------------------------------------------------------
Along Main Stream number: 1 in normal stream number 1
Stream flow area =      1.570(Ac.)
Runoff from this stream =      1.910(CFS)
Time of concentration =    5.90 min.
Rainfall intensity =     1.880(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      902.000 to Point/Station      904.000
**** INITIAL AREA EVALUATION ****
------------------------------------------------------------------------------
Initial area flow distance =   140.000(Ft.)
Top (of initial area) elevation =  1660.000(Ft.)
Bottom (of initial area) elevation =  1659.100(Ft.)
Difference in elevation =     0.900(Ft.)
Slope =    0.00643  s(percent)=       0.64
TC = k(0.300)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    5.942 min.
Rainfall intensity =      1.873(In/Hr) for a     2.0 year storm
COMMERCIAL subarea type
Runoff Coefficient = 0.850
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 1)  =  36.00
Pervious area fraction =  0.100; Impervious fraction =  0.900
Initial subarea runoff =      1.051(CFS)
Total initial stream area =        0.660(Ac.)
Pervious area fraction = 0.100


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      904.000 to Point/Station      903.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------------
Upstream point/station elevation =  1651.500(Ft.)
Downstream point/station elevation =  1651.000(Ft.)
Pipe length  =    41.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     1.051(CFS)
Nearest computed pipe diameter  =      9.00(In.)
Calculated individual pipe flow  =     1.051(CFS)
Normal flow depth in pipe =    4.89(In.)
Flow top width inside pipe =    8.97(In.)
Critical Depth =    5.65(In.)
Pipe flow velocity =      4.28(Ft/s)
Travel time through pipe =    0.16 min.
Time of concentration (TC) =     6.10 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      904.000 to Point/Station      903.000
**** CONFLUENCE OF MINOR STREAMS ****
------------------------------------------------------------------------------
Along Main Stream number: 1 in normal stream number 2
Stream flow area =      0.660(Ac.)
Runoff from this stream =      1.051(CFS)
```

```
Time of concentration =    6.10 min.
Rainfall intensity =     1.847(In/Hr)
Summary of stream data:

Stream   Flow rate      TC            Rainfall Intensity
 No.       (CFS)       (min)                (In/Hr)


1        1.910      5.90                1.880
2        1.051      6.10                1.847
Largest stream flow has longer or shorter time of concentration
Qp =      1.910 + sum of
          Qa          Tb/Ta
           1.051 *    0.967 =      1.016
Qp =      2.926

Total of 2 streams to confluence:
Flow rates before confluence point:
       1.910       1.051
Area of streams before confluence:
        1.570        0.660
Results of confluence:
Total flow rate =      2.926(CFS)
Time of concentration =     5.900 min.
Effective stream area after confluence =      2.230(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      903.000 to Point/Station      906.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________________
Upstream point/station elevation =  1651.000(Ft.)
Downstream point/station elevation =  1514.000(Ft.)
Pipe length  =   965.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     2.926(CFS)
Nearest computed pipe diameter  =      9.00(In.)
Calculated individual pipe flow  =     2.926(CFS)
Normal flow depth in pipe =    4.34(In.)
Flow top width inside pipe =    8.99(In.)
Critical depth could not be calculated.
Pipe flow velocity =     13.89(Ft/s)
Travel time through pipe =    1.16 min.
Time of concentration (TC) =     7.06 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      903.000 to Point/Station      906.000
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________________
Along Main Stream number: 1 in normal stream number 1
Stream flow area =      2.230(Ac.)
Runoff from this stream =      2.926(CFS)
Time of concentration =    7.06 min.
Rainfall intensity =     1.710(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      900.000 to Point/Station      906.000
**** INITIAL AREA EVALUATION ****
______________________________________________________________________________
Initial area flow distance =   953.000(Ft.)
Top (of initial area) elevation =  1717.700(Ft.)
Bottom (of initial area) elevation =  1520.000(Ft.)
Difference in elevation =   197.700(Ft.)
Slope =    0.20745  s(percent)=      20.75
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   11.286 min.
Rainfall intensity =      1.333(In/Hr) for a     2.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.545
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 1)  =  60.60
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =      4.487(CFS)
Total initial stream area =        6.170(Ac.)
Pervious area fraction = 1.000


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      906.000 to Point/Station      905.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
----------------------------------------------------------------------
Upstream point/station elevation =  1514.500(Ft.)
Downstream point/station elevation =  1514.000(Ft.)
Pipe length  =    23.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     4.487(CFS)
Nearest computed pipe diameter  =     12.00(In.)
Calculated individual pipe flow  =     4.487(CFS)
Normal flow depth in pipe =    8.53(In.)
Flow top width inside pipe =   10.88(In.)
Critical Depth =   10.62(In.)
Pipe flow velocity =      7.51(Ft/s)
Travel time through pipe =    0.05 min.
Time of concentration (TC) =    11.34 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      906.000 to Point/Station      905.000
**** CONFLUENCE OF MINOR STREAMS ****
----------------------------------------------------------------------
Along Main Stream number: 1 in normal stream number 2
Stream flow area =      6.170(Ac.)
Runoff from this stream =      4.487(CFS)
Time of concentration =   11.34 min.
Rainfall intensity =     1.330(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      907.000 to Point/Station      908.000
**** INITIAL AREA EVALUATION ****
----------------------------------------------------------------------
Initial area flow distance =   508.000(Ft.)
Top (of initial area) elevation =  1528.000(Ft.)
Bottom (of initial area) elevation =  1521.000(Ft.)
Difference in elevation =     7.000(Ft.)
Slope =    0.01378  s(percent)=       1.38
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   15.093 min.
Rainfall intensity =      1.143(In/Hr) for a     2.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.638
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.500
Decimal fraction soil group D = 0.500
RI index for soil(AMC 1)  =  74.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =      0.438(CFS)
Total initial stream area =        0.600(Ac.)
Pervious area fraction = 1.000


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      908.000 to Point/Station      905.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
----------------------------------------------------------------------
Upstream point/station elevation =  1514.500(Ft.)
Downstream point/station elevation =  1514.000(Ft.)
Pipe length  =    23.00(Ft.)   Manning's N = 0.013
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```
No. of pipes = 1  Required pipe flow  =     0.438(CFS)
Nearest computed pipe diameter  =      6.00(In.)
Calculated individual pipe flow  =     0.438(CFS)
Normal flow depth in pipe =    3.11(In.)
Flow top width inside pipe =    6.00(In.)
Critical Depth =    4.05(In.)
Pipe flow velocity =      4.27(Ft/s)
Travel time through pipe =    0.09 min.
Time of concentration (TC) =    15.18 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      908.000 to Point/Station      905.000
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________________
Along Main Stream number: 1 in normal stream number 3
Stream flow area =      0.600(Ac.)
Runoff from this stream =      0.438(CFS)
Time of concentration =   15.18 min.
Rainfall intensity =     1.139(In/Hr)
Summary of stream data:

Stream   Flow rate      TC            Rainfall Intensity
 No.       (CFS)       (min)                (In/Hr)


1        2.926      7.06                1.710
2        4.487     11.34                1.330
3        0.438     15.18                1.139
Largest stream flow has longer or shorter time of concentration
Qp =      4.487 + sum of
          Qb         Ia/Ib
           2.926 *    0.778 =      2.276
          Qa          Tb/Ta
           0.438 *    0.747 =      0.327
Qp =      7.090

Total of 3 streams to confluence:
Flow rates before confluence point:
       2.926       4.487       0.438
Area of streams before confluence:
        2.230        6.170        0.600
Results of confluence:
Total flow rate =      7.090(CFS)
Time of concentration =    11.337 min.
Effective stream area after confluence =      9.000(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      905.000 to Point/Station      909.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________________
Upstream point/station elevation =  1514.000(Ft.)
Downstream point/station elevation =  1502.700(Ft.)
Pipe length  =   592.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     7.090(CFS)
Nearest computed pipe diameter  =     15.00(In.)
Calculated individual pipe flow  =     7.090(CFS)
Normal flow depth in pipe =   10.10(In.)
Flow top width inside pipe =   14.07(In.)
Critical Depth =   12.79(In.)
Pipe flow velocity =      8.07(Ft/s)
Travel time through pipe =    1.22 min.
Time of concentration (TC) =    12.56 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      905.000 to Point/Station      909.000
**** SUBAREA FLOW ADDITION ****
______________________________________________________________________________
SINGLE FAMILY (1/4 Acre Lot)
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```
Runoff Coefficient = 0.649
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.500
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.500
RI index for soil(AMC 1)  =  45.60
Pervious area fraction =  0.500; Impervious fraction =  0.500
Time of concentration =    12.56 min.
Rainfall intensity =      1.260(In/Hr) for a     2.0 year storm
Subarea runoff =     31.557(CFS) for     38.600(Ac.)
Total runoff =     38.647(CFS)       Total area =      47.600(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      909.000 to Point/Station      910.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------------
Upstream point/station elevation =  1502.700(Ft.)
Downstream point/station elevation =  1499.100(Ft.)
Pipe length  =   301.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    38.647(CFS)
Nearest computed pipe diameter  =     30.00(In.)
Calculated individual pipe flow  =    38.647(CFS)
Normal flow depth in pipe =   21.47(In.)
Flow top width inside pipe =   27.07(In.)
Critical Depth =   25.20(In.)
Pipe flow velocity =     10.28(Ft/s)
Travel time through pipe =    0.49 min.
Time of concentration (TC) =    13.05 min.


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Process from Point/Station      909.000 to Point/Station      910.000
**** CONFLUENCE OF MINOR STREAMS ****
------------------------------------------------------------------------------
Along Main Stream number: 1 in normal stream number 1
Stream flow area =     47.600(Ac.)
Runoff from this stream =     38.647(CFS)
Time of concentration =   13.05 min.
Rainfall intensity =     1.235(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      129.000 to Point/Station      130.000
**** INITIAL AREA EVALUATION ****
------------------------------------------------------------------------------
Initial area flow distance =   226.000(Ft.)
Top (of initial area) elevation =  1521.000(Ft.)
Bottom (of initial area) elevation =  1519.100(Ft.)
Difference in elevation =     1.900(Ft.)
Slope =    0.00841  s(percent)=       0.84
TC = k(0.390)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    8.867 min.
Rainfall intensity =      1.515(In/Hr) for a     2.0 year storm
SINGLE FAMILY (1/4 Acre Lot)
Runoff Coefficient = 0.625
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 1)  =  36.00
Pervious area fraction =  0.500; Impervious fraction =  0.500
Initial subarea runoff =      0.512(CFS)
Total initial stream area =        0.540(Ac.)
Pervious area fraction = 0.500


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      130.000 to Point/Station      131.000
**** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------------
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```
Top of street segment elevation =  1519.100(Ft.)
End of street segment elevation =  1508.600(Ft.)
Length of street segment  =   768.000(Ft.)
Height of curb above gutter flowline  =    6.0(In.)
Width of half street (curb to crown)  =  18.000(Ft.)
Distance from crown to crossfall grade break  =  16.000(Ft.)
Slope from gutter to grade break (v/hz) =   0.020
Slope from grade break to crown (v/hz)  =   0.020
Street flow is on [1] side(s) of the street
Distance from curb to property line  =  10.000(Ft.)
Slope from curb to property line (v/hz) =   0.020
Gutter width =   2.000(Ft.)
Gutter hike from flowline =  1.500(In.)
 Manning's N in gutter =  0.0130
 Manning's N from gutter to grade break =  0.0130
 Manning's N from grade break to crown =  0.0130
Estimated mean flow rate at midpoint of street =      1.250(CFS)
Depth of flow =   0.217(Ft.), Average velocity =   2.404(Ft/s)
Streetflow hydraulics at midpoint of street travel:
Halfstreet flow width =   6.595(Ft.)
Flow velocity =   2.40(Ft/s)
Travel time =    5.32 min.     TC =   14.19  min.
 Adding area flow to street
SINGLE FAMILY (1/4 Acre Lot)
Runoff Coefficient = 0.642
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.500
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.500
RI index for soil(AMC 1)  =  45.60
Pervious area fraction =  0.500; Impervious fraction =  0.500
Rainfall intensity =      1.181(In/Hr) for a     2.0 year storm
Subarea runoff =      1.387(CFS) for      1.830(Ac.)
Total runoff =      1.899(CFS)       Total area =       2.370(Ac.)
Street flow at end of street =      1.899(CFS)
Half street flow at end of street =      1.899(CFS)
Depth of flow =   0.244(Ft.), Average velocity =   2.637(Ft/s)
Flow width (from curb towards crown)=   7.969(Ft.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      131.000 to Point/Station      910.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------------
Upstream point/station elevation =  1499.400(Ft.)
Downstream point/station elevation =  1499.100(Ft.)
Pipe length  =    22.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     1.899(CFS)
Nearest computed pipe diameter  =      9.00(In.)
Calculated individual pipe flow  =     1.899(CFS)
Normal flow depth in pipe =    7.24(In.)
Flow top width inside pipe =    7.14(In.)
Critical Depth =    7.54(In.)
Pipe flow velocity =      4.98(Ft/s)
Travel time through pipe =    0.07 min.
Time of concentration (TC) =    14.27 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      131.000 to Point/Station      910.000
**** CONFLUENCE OF MINOR STREAMS ****
------------------------------------------------------------------------------
Along Main Stream number: 1 in normal stream number 2
Stream flow area =      2.370(Ac.)
Runoff from this stream =      1.899(CFS)
Time of concentration =   14.27 min.
Rainfall intensity =     1.178(In/Hr)


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Process from Point/Station      132.000 to Point/Station      133.000
```

```
**** INITIAL AREA EVALUATION ****
------------------------------------------------------------------------
Initial area flow distance =   636.000(Ft.)
Top (of initial area) elevation =  1526.500(Ft.)
Bottom (of initial area) elevation =  1519.100(Ft.)
Difference in elevation =     7.400(Ft.)
Slope =    0.01164  s(percent)=       1.16
TC = k(0.390)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   12.569 min.
Rainfall intensity =      1.259(In/Hr) for a     2.0 year storm
SINGLE FAMILY (1/4 Acre Lot)
Runoff Coefficient = 0.669
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.300
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.700
RI index for soil(AMC 1)  =  50.16
Pervious area fraction =  0.500; Impervious fraction =  0.500
Initial subarea runoff =      1.146(CFS)
Total initial stream area =        1.360(Ac.)
Pervious area fraction = 0.500


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      133.000 to Point/Station      134.000
**** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------
Top of street segment elevation =  1519.100(Ft.)
End of street segment elevation =  1510.100(Ft.)
Length of street segment  =   806.000(Ft.)
Height of curb above gutter flowline  =    6.0(In.)
Width of half street (curb to crown)  =  18.000(Ft.)
Distance from crown to crossfall grade break  =   9.000(Ft.)
Slope from gutter to grade break (v/hz) =   0.020
Slope from grade break to crown (v/hz)  =   0.020
Street flow is on [1] side(s) of the street
Distance from curb to property line  =  10.000(Ft.)
Slope from curb to property line (v/hz) =   0.020
Gutter width =   2.000(Ft.)
Gutter hike from flowline =  2.000(In.)
 Manning's N in gutter =  0.0130
 Manning's N from gutter to grade break =  0.0130
 Manning's N from grade break to crown =  0.0130
Estimated mean flow rate at midpoint of street =      3.435(CFS)
Depth of flow =   0.336(Ft.), Average velocity =   2.821(Ft/s)
Streetflow hydraulics at midpoint of street travel:
Halfstreet flow width =  10.445(Ft.)
Flow velocity =   2.82(Ft/s)
Travel time =    4.76 min.     TC =   17.33  min.
 Adding area flow to street
SINGLE FAMILY (1/4 Acre Lot)
Runoff Coefficient = 0.630
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.500
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.500
RI index for soil(AMC 1)  =  45.60
Pervious area fraction =  0.500; Impervious fraction =  0.500
Rainfall intensity =      1.062(In/Hr) for a     2.0 year storm
Subarea runoff =      4.498(CFS) for      6.720(Ac.)
Total runoff =      5.645(CFS)       Total area =       8.080(Ac.)
Street flow at end of street =      5.645(CFS)
Half street flow at end of street =      5.645(CFS)
Depth of flow =   0.384(Ft.), Average velocity =   3.169(Ft/s)
Flow width (from curb towards crown)=  12.863(Ft.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      134.000 to Point/Station      910.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------
```

```
Upstream point/station elevation =  1499.400(Ft.)
Downstream point/station elevation =  1499.100(Ft.)
Pipe length  =    25.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     5.645(CFS)
Nearest computed pipe diameter  =     15.00(In.)
Calculated individual pipe flow  =     5.645(CFS)
Normal flow depth in pipe =   10.13(In.)
Flow top width inside pipe =   14.05(In.)
Critical Depth =   11.54(In.)
Pipe flow velocity =      6.40(Ft/s)
Travel time through pipe =    0.07 min.
Time of concentration (TC) =    17.40 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      134.000 to Point/Station      910.000
**** CONFLUENCE OF MINOR STREAMS ****
________________________________________________________________________
Along Main Stream number: 1 in normal stream number 3
Stream flow area =      8.080(Ac.)
Runoff from this stream =      5.645(CFS)
Time of concentration =   17.40 min.
Rainfall intensity =     1.060(In/Hr)
Summary of stream data:

Stream   Flow rate      TC            Rainfall Intensity
 No.       (CFS)       (min)                (In/Hr)


1       38.647     13.05                1.235
2        1.899     14.27                1.178
3        5.645     17.40                1.060
Largest stream flow has longer or shorter time of concentration
Qp =     38.647 + sum of
          Qa          Tb/Ta
           1.899 *    0.915 =      1.736
          Qa          Tb/Ta
           5.645 *    0.750 =      4.234
Qp =     44.617

Total of 3 streams to confluence:
Flow rates before confluence point:
      38.647       1.899       5.645
Area of streams before confluence:
       47.600        2.370        8.080
Results of confluence:
Total flow rate =     44.617(CFS)
Time of concentration =    13.047 min.
Effective stream area after confluence =     58.050(Ac.)


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Process from Point/Station      910.000 to Point/Station      911.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =  1499.100(Ft.)
Downstream point/station elevation =  1498.000(Ft.)
Pipe length  =   107.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    44.617(CFS)
Nearest computed pipe diameter  =     33.00(In.)
Calculated individual pipe flow  =    44.617(CFS)
Normal flow depth in pipe =   22.99(In.)
Flow top width inside pipe =   30.34(In.)
Critical Depth =   26.58(In.)
Pipe flow velocity =     10.10(Ft/s)
Travel time through pipe =    0.18 min.
Time of concentration (TC) =    13.22 min.
End of computations, total study area =           58.05 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.
```

```
Area averaged pervious area fraction(Ap) = 0.561
Area averaged RI index number =  67.1
```

- **Area 'A' – 10 Year Proposed Condition – Rational Method**

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                Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2014 Version 9.0
        Rational Hydrology Study        Date: 06/02/21  File:PR010.out
------------------------------------------------------------------------
TRACT 31194 - 'GOLDEN MEADOWS' SUPPLEMENTAL HYDROLOGY STUDY – TANK SITE
DEVELOPED CONDITION RATIONAL METHOD - 10 YEAR STORM
HUNSAKER & ASSOCIATES, JUNE 2021
BY: BRIAN LOWELL, PE
------------------------------------------------------------------------
 *********   Hydrology Study Control Information **********

 English (in-lb) Units used in input data file

------------------------------------------------------------------------


Program License Serial Number 6407

------------------------------------------------------------------------
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

2 year, 1 hour precipitation =  0.550(In.)
100 year, 1 hour precipitation =  1.300(In.)

Storm event year =  10.0
Calculated rainfall intensity data:
1 hour intensity =  0.859(In/Hr)
Slope of intensity duration curve = 0.5300




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Process from Point/Station      900.000 to Point/Station      901.000
**** INITIAL AREA EVALUATION ****
________________________________________________________________________
Initial area flow distance =   183.000(Ft.)
Top (of initial area) elevation =  1717.700(Ft.)
Bottom (of initial area) elevation =  1659.000(Ft.)
Difference in elevation =    58.700(Ft.)
Slope =    0.32077  s(percent)=      32.08
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    5.346 min.
Rainfall intensity =      3.093(In/Hr) for a    10.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.802
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)  =  78.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =      2.829(CFS)
Total initial stream area =        1.140(Ac.)
Pervious area fraction = 1.000


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      900.000 to Point/Station      901.000
**** CONFLUENCE OF MINOR STREAMS ****
________________________________________________________________________
Along Main Stream number: 1 in normal stream number 1
Stream flow area =      1.140(Ac.)
Runoff from this stream =      2.829(CFS)
```

```
Time of concentration =    5.35 min.
Rainfall intensity =     3.093(In/Hr)


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Process from Point/Station      902.000 to Point/Station      901.000
**** INITIAL AREA EVALUATION ****
------------------------------------------------------------------------------
Initial area flow distance =   183.000(Ft.)
Top (of initial area) elevation =  1660.000(Ft.)
Bottom (of initial area) elevation =  1659.000(Ft.)
Difference in elevation =     1.000(Ft.)
Slope =    0.00546  s(percent)=       0.55
TC = k(0.300)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    6.833 min.
Rainfall intensity =      2.716(In/Hr) for a    10.0 year storm
COMMERCIAL subarea type
Runoff Coefficient = 0.875
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 =  0.100; Impervious fraction =  0.900
Initial subarea runoff =      1.022(CFS)
Total initial stream area =        0.430(Ac.)
Pervious area fraction = 0.100


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Process from Point/Station      902.000 to Point/Station      901.000
**** CONFLUENCE OF MINOR STREAMS ****
------------------------------------------------------------------------------
Along Main Stream number: 1 in normal stream number 2
Stream flow area =      0.430(Ac.)
Runoff from this stream =      1.022(CFS)
Time of concentration =    6.83 min.
Rainfall intensity =     2.716(In/Hr)
Summary of stream data:

Stream   Flow rate      TC            Rainfall Intensity
 No.       (CFS)       (min)                (In/Hr)


1        2.829      5.35                 3.093
2        1.022      6.83                 2.716
Largest stream flow has longer or shorter time of concentration
Qp =      2.829 + sum of
          Qa          Tb/Ta
           1.022 *    0.782 =      0.799
Qp =      3.628

Total of 2 streams to confluence:
Flow rates before confluence point:
       2.829       1.022
Area of streams before confluence:
        1.140        0.430
Results of confluence:
Total flow rate =      3.628(CFS)
Time of concentration =     5.346 min.
Effective stream area after confluence =      1.570(Ac.)


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Process from Point/Station      901.000 to Point/Station      903.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------------
Upstream point/station elevation =  1653.000(Ft.)
Downstream point/station elevation =  1651.000(Ft.)
Pipe length  =   165.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     3.628(CFS)
```

```
Nearest computed pipe diameter  =     12.00(In.)
Calculated individual pipe flow  =     3.628(CFS)
Normal flow depth in pipe =    9.12(In.)
Flow top width inside pipe =   10.25(In.)
Critical Depth =    9.75(In.)
Pipe flow velocity =      5.67(Ft/s)
Travel time through pipe =    0.49 min.
Time of concentration (TC) =     5.83 min.


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Process from Point/Station      901.000 to Point/Station      903.000
**** CONFLUENCE OF MINOR STREAMS ****
------------------------------------------------------------------------------
Along Main Stream number: 1 in normal stream number 1
Stream flow area =      1.570(Ac.)
Runoff from this stream =      3.628(CFS)
Time of concentration =    5.83 min.
Rainfall intensity =     2.954(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      902.000 to Point/Station      904.000
**** INITIAL AREA EVALUATION ****
------------------------------------------------------------------------------
Initial area flow distance =   140.000(Ft.)
Top (of initial area) elevation =  1660.000(Ft.)
Bottom (of initial area) elevation =  1659.100(Ft.)
Difference in elevation =     0.900(Ft.)
Slope =    0.00643  s(percent)=       0.64
TC = k(0.300)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    5.942 min.
Rainfall intensity =      2.924(In/Hr) for a    10.0 year storm
COMMERCIAL subarea type
Runoff Coefficient = 0.876
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 =  0.100; Impervious fraction =  0.900
Initial subarea runoff =      1.691(CFS)
Total initial stream area =        0.660(Ac.)
Pervious area fraction = 0.100


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      904.000 to Point/Station      903.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------------
Upstream point/station elevation =  1651.500(Ft.)
Downstream point/station elevation =  1651.000(Ft.)
Pipe length  =    41.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     1.691(CFS)
Nearest computed pipe diameter  =      9.00(In.)
Calculated individual pipe flow  =     1.691(CFS)
Normal flow depth in pipe =    6.84(In.)
Flow top width inside pipe =    7.68(In.)
Critical Depth =    7.16(In.)
Pipe flow velocity =      4.70(Ft/s)
Travel time through pipe =    0.15 min.
Time of concentration (TC) =     6.09 min.


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Process from Point/Station      904.000 to Point/Station      903.000
**** CONFLUENCE OF MINOR STREAMS ****
------------------------------------------------------------------------------
Along Main Stream number: 1 in normal stream number 2
Stream flow area =      0.660(Ac.)
Runoff from this stream =      1.691(CFS)
```

```
Time of concentration =    6.09 min.
Rainfall intensity =     2.887(In/Hr)
Summary of stream data:

Stream   Flow rate      TC            Rainfall Intensity
 No.       (CFS)       (min)                (In/Hr)


1        3.628      5.83                 2.954
2        1.691      6.09                 2.887
Largest stream flow has longer or shorter time of concentration
Qp =      3.628 + sum of
          Qa          Tb/Ta
           1.691 *    0.958 =      1.620
Qp =      5.248

Total of 2 streams to confluence:
Flow rates before confluence point:
       3.628       1.691
Area of streams before confluence:
        1.570        0.660
Results of confluence:
Total flow rate =      5.248(CFS)
Time of concentration =     5.831 min.
Effective stream area after confluence =      2.230(Ac.)


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Process from Point/Station      903.000 to Point/Station      906.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------------
Upstream point/station elevation =  1651.000(Ft.)
Downstream point/station elevation =  1514.000(Ft.)
Pipe length  =   965.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     5.248(CFS)
Nearest computed pipe diameter  =      9.00(In.)
Calculated individual pipe flow  =     5.248(CFS)
Normal flow depth in pipe =    6.33(In.)
Flow top width inside pipe =    8.22(In.)
Critical depth could not be calculated.
Pipe flow velocity =     15.81(Ft/s)
Travel time through pipe =    1.02 min.
Time of concentration (TC) =     6.85 min.


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Process from Point/Station      903.000 to Point/Station      906.000
**** CONFLUENCE OF MINOR STREAMS ****
------------------------------------------------------------------------------
Along Main Stream number: 1 in normal stream number 1
Stream flow area =      2.230(Ac.)
Runoff from this stream =      5.248(CFS)
Time of concentration =    6.85 min.
Rainfall intensity =     2.712(In/Hr)


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Process from Point/Station      900.000 to Point/Station      906.000
**** INITIAL AREA EVALUATION ****
------------------------------------------------------------------------------
Initial area flow distance =   953.000(Ft.)
Top (of initial area) elevation =  1717.700(Ft.)
Bottom (of initial area) elevation =  1520.000(Ft.)
Difference in elevation =   197.700(Ft.)
Slope =    0.20745  s(percent)=      20.75
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   11.286 min.
Rainfall intensity =      2.081(In/Hr) for a    10.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.762
Decimal fraction soil group A = 0.000
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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)  =  78.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =      9.789(CFS)
Total initial stream area =        6.170(Ac.)
Pervious area fraction = 1.000


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Process from Point/Station      906.000 to Point/Station      905.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------
Upstream point/station elevation =  1514.500(Ft.)
Downstream point/station elevation =  1514.000(Ft.)
Pipe length  =    23.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     9.789(CFS)
Nearest computed pipe diameter  =     18.00(In.)
Calculated individual pipe flow  =     9.789(CFS)
Normal flow depth in pipe =   10.38(In.)
Flow top width inside pipe =   17.79(In.)
Critical Depth =   14.48(In.)
Pipe flow velocity =      9.27(Ft/s)
Travel time through pipe =    0.04 min.
Time of concentration (TC) =    11.33 min.


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Process from Point/Station      906.000 to Point/Station      905.000
**** CONFLUENCE OF MINOR STREAMS ****
------------------------------------------------------------------------
Along Main Stream number: 1 in normal stream number 2
Stream flow area =      6.170(Ac.)
Runoff from this stream =      9.789(CFS)
Time of concentration =   11.33 min.
Rainfall intensity =     2.077(In/Hr)


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Process from Point/Station      907.000 to Point/Station      908.000
**** INITIAL AREA EVALUATION ****
------------------------------------------------------------------------
Initial area flow distance =   508.000(Ft.)
Top (of initial area) elevation =  1528.000(Ft.)
Bottom (of initial area) elevation =  1521.000(Ft.)
Difference in elevation =     7.000(Ft.)
Slope =    0.01378  s(percent)=       1.38
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   15.093 min.
Rainfall intensity =      1.784(In/Hr) for a    10.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.813
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.500
Decimal fraction soil group D = 0.500
RI index for soil(AMC 2)  =  87.50
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =      0.871(CFS)
Total initial stream area =        0.600(Ac.)
Pervious area fraction = 1.000


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Process from Point/Station      908.000 to Point/Station      905.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------
Upstream point/station elevation =  1514.500(Ft.)
Downstream point/station elevation =  1514.000(Ft.)
Pipe length  =    23.00(Ft.)   Manning's N = 0.013
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No. of pipes = 1  Required pipe flow  =     0.871(CFS)
Nearest computed pipe diameter  =      9.00(In.)
Calculated individual pipe flow  =     0.871(CFS)
Normal flow depth in pipe =    3.71(In.)
Flow top width inside pipe =    8.86(In.)
Critical Depth =    5.13(In.)
Pipe flow velocity =      5.06(Ft/s)
Travel time through pipe =    0.08 min.
Time of concentration (TC) =    15.17 min.


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Process from Point/Station      908.000 to Point/Station      905.000
**** CONFLUENCE OF MINOR STREAMS ****
------------------------------------------------------------------------
Along Main Stream number: 1 in normal stream number 3
Stream flow area =      0.600(Ac.)
Runoff from this stream =      0.871(CFS)
Time of concentration =   15.17 min.
Rainfall intensity =     1.779(In/Hr)
Summary of stream data:

Stream   Flow rate      TC            Rainfall Intensity
 No.       (CFS)       (min)                (In/Hr)


1        5.248      6.85                 2.712
2        9.789     11.33                 2.077
3        0.871     15.17                 1.779
Largest stream flow has longer or shorter time of concentration
Qp =      9.789 + sum of
          Qb         Ia/Ib
           5.248 *    0.766 =      4.020
          Qa          Tb/Ta
           0.871 *    0.747 =      0.650
Qp =     14.459

Total of 3 streams to confluence:
Flow rates before confluence point:
       5.248       9.789       0.871
Area of streams before confluence:
        2.230        6.170        0.600
Results of confluence:
Total flow rate =     14.459(CFS)
Time of concentration =    11.327 min.
Effective stream area after confluence =      9.000(Ac.)


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Process from Point/Station      905.000 to Point/Station      909.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------
Upstream point/station elevation =  1514.000(Ft.)
Downstream point/station elevation =  1502.700(Ft.)
Pipe length  =   592.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    14.459(CFS)
Nearest computed pipe diameter  =     18.00(In.)
Calculated individual pipe flow  =    14.459(CFS)
Normal flow depth in pipe =   14.70(In.)
Flow top width inside pipe =   13.94(In.)
Critical Depth =   16.72(In.)
Pipe flow velocity =      9.36(Ft/s)
Travel time through pipe =    1.05 min.
Time of concentration (TC) =    12.38 min.


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      905.000 to Point/Station      909.000
**** SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------
SINGLE FAMILY (1/4 Acre Lot)
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Runoff Coefficient = 0.782
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.500
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.500
RI index for soil(AMC 2)  =  65.50
Pervious area fraction =  0.500; Impervious fraction =  0.500
Time of concentration =    12.38 min.
Rainfall intensity =      1.982(In/Hr) for a    10.0 year storm
Subarea runoff =     59.836(CFS) for     38.600(Ac.)
Total runoff =     74.295(CFS)       Total area =      47.600(Ac.)


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Process from Point/Station      909.000 to Point/Station      910.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------------
Upstream point/station elevation =  1502.700(Ft.)
Downstream point/station elevation =  1499.100(Ft.)
Pipe length  =   301.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    74.295(CFS)
Nearest computed pipe diameter  =     36.00(In.)
Calculated individual pipe flow  =    74.295(CFS)
Normal flow depth in pipe =   30.14(In.)
Flow top width inside pipe =   26.58(In.)
Critical Depth =   32.54(In.)
Pipe flow velocity =     11.75(Ft/s)
Travel time through pipe =    0.43 min.
Time of concentration (TC) =    12.81 min.


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Process from Point/Station      909.000 to Point/Station      910.000
**** CONFLUENCE OF MINOR STREAMS ****
------------------------------------------------------------------------------
Along Main Stream number: 1 in normal stream number 1
Stream flow area =     47.600(Ac.)
Runoff from this stream =     74.295(CFS)
Time of concentration =   12.81 min.
Rainfall intensity =     1.946(In/Hr)


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Process from Point/Station      129.000 to Point/Station      130.000
**** INITIAL AREA EVALUATION ****
------------------------------------------------------------------------------
Initial area flow distance =   226.000(Ft.)
Top (of initial area) elevation =  1521.000(Ft.)
Bottom (of initial area) elevation =  1519.100(Ft.)
Difference in elevation =     1.900(Ft.)
Slope =    0.00841  s(percent)=       0.84
TC = k(0.390)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    8.867 min.
Rainfall intensity =      2.365(In/Hr) for a    10.0 year storm
SINGLE FAMILY (1/4 Acre Lot)
Runoff Coefficient = 0.762
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 =      0.973(CFS)
Total initial stream area =        0.540(Ac.)
Pervious area fraction = 0.500


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Process from Point/Station      130.000 to Point/Station      131.000
**** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------------
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```
Top of street segment elevation =  1519.100(Ft.)
End of street segment elevation =  1508.600(Ft.)
Length of street segment  =   768.000(Ft.)
Height of curb above gutter flowline  =    6.0(In.)
Width of half street (curb to crown)  =  18.000(Ft.)
Distance from crown to crossfall grade break  =  16.000(Ft.)
Slope from gutter to grade break (v/hz) =   0.020
Slope from grade break to crown (v/hz)  =   0.020
Street flow is on [1] side(s) of the street
Distance from curb to property line  =  10.000(Ft.)
Slope from curb to property line (v/hz) =   0.020
Gutter width =   2.000(Ft.)
Gutter hike from flowline =  1.500(In.)
 Manning's N in gutter =  0.0130
 Manning's N from gutter to grade break =  0.0130
 Manning's N from grade break to crown =  0.0130
Estimated mean flow rate at midpoint of street =      2.361(CFS)
Depth of flow =   0.260(Ft.), Average velocity =   2.771(Ft/s)
Streetflow hydraulics at midpoint of street travel:
Halfstreet flow width =   8.758(Ft.)
Flow velocity =   2.77(Ft/s)
Travel time =    4.62 min.     TC =   13.49  min.
 Adding area flow to street
SINGLE FAMILY (1/4 Acre Lot)
Runoff Coefficient = 0.778
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.500
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.500
RI index for soil(AMC 2)  =  65.50
Pervious area fraction =  0.500; Impervious fraction =  0.500
Rainfall intensity =      1.894(In/Hr) for a    10.0 year storm
Subarea runoff =      2.697(CFS) for      1.830(Ac.)
Total runoff =      3.670(CFS)       Total area =       2.370(Ac.)
Street flow at end of street =      3.670(CFS)
Half street flow at end of street =      3.670(CFS)
Depth of flow =   0.296(Ft.), Average velocity =   3.073(Ft/s)
Flow width (from curb towards crown)=  10.533(Ft.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      131.000 to Point/Station      910.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________________
Upstream point/station elevation =  1499.400(Ft.)
Downstream point/station elevation =  1499.100(Ft.)
Pipe length  =    22.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     3.670(CFS)
Nearest computed pipe diameter  =     12.00(In.)
Calculated individual pipe flow  =     3.670(CFS)
Normal flow depth in pipe =    8.75(In.)
Flow top width inside pipe =   10.66(In.)
Critical Depth =    9.80(In.)
Pipe flow velocity =      5.98(Ft/s)
Travel time through pipe =    0.06 min.
Time of concentration (TC) =    13.55 min.


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Process from Point/Station      131.000 to Point/Station      910.000
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________________
Along Main Stream number: 1 in normal stream number 2
Stream flow area =      2.370(Ac.)
Runoff from this stream =      3.670(CFS)
Time of concentration =   13.55 min.
Rainfall intensity =     1.889(In/Hr)


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Process from Point/Station      132.000 to Point/Station      133.000
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**** INITIAL AREA EVALUATION ****
------------------------------------------------------------------------
Initial area flow distance =   636.000(Ft.)
Top (of initial area) elevation =  1526.500(Ft.)
Bottom (of initial area) elevation =  1519.100(Ft.)
Difference in elevation =     7.400(Ft.)
Slope =    0.01164  s(percent)=       1.16
TC = k(0.390)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   12.569 min.
Rainfall intensity =      1.966(In/Hr) for a    10.0 year storm
SINGLE FAMILY (1/4 Acre Lot)
Runoff Coefficient = 0.796
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.300
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.700
RI index for soil(AMC 2)  =  69.30
Pervious area fraction =  0.500; Impervious fraction =  0.500
Initial subarea runoff =      2.128(CFS)
Total initial stream area =        1.360(Ac.)
Pervious area fraction = 0.500


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Process from Point/Station      133.000 to Point/Station      134.000
**** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------
Top of street segment elevation =  1519.100(Ft.)
End of street segment elevation =  1510.100(Ft.)
Length of street segment  =   806.000(Ft.)
Height of curb above gutter flowline  =    6.0(In.)
Width of half street (curb to crown)  =  18.000(Ft.)
Distance from crown to crossfall grade break  =   9.000(Ft.)
Slope from gutter to grade break (v/hz) =   0.020
Slope from grade break to crown (v/hz)  =   0.020
Street flow is on [1] side(s) of the street
Distance from curb to property line  =  10.000(Ft.)
Slope from curb to property line (v/hz) =   0.020
Gutter width =   2.000(Ft.)
Gutter hike from flowline =  2.000(In.)
 Manning's N in gutter =  0.0130
 Manning's N from gutter to grade break =  0.0130
 Manning's N from grade break to crown =  0.0130
Estimated mean flow rate at midpoint of street =      6.528(CFS)
Depth of flow =   0.400(Ft.), Average velocity =   3.281(Ft/s)
Streetflow hydraulics at midpoint of street travel:
Halfstreet flow width =  13.650(Ft.)
Flow velocity =   3.28(Ft/s)
Travel time =    4.09 min.     TC =   16.66  min.
 Adding area flow to street
SINGLE FAMILY (1/4 Acre Lot)
Runoff Coefficient = 0.768
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.500
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.500
RI index for soil(AMC 2)  =  65.50
Pervious area fraction =  0.500; Impervious fraction =  0.500
Rainfall intensity =      1.693(In/Hr) for a    10.0 year storm
Subarea runoff =      8.738(CFS) for      6.720(Ac.)
Total runoff =     10.866(CFS)       Total area =       8.080(Ac.)
Street flow at end of street =     10.866(CFS)
Half street flow at end of street =     10.866(CFS)
Depth of flow =   0.461(Ft.), Average velocity =   3.709(Ft/s)
Flow width (from curb towards crown)=  16.741(Ft.)


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Process from Point/Station      134.000 to Point/Station      910.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------
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```
Upstream point/station elevation =  1499.400(Ft.)
Downstream point/station elevation =  1499.100(Ft.)
Pipe length  =    25.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    10.866(CFS)
Nearest computed pipe diameter  =     18.00(In.)
Calculated individual pipe flow  =    10.866(CFS)
Normal flow depth in pipe =   13.92(In.)
Flow top width inside pipe =   15.07(In.)
Critical Depth =   15.17(In.)
Pipe flow velocity =      7.41(Ft/s)
Travel time through pipe =    0.06 min.
Time of concentration (TC) =    16.72 min.


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Process from Point/Station      134.000 to Point/Station      910.000
**** CONFLUENCE OF MINOR STREAMS ****
________________________________________________________________________
Along Main Stream number: 1 in normal stream number 3
Stream flow area =      8.080(Ac.)
Runoff from this stream =     10.866(CFS)
Time of concentration =   16.72 min.
Rainfall intensity =     1.690(In/Hr)
Summary of stream data:

Stream   Flow rate      TC            Rainfall Intensity
 No.       (CFS)       (min)                (In/Hr)


1       74.295     12.81                1.946
2        3.670     13.55                1.889
3       10.866     16.72                1.690
Largest stream flow has longer or shorter time of concentration
Qp =     74.295 + sum of
          Qa          Tb/Ta
           3.670 *    0.945 =      3.470
          Qa          Tb/Ta
          10.866 *    0.766 =      8.324
Qp =     86.089

Total of 3 streams to confluence:
Flow rates before confluence point:
      74.295       3.670      10.866
Area of streams before confluence:
       47.600        2.370        8.080
Results of confluence:
Total flow rate =     86.089(CFS)
Time of concentration =    12.808 min.
Effective stream area after confluence =     58.050(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      910.000 to Point/Station      911.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =  1499.100(Ft.)
Downstream point/station elevation =  1498.000(Ft.)
Pipe length  =   107.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    86.089(CFS)
Nearest computed pipe diameter  =     39.00(In.)
Calculated individual pipe flow  =    86.089(CFS)
Normal flow depth in pipe =   33.09(In.)
Flow top width inside pipe =   27.96(In.)
Critical Depth =   34.64(In.)
Pipe flow velocity =     11.48(Ft/s)
Travel time through pipe =    0.16 min.
Time of concentration (TC) =    12.96 min.
End of computations, total study area =           58.05 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.
```

```
Area averaged pervious area fraction(Ap) = 0.561
Area averaged RI index number =  67.1
```

- **Area 'A' – 100 Year Proposed Condition – Rational Method**

```
                Riverside County Rational Hydrology Program

CIVILCADD/CIVILDESIGN Engineering Software,(c) 1989 - 2014 Version 9.0
        Rational Hydrology Study        Date: 06/02/21  File:PR100.out
------------------------------------------------------------------------
TRACT 31194 - 'GOLDEN MEADOWS' SUPPLEMENTAL HYDROLOGY STUDY – TANK SITE
DEVELOPED CONDITION RATIONAL METHOD - 100 YEAR STORM
HUNSAKER & ASSOCIATES, JUNE 2021
BY: BRIAN LOWELL, PE
------------------------------------------------------------------------
 *********   Hydrology Study Control Information **********

 English (in-lb) Units used in input data file

------------------------------------------------------------------------


Program License Serial Number 6407

------------------------------------------------------------------------
Rational Method Hydrology Program based on
Riverside County Flood Control & Water Conservation District
1978 hydrology manual

Storm event (year) =  100.00 Antecedent Moisture Condition = 3

2 year, 1 hour precipitation =  0.550(In.)
100 year, 1 hour precipitation =  1.300(In.)

Storm event year = 100.0
Calculated rainfall intensity data:
1 hour intensity =  1.300(In/Hr)
Slope of intensity duration curve = 0.5300




++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      900.000 to Point/Station      901.000
**** INITIAL AREA EVALUATION ****
------------------------------------------------------------------------
Initial area flow distance =   183.000(Ft.)
Top (of initial area) elevation =  1717.700(Ft.)
Bottom (of initial area) elevation =  1659.000(Ft.)
Difference in elevation =    58.700(Ft.)
Slope =    0.32077  s(percent)=      32.08
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    5.346 min.
Rainfall intensity =      4.683(In/Hr) for a   100.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.872
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 3)  =  89.80
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =      4.654(CFS)
Total initial stream area =        1.140(Ac.)
Pervious area fraction = 1.000


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      900.000 to Point/Station      901.000
**** CONFLUENCE OF MINOR STREAMS ****
------------------------------------------------------------------------
Along Main Stream number: 1 in normal stream number 1
Stream flow area =      1.140(Ac.)
Runoff from this stream =      4.654(CFS)
```

```
Time of concentration =    5.35 min.
Rainfall intensity =     4.683(In/Hr)


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Process from Point/Station      902.000 to Point/Station      901.000
**** INITIAL AREA EVALUATION ****
------------------------------------------------------------------------------
Initial area flow distance =   183.000(Ft.)
Top (of initial area) elevation =  1660.000(Ft.)
Bottom (of initial area) elevation =  1659.000(Ft.)
Difference in elevation =     1.000(Ft.)
Slope =    0.00546  s(percent)=       0.55
TC = k(0.300)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    6.833 min.
Rainfall intensity =      4.112(In/Hr) for a   100.0 year storm
COMMERCIAL subarea type
Runoff Coefficient = 0.891
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 3)  =  74.80
Pervious area fraction =  0.100; Impervious fraction =  0.900
Initial subarea runoff =      1.576(CFS)
Total initial stream area =        0.430(Ac.)
Pervious area fraction = 0.100


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Process from Point/Station      902.000 to Point/Station      901.000
**** CONFLUENCE OF MINOR STREAMS ****
------------------------------------------------------------------------------
Along Main Stream number: 1 in normal stream number 2
Stream flow area =      0.430(Ac.)
Runoff from this stream =      1.576(CFS)
Time of concentration =    6.83 min.
Rainfall intensity =     4.112(In/Hr)
Summary of stream data:

Stream   Flow rate      TC            Rainfall Intensity
 No.       (CFS)       (min)                (In/Hr)


1        4.654      5.35                4.683
2        1.576      6.83                4.112
Largest stream flow has longer or shorter time of concentration
Qp =      4.654 + sum of
          Qa          Tb/Ta
           1.576 *    0.782 =      1.233
Qp =      5.887

Total of 2 streams to confluence:
Flow rates before confluence point:
       4.654       1.576
Area of streams before confluence:
        1.140        0.430
Results of confluence:
Total flow rate =      5.887(CFS)
Time of concentration =     5.346 min.
Effective stream area after confluence =      1.570(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      901.000 to Point/Station      903.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------------
Upstream point/station elevation =  1653.000(Ft.)
Downstream point/station elevation =  1651.000(Ft.)
Pipe length  =   165.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     5.887(CFS)
```

```
Nearest computed pipe diameter  =     15.00(In.)
Calculated individual pipe flow  =     5.887(CFS)
Normal flow depth in pipe =   10.41(In.)
Flow top width inside pipe =   13.83(In.)
Critical Depth =   11.78(In.)
Pipe flow velocity =      6.48(Ft/s)
Travel time through pipe =    0.42 min.
Time of concentration (TC) =     5.77 min.


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Process from Point/Station      901.000 to Point/Station      903.000
**** CONFLUENCE OF MINOR STREAMS ****
------------------------------------------------------------------------------
Along Main Stream number: 1 in normal stream number 1
Stream flow area =      1.570(Ac.)
Runoff from this stream =      5.887(CFS)
Time of concentration =    5.77 min.
Rainfall intensity =     4.497(In/Hr)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      902.000 to Point/Station      904.000
**** INITIAL AREA EVALUATION ****
------------------------------------------------------------------------------
Initial area flow distance =   140.000(Ft.)
Top (of initial area) elevation =  1660.000(Ft.)
Bottom (of initial area) elevation =  1659.100(Ft.)
Difference in elevation =     0.900(Ft.)
Slope =    0.00643  s(percent)=       0.64
TC = k(0.300)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    5.942 min.
Rainfall intensity =      4.428(In/Hr) for a   100.0 year storm
COMMERCIAL subarea type
Runoff Coefficient = 0.892
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 3)  =  74.80
Pervious area fraction =  0.100; Impervious fraction =  0.900
Initial subarea runoff =      2.606(CFS)
Total initial stream area =        0.660(Ac.)
Pervious area fraction = 0.100


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Process from Point/Station      904.000 to Point/Station      903.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------------
Upstream point/station elevation =  1651.500(Ft.)
Downstream point/station elevation =  1651.000(Ft.)
Pipe length  =    41.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     2.606(CFS)
Nearest computed pipe diameter  =     12.00(In.)
Calculated individual pipe flow  =     2.606(CFS)
Normal flow depth in pipe =    7.14(In.)
Flow top width inside pipe =   11.78(In.)
Critical Depth =    8.30(In.)
Pipe flow velocity =      5.36(Ft/s)
Travel time through pipe =    0.13 min.
Time of concentration (TC) =     6.07 min.


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Process from Point/Station      904.000 to Point/Station      903.000
**** CONFLUENCE OF MINOR STREAMS ****
------------------------------------------------------------------------------
Along Main Stream number: 1 in normal stream number 2
Stream flow area =      0.660(Ac.)
Runoff from this stream =      2.606(CFS)
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```
Time of concentration =    6.07 min.
Rainfall intensity =     4.378(In/Hr)
Summary of stream data:

Stream   Flow rate      TC            Rainfall Intensity
 No.       (CFS)       (min)                (In/Hr)


1        5.887      5.77                 4.497
2        2.606      6.07                 4.378
Largest stream flow has longer or shorter time of concentration
Qp =      5.887 + sum of
          Qa          Tb/Ta
           2.606 *    0.951 =      2.477
Qp =      8.364

Total of 2 streams to confluence:
Flow rates before confluence point:
       5.887       2.606
Area of streams before confluence:
        1.570        0.660
Results of confluence:
Total flow rate =      8.364(CFS)
Time of concentration =     5.770 min.
Effective stream area after confluence =      2.230(Ac.)


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Process from Point/Station      903.000 to Point/Station      906.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________________
Upstream point/station elevation =  1651.000(Ft.)
Downstream point/station elevation =  1514.000(Ft.)
Pipe length  =   965.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     8.364(CFS)
Nearest computed pipe diameter  =     12.00(In.)
Calculated individual pipe flow  =     8.364(CFS)
Normal flow depth in pipe =    6.86(In.)
Flow top width inside pipe =   11.88(In.)
Critical depth could not be calculated.
Pipe flow velocity =     18.02(Ft/s)
Travel time through pipe =    0.89 min.
Time of concentration (TC) =     6.66 min.


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Process from Point/Station      903.000 to Point/Station      906.000
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________________
Along Main Stream number: 1 in normal stream number 1
Stream flow area =      2.230(Ac.)
Runoff from this stream =      8.364(CFS)
Time of concentration =    6.66 min.
Rainfall intensity =     4.167(In/Hr)


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Process from Point/Station      900.000 to Point/Station      906.000
**** INITIAL AREA EVALUATION ****
______________________________________________________________________________
Initial area flow distance =   953.000(Ft.)
Top (of initial area) elevation =  1717.700(Ft.)
Bottom (of initial area) elevation =  1520.000(Ft.)
Difference in elevation =   197.700(Ft.)
Slope =    0.20745  s(percent)=      20.75
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   11.286 min.
Rainfall intensity =      3.152(In/Hr) for a   100.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.859
Decimal fraction soil group A = 0.000
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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 3)  =  89.80
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =     16.698(CFS)
Total initial stream area =        6.170(Ac.)
Pervious area fraction = 1.000


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Process from Point/Station      906.000 to Point/Station      905.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------------
Upstream point/station elevation =  1514.500(Ft.)
Downstream point/station elevation =  1514.000(Ft.)
Pipe length  =    23.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    16.698(CFS)
Nearest computed pipe diameter  =     21.00(In.)
Calculated individual pipe flow  =    16.698(CFS)
Normal flow depth in pipe =   13.13(In.)
Flow top width inside pipe =   20.33(In.)
Critical Depth =   18.01(In.)
Pipe flow velocity =     10.55(Ft/s)
Travel time through pipe =    0.04 min.
Time of concentration (TC) =    11.32 min.


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Process from Point/Station      906.000 to Point/Station      905.000
**** CONFLUENCE OF MINOR STREAMS ****
------------------------------------------------------------------------------
Along Main Stream number: 1 in normal stream number 2
Stream flow area =      6.170(Ac.)
Runoff from this stream =     16.698(CFS)
Time of concentration =   11.32 min.
Rainfall intensity =     3.146(In/Hr)


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Process from Point/Station      907.000 to Point/Station      908.000
**** INITIAL AREA EVALUATION ****
------------------------------------------------------------------------------
Initial area flow distance =   508.000(Ft.)
Top (of initial area) elevation =  1528.000(Ft.)
Bottom (of initial area) elevation =  1521.000(Ft.)
Difference in elevation =     7.000(Ft.)
Slope =    0.01378  s(percent)=       1.38
TC = k(0.530)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   15.093 min.
Rainfall intensity =      2.702(In/Hr) for a   100.0 year storm
UNDEVELOPED (poor cover) subarea
Runoff Coefficient = 0.877
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.500
Decimal fraction soil group D = 0.500
RI index for soil(AMC 3)  =  95.00
Pervious area fraction =  1.000; Impervious fraction =  0.000
Initial subarea runoff =      1.422(CFS)
Total initial stream area =        0.600(Ac.)
Pervious area fraction = 1.000


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Process from Point/Station      908.000 to Point/Station      905.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------------
Upstream point/station elevation =  1514.500(Ft.)
Downstream point/station elevation =  1514.000(Ft.)
Pipe length  =    23.00(Ft.)   Manning's N = 0.013
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```
No. of pipes = 1  Required pipe flow  =     1.422(CFS)
Nearest computed pipe diameter  =      9.00(In.)
Calculated individual pipe flow  =     1.422(CFS)
Normal flow depth in pipe =    4.93(In.)
Flow top width inside pipe =    8.96(In.)
Critical Depth =    6.59(In.)
Pipe flow velocity =      5.73(Ft/s)
Travel time through pipe =    0.07 min.
Time of concentration (TC) =    15.16 min.


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Process from Point/Station      908.000 to Point/Station      905.000
**** CONFLUENCE OF MINOR STREAMS ****
________________________________________________________________________
Along Main Stream number: 1 in normal stream number 3
Stream flow area =      0.600(Ac.)
Runoff from this stream =      1.422(CFS)
Time of concentration =   15.16 min.
Rainfall intensity =     2.695(In/Hr)
Summary of stream data:

Stream   Flow rate      TC            Rainfall Intensity
 No.       (CFS)       (min)                (In/Hr)


1        8.364      6.66                 4.167
2       16.698     11.32                 3.146
3        1.422     15.16                 2.695
Largest stream flow has longer or shorter time of concentration
Qp =     16.698 + sum of
          Qb         Ia/Ib
           8.364 *    0.755 =      6.315
          Qa          Tb/Ta
           1.422 *    0.747 =      1.062
Qp =     24.075

Total of 3 streams to confluence:
Flow rates before confluence point:
       8.364      16.698       1.422
Area of streams before confluence:
        2.230        6.170        0.600
Results of confluence:
Total flow rate =     24.075(CFS)
Time of concentration =    11.322 min.
Effective stream area after confluence =      9.000(Ac.)


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Process from Point/Station      905.000 to Point/Station      909.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
________________________________________________________________________
Upstream point/station elevation =  1514.000(Ft.)
Downstream point/station elevation =  1502.700(Ft.)
Pipe length  =   592.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    24.075(CFS)
Nearest computed pipe diameter  =     24.00(In.)
Calculated individual pipe flow  =    24.075(CFS)
Normal flow depth in pipe =   15.80(In.)
Flow top width inside pipe =   22.77(In.)
Critical Depth =   20.83(In.)
Pipe flow velocity =     10.97(Ft/s)
Travel time through pipe =    0.90 min.
Time of concentration (TC) =    12.22 min.


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Process from Point/Station      905.000 to Point/Station      909.000
**** SUBAREA FLOW ADDITION ****
________________________________________________________________________
SINGLE FAMILY (1/4 Acre Lot)
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```
Runoff Coefficient = 0.861
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.500
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.500
RI index for soil(AMC 3)  =  82.30
Pervious area fraction =  0.500; Impervious fraction =  0.500
Time of concentration =    12.22 min.
Rainfall intensity =      3.021(In/Hr) for a   100.0 year storm
Subarea runoff =    100.411(CFS) for     38.600(Ac.)
Total runoff =    124.486(CFS)       Total area =      47.600(Ac.)


++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
Process from Point/Station      909.000 to Point/Station      910.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
______________________________________________________________________________
Upstream point/station elevation =  1502.700(Ft.)
Downstream point/station elevation =  1499.100(Ft.)
Pipe length  =   301.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =   124.486(CFS)
Nearest computed pipe diameter  =     45.00(In.)
Calculated individual pipe flow  =   124.486(CFS)
Normal flow depth in pipe =   34.69(In.)
Flow top width inside pipe =   37.83(In.)
Critical Depth =   40.11(In.)
Pipe flow velocity =     13.62(Ft/s)
Travel time through pipe =    0.37 min.
Time of concentration (TC) =    12.59 min.


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Process from Point/Station      909.000 to Point/Station      910.000
**** CONFLUENCE OF MINOR STREAMS ****
______________________________________________________________________________
Along Main Stream number: 1 in normal stream number 1
Stream flow area =     47.600(Ac.)
Runoff from this stream =    124.486(CFS)
Time of concentration =   12.59 min.
Rainfall intensity =     2.974(In/Hr)


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Process from Point/Station      129.000 to Point/Station      130.000
**** INITIAL AREA EVALUATION ****
______________________________________________________________________________
Initial area flow distance =   226.000(Ft.)
Top (of initial area) elevation =  1521.000(Ft.)
Bottom (of initial area) elevation =  1519.100(Ft.)
Difference in elevation =     1.900(Ft.)
Slope =    0.00841  s(percent)=       0.84
TC = k(0.390)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =    8.867 min.
Rainfall intensity =      3.581(In/Hr) for a   100.0 year storm
SINGLE FAMILY (1/4 Acre Lot)
Runoff Coefficient = 0.850
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 3)  =  74.80
Pervious area fraction =  0.500; Impervious fraction =  0.500
Initial subarea runoff =      1.644(CFS)
Total initial stream area =        0.540(Ac.)
Pervious area fraction = 0.500


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Process from Point/Station      130.000 to Point/Station      131.000
**** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ****
______________________________________________________________________________
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Top of street segment elevation =  1519.100(Ft.)
End of street segment elevation =  1508.600(Ft.)
Length of street segment  =   768.000(Ft.)
Height of curb above gutter flowline  =    6.0(In.)
Width of half street (curb to crown)  =  18.000(Ft.)
Distance from crown to crossfall grade break  =  16.000(Ft.)
Slope from gutter to grade break (v/hz) =   0.020
Slope from grade break to crown (v/hz)  =   0.020
Street flow is on [1] side(s) of the street
Distance from curb to property line  =  10.000(Ft.)
Slope from curb to property line (v/hz) =   0.020
Gutter width =   2.000(Ft.)
Gutter hike from flowline =  1.500(In.)
 Manning's N in gutter =  0.0130
 Manning's N from gutter to grade break =  0.0130
 Manning's N from grade break to crown =  0.0130
Estimated mean flow rate at midpoint of street =      3.981(CFS)
Depth of flow =   0.303(Ft.), Average velocity =   3.133(Ft/s)
Streetflow hydraulics at midpoint of street travel:
Halfstreet flow width =  10.889(Ft.)
Flow velocity =   3.13(Ft/s)
Travel time =    4.09 min.     TC =   12.95  min.
 Adding area flow to street
SINGLE FAMILY (1/4 Acre Lot)
Runoff Coefficient = 0.860
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.500
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.500
RI index for soil(AMC 3)  =  82.30
Pervious area fraction =  0.500; Impervious fraction =  0.500
Rainfall intensity =      2.930(In/Hr) for a   100.0 year storm
Subarea runoff =      4.610(CFS) for      1.830(Ac.)
Total runoff =      6.253(CFS)       Total area =       2.370(Ac.)
Street flow at end of street =      6.253(CFS)
Half street flow at end of street =      6.253(CFS)
Depth of flow =   0.346(Ft.), Average velocity =   3.492(Ft/s)
Flow width (from curb towards crown)=  13.061(Ft.)


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Process from Point/Station      131.000 to Point/Station      910.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------------
Upstream point/station elevation =  1499.400(Ft.)
Downstream point/station elevation =  1499.100(Ft.)
Pipe length  =    22.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =     6.253(CFS)
Nearest computed pipe diameter  =     15.00(In.)
Calculated individual pipe flow  =     6.253(CFS)
Normal flow depth in pipe =   10.42(In.)
Flow top width inside pipe =   13.82(In.)
Critical Depth =   12.11(In.)
Pipe flow velocity =      6.87(Ft/s)
Travel time through pipe =    0.05 min.
Time of concentration (TC) =    13.01 min.


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Process from Point/Station      131.000 to Point/Station      910.000
**** CONFLUENCE OF MINOR STREAMS ****
------------------------------------------------------------------------------
Along Main Stream number: 1 in normal stream number 2
Stream flow area =      2.370(Ac.)
Runoff from this stream =      6.253(CFS)
Time of concentration =   13.01 min.
Rainfall intensity =     2.923(In/Hr)


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Process from Point/Station      132.000 to Point/Station      133.000
```

```
**** INITIAL AREA EVALUATION ****
------------------------------------------------------------------------
Initial area flow distance =   636.000(Ft.)
Top (of initial area) elevation =  1526.500(Ft.)
Bottom (of initial area) elevation =  1519.100(Ft.)
Difference in elevation =     7.400(Ft.)
Slope =    0.01164  s(percent)=       1.16
TC = k(0.390)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration =   12.569 min.
Rainfall intensity =      2.977(In/Hr) for a   100.0 year storm
SINGLE FAMILY (1/4 Acre Lot)
Runoff Coefficient = 0.866
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.300
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.700
RI index for soil(AMC 3)  =  84.58
Pervious area fraction =  0.500; Impervious fraction =  0.500
Initial subarea runoff =      3.506(CFS)
Total initial stream area =        1.360(Ac.)
Pervious area fraction = 0.500


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Process from Point/Station      133.000 to Point/Station      134.000
**** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ****
------------------------------------------------------------------------
Top of street segment elevation =  1519.100(Ft.)
End of street segment elevation =  1510.100(Ft.)
Length of street segment  =   806.000(Ft.)
Height of curb above gutter flowline  =    6.0(In.)
Width of half street (curb to crown)  =  18.000(Ft.)
Distance from crown to crossfall grade break  =   9.000(Ft.)
Slope from gutter to grade break (v/hz) =   0.020
Slope from grade break to crown (v/hz)  =   0.020
Street flow is on [1] side(s) of the street
Distance from curb to property line  =  10.000(Ft.)
Slope from curb to property line (v/hz) =   0.020
Gutter width =   2.000(Ft.)
Gutter hike from flowline =  2.000(In.)
 Manning's N in gutter =  0.0130
 Manning's N from gutter to grade break =  0.0130
 Manning's N from grade break to crown =  0.0130
Estimated mean flow rate at midpoint of street =     11.030(CFS)
Depth of flow =   0.463(Ft.), Average velocity =   3.723(Ft/s)
Streetflow hydraulics at midpoint of street travel:
Halfstreet flow width =  16.840(Ft.)
Flow velocity =   3.72(Ft/s)
Travel time =    3.61 min.     TC =   16.18  min.
 Adding area flow to street
SINGLE FAMILY (1/4 Acre Lot)
Runoff Coefficient = 0.855
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.500
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.500
RI index for soil(AMC 3)  =  82.30
Pervious area fraction =  0.500; Impervious fraction =  0.500
Rainfall intensity =      2.604(In/Hr) for a   100.0 year storm
Subarea runoff =     14.968(CFS) for      6.720(Ac.)
Total runoff =     18.474(CFS)       Total area =       8.080(Ac.)
Street flow at end of street =     18.474(CFS)
Half street flow at end of street =     18.474(CFS)
Depth of flow =   0.537(Ft.), Average velocity =   4.289(Ft/s)
Warning: depth of flow exceeds top of curb
Note:  depth of flow exceeds top of street crown.
Distance that curb overflow reaches into property =    1.85(Ft.)
Flow width (from curb towards crown)=  18.000(Ft.)


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Process from Point/Station      134.000 to Point/Station      910.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------
Upstream point/station elevation =  1499.400(Ft.)
Downstream point/station elevation =  1499.100(Ft.)
Pipe length  =    25.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =    18.474(CFS)
Nearest computed pipe diameter  =     24.00(In.)
Calculated individual pipe flow  =    18.474(CFS)
Normal flow depth in pipe =   15.45(In.)
Flow top width inside pipe =   22.99(In.)
Critical Depth =   18.58(In.)
Pipe flow velocity =      8.65(Ft/s)
Travel time through pipe =    0.05 min.
Time of concentration (TC) =    16.23 min.


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Process from Point/Station      134.000 to Point/Station      910.000
**** CONFLUENCE OF MINOR STREAMS ****
------------------------------------------------------------------------
Along Main Stream number: 1 in normal stream number 3
Stream flow area =      8.080(Ac.)
Runoff from this stream =     18.474(CFS)
Time of concentration =   16.23 min.
Rainfall intensity =     2.600(In/Hr)
Summary of stream data:

Stream   Flow rate      TC            Rainfall Intensity
 No.       (CFS)       (min)                (In/Hr)


1      124.486     12.59                2.974
2        6.253     13.01                2.923
3       18.474     16.23                2.600
Largest stream flow has longer or shorter time of concentration
Qp =    124.486 + sum of
          Qa          Tb/Ta
           6.253 *    0.968 =      6.053
          Qa          Tb/Ta
          18.474 *    0.776 =     14.335
Qp =    144.874

Total of 3 streams to confluence:
Flow rates before confluence point:
     124.486       6.253      18.474
Area of streams before confluence:
       47.600        2.370        8.080
Results of confluence:
Total flow rate =    144.874(CFS)
Time of concentration =    12.590 min.
Effective stream area after confluence =     58.050(Ac.)


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Process from Point/Station      910.000 to Point/Station      911.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
------------------------------------------------------------------------
Upstream point/station elevation =  1499.100(Ft.)
Downstream point/station elevation =  1498.000(Ft.)
Pipe length  =   107.00(Ft.)   Manning's N = 0.013
No. of pipes = 1  Required pipe flow  =   144.874(CFS)
Nearest computed pipe diameter  =     48.00(In.)
Calculated individual pipe flow  =   144.874(CFS)
Normal flow depth in pipe =   39.09(In.)
Flow top width inside pipe =   37.32(In.)
Critical Depth =   42.64(In.)
Pipe flow velocity =     13.21(Ft/s)
Travel time through pipe =    0.13 min.
Time of concentration (TC) =    12.72 min.
End of computations, total study area =           58.05 (Ac.)
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The following figures may
be used for a unit hydrograph study of the same area.

Area averaged pervious area fraction(Ap) = 0.561
Area averaged RI index number =  67.1
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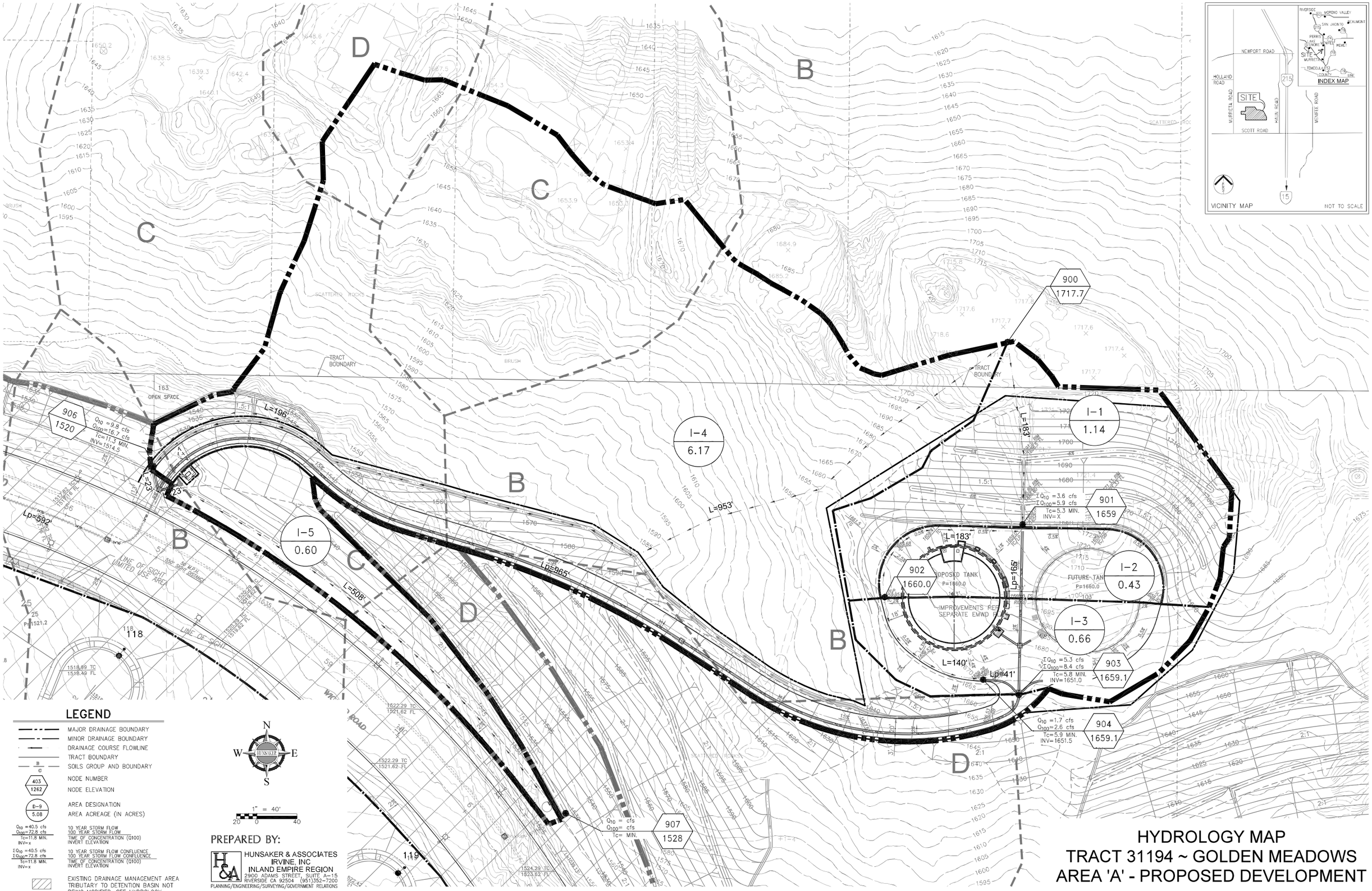
SECTION 4 - Hydrology Maps

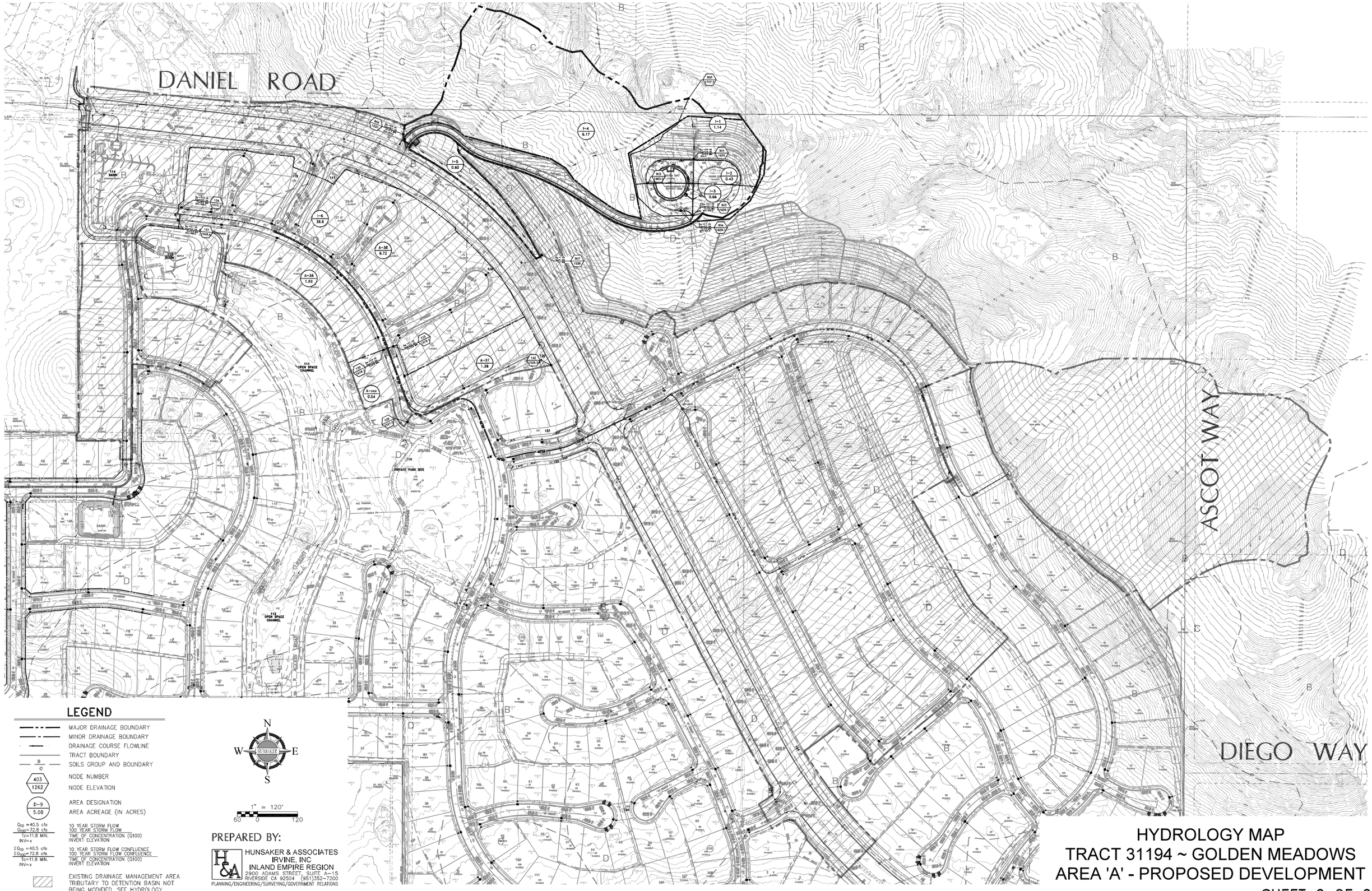
- Proposed Condition Hydrology Map



HYDROLOGY MAP
TRACT 31194 ~ GOLDEN MEADOWS
AREA 'A' - PROPOSED DEVELOPMENT

SHEET 1 OF 2

PLOTTED BY: Brian Lovell DATE: Jun 02, 2021 11:52:08 PW FILE: I:\05546\Engineering\Hydrology\Water Tank Site Hydrology\Maps\05546 GPH 01 HYDR TANK SITE.dwg



LEGEND

- MAJOR DRAINAGE BOUNDARY
- MINOR DRAINAGE BOUNDARY
- DRAINAGE COURSE FLOWLINE
- TRACT BOUNDARY
- SOILS GROUP AND BOUNDARY
- NODE NUMBER
- NODE ELEVATION
- AREA DESIGNATION
- AREA ACREAGE (IN ACRES)
- Q_{10} =40.5 cfs / Q_{100}=72.8 cfs — 10 YEAR STORM FLOW / 100 YEAR STORM FLOW — Tc=11.8 MIN. — TIME OF CONCENTRATION (G100) — INV=x — INVERT ELEVATION
- ΣQ_{10} =40.5 cfs / ΣQ_{100}=72.8 cfs — 10 YEAR STORM FLOW CONFLUENCE / 100 YEAR STORM FLOW CONFLUENCE — Tc=11.8 MIN. — TIME OF CONCENTRATION (G100) — INV=x — INVERT ELEVATION
- EXISTING DRAINAGE MANAGEMENT AREA TRIBUTARY TO DETENTION BASIN NOT BEING MODIFIED, SEE HYDROLOGY ANALYSIS FOR TRACT 31194

N W HUNSAKER E S

1" = 120'
60 0 120

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HYDROLOGY MAP
TRACT 31194 ~ GOLDEN MEADOWS
AREA 'A' - PROPOSED DEVELOPMENT

SHEET 2 OF 2

PLOTTED BY: Brian Lowell DATE: Jun 22, 2021 11:58:29 PM FILE: I:\00546\Engineering\Hydrology\Water Tank Site Hydrology\Maps\00546-Sht-C-H- PRE TANK SITE.dwg