APPENDIX A

Air Quality and Greenhouse Gas Modeling Data

Victorville Pipeline - Mojave Desert Air Basin, Annual

Victorville Pipeline

Mojave Desert Air Basin, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
General Light Industry	55.00	1000sqft	1.26	55,000.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.6	**Precipitation Freq (Days)**	31
Climate Zone	10			**Operational Year**	2019
Utility Company	Southern California Edison				
CO2 Intensity (lb/MWhr)	702.44	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - Assumed based on average trenching width of apparoximately 10 feet for a 24" pipeline alignment

Construction Phase - Construction assumptions based on information from applicant.

Off-road Equipment - Construction equipment based on information from client.

Off-road Equipment - Construction assumptions

Off-road Equipment - Construction assumptions

Vehicle Trips - 1 trip per week for maintenance

Water And Wastewater - No indoor or outdoor water usage

Solid Waste - No solid waste

Construction Off-road Equipment Mitigation - 'Per CARB Title 13 CCR Section 2520-2427, equipment required to be Tier 4 Final for new equipment. For conservative analysis, Project will
utilize Tier 2. Compliance with MDAQMD Dust control Rule 403.

Area Mitigation - MDAQMD Rule 1115 - Metal parts & Products Coating Operations

Water Mitigation -

Table Name	Column Name	Default Value	New Value
tblAreaMitigation	UseLowVOCPaintParkingCheck	False	True
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	4.00
tblConstEquipMitigation	Tier	No Change	Tier 2
tblConstEquipMitigation	Tier	No Change	Tier 2
tblConstEquipMitigation	Tier	No Change	Tier 2
tblConstEquipMitigation	Tier	No Change	Tier 2
tblConstEquipMitigation	Tier	No Change	Tier 2
tblConstEquipMitigation	Tier	No Change	Tier 2
tblConstEquipMitigation	Tier	No Change	Tier 2
tblConstEquipMitigation	Tier	No Change	Tier 2
tblConstEquipMitigation	Tier	No Change	Tier 2
tblConstEquipMitigation	Tier	No Change	Tier 2
tblConstEquipMitigation	Tier	No Change	Tier 2

tblConstEquipMitigation	Tier	No Change	Tier 2
tblGrading	AcresOfGrading	3.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	2.00
tblOffRoadEquipment	PhaseName		Trenching
tblOffRoadEquipment	PhaseName		Trenching
tblOffRoadEquipment	PhaseName		Trenching
tblOffRoadEquipment	PhaseName		Trenching
tblOffRoadEquipment	PhaseName		Site Preparation
tblOffRoadEquipment	PhaseName		Trenching
tblOffRoadEquipment	UsageHours	8.00	7.00
tblSolidWaste	SolidWasteGenerationRate	68.20	0.00
tblVehicleTrips	ST_TR	1.32	0.00
tblVehicleTrips	SU_TR	0.68	0.00
tblVehicleTrips	WD_TR	6.97	0.20
tblWater	IndoorWaterUseRate	12,718,750.00	0.00

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					

2018	0.0522	0.5212	0.4089	6.9000e-004	0.0137	0.0273	0.0410	4.9800e-003	0.0252	0.0302	0.0000	61.5573	61.5573	0.0174	0.0000	61.9929
Maximum	**0.0522**	**0.5212**	**0.4089**	**6.9000e-004**	**0.0137**	**0.0273**	**0.0410**	**4.9800e-003**	**0.0252**	**0.0302**	**0.0000**	**61.5573**	**61.5573**	**0.0174**	**0.0000**	**61.9929**

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					
2018	0.0254	0.5308	0.4401	6.9000e-004	0.0137	0.0167	0.0304	4.9800e-003	0.0167	0.0217	0.0000	61.5572	61.5572	0.0174	0.0000	61.9928
Maximum	**0.0254**	**0.5308**	**0.4401**	**6.9000e-004**	**0.0137**	**0.0167**	**0.0304**	**4.9800e-003**	**0.0167**	**0.0217**	**0.0000**	**61.5572**	**61.5572**	**0.0174**	**0.0000**	**61.9928**

	ROG	NOx	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	**51.44**	**-1.82**	**-7.63**	**0.00**	**0.00**	**38.87**	**25.92**	**0.00**	**33.80**	**28.22**	**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	6-1-2018	8-31-2018	0.5899	0.5681
		Highest	0.5899	0.5681

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	0.2786	0.0000	5.1000e-004	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	9.8000e-004	9.8000e-004	0.0000	0.0000	1.0500e-003
Energy	9.6400e-003	0.0876	0.0736	5.3000e-004		6.6600e-003	6.6600e-003		6.6600e-003	6.6600e-003	0.0000	273.2289	273.2289	9.1700e-003	3.2700e-003	274.4319
Mobile	3.6600e-003	0.0320	0.0408	1.4000e-004	8.7800e-003	1.3000e-004	8.9100e-003	2.3500e-003	1.2000e-004	2.4800e-003	0.0000	13.4219	13.4219	1.0900e-003	0.0000	13.4491
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	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.2919**	**0.1196**	**0.1149**	**6.7000e-004**	**8.7800e-003**	**6.7900e-003**	**0.0156**	**2.3500e-003**	**6.7800e-003**	**9.1400e-003**	**0.0000**	**286.6517**	**286.6517**	**0.0103**	**3.2700e-003**	**287.8821**

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	0.2625	0.0000	5.1000e-004	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	9.8000e-004	9.8000e-004	0.0000	0.0000	1.0500e-003
Energy	9.6400e-003	0.0876	0.0736	5.3000e-004		6.6600e-003	6.6600e-003		6.6600e-003	6.6600e-003	0.0000	273.2289	273.2289	9.1700e-003	3.2700e-003	274.4319
Mobile	3.6600e-003	0.0320	0.0408	1.4000e-004	8.7800e-003	1.3000e-004	8.9100e-003	2.3500e-003	1.2000e-004	2.4800e-003	0.0000	13.4219	13.4219	1.0900e-003	0.0000	13.4491
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	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.2758**	**0.1196**	**0.1149**	**6.7000e-004**	**8.7800e-003**	**6.7900e-003**	**0.0156**	**2.3500e-003**	**6.7800e-003**	**9.1400e-003**	**0.0000**	**286.6517**	**286.6517**	**0.0103**	**3.2700e-003**	**287.8821**

	ROG	NOx	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	**5.50**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Site Preparation	Site Preparation	6/1/2018	6/4/2018	5	2	
2	Trenching	Trenching	6/5/2018	7/23/2018	5	35	
3	Paving	Paving	7/12/2018	7/25/2018	5	10	

Acres of Grading (Site Preparation Phase): 1

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

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Site Preparation	Graders	1	8.00	187	0.41
Site Preparation	Rubber Tired Dozers	1	7.00	247	0.40
Site Preparation	Scrapers	1	8.00	367	0.48
Site Preparation	Tractors/Loaders/Backhoes	1	7.00	97	0.37
Trenching	Cranes	1	10.00	231	0.29
Trenching	Dumpers/Tenders	1	10.00	16	0.38
Trenching	Excavators	2	10.00	158	0.38
Trenching	Plate Compactors	2	10.00	8	0.43
Trenching	Tractors/Loaders/Backhoes	2	10.00	97	0.37
Paving	Cement and Mortar Mixers	1	6.00	9	0.56
Paving	Pavers	1	6.00	130	0.42
Paving	Paving Equipment	1	8.00	132	0.36
Paving	Rollers	2	7.00	80	0.38
Paving	Tractors/Loaders/Backhoes	1	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
Site Preparation	4	10.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Trenching	8	20.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Paving	6	15.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Paving	6	15.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Paving	6	15.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Use Cleaner Engines for Construction Equipment

Reduce Vehicle Speed on Unpaved Roads

3.2 Site Preparation - 2018

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					5.8000e-003	0.0000	5.8000e-003	2.9500e-003	0.0000	2.9500e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	2.9200e-003	0.0346	0.0166	3.0000e-005		1.4900e-003	1.4900e-003		1.3700e-003	1.3700e-003	0.0000	2.9221	2.9221	9.1000e-004	0.0000	2.9448
Total	**2.9200e-003**	**0.0346**	**0.0166**	**3.0000e-005**	**5.8000e-003**	**1.4900e-003**	**7.2900e-003**	**2.9500e-003**	**1.3700e-003**	**4.3200e-003**	**0.0000**	**2.9221**	**2.9221**	**9.1000e-004**	**0.0000**	**2.9448**

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	5.0000e-005	4.0000e-005	4.0000e-004	0.0000	8.0000e-005	0.0000	8.0000e-005	2.0000e-005	0.0000	2.0000e-005	0.0000	0.0743	0.0743	0.0000	0.0000	0.0744
Total	**5.0000e-005**	**4.0000e-005**	**4.0000e-004**	**0.0000**	**8.0000e-005**	**0.0000**	**8.0000e-005**	**2.0000e-005**	**0.0000**	**2.0000e-005**	**0.0000**	**0.0743**	**0.0743**	**0.0000**	**0.0000**	**0.0744**

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					5.8000e-003	0.0000	5.8000e-003	2.9500e-003	0.0000	2.9500e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	8.5000e-004	0.0264	0.0176	3.0000e-005		6.3000e-004	6.3000e-004		6.3000e-004	6.3000e-004	0.0000	2.9221	2.9221	9.1000e-004	0.0000	2.9448
Total	**8.5000e-004**	**0.0264**	**0.0176**	**3.0000e-005**	**5.8000e-003**	**6.3000e-004**	**6.4300e-003**	**2.9500e-003**	**6.3000e-004**	**3.5800e-003**	**0.0000**	**2.9221**	**2.9221**	**9.1000e-004**	**0.0000**	**2.9448**

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	5.0000e-005	4.0000e-005	4.0000e-004	0.0000	8.0000e-005	0.0000	8.0000e-005	2.0000e-005	0.0000	2.0000e-005	0.0000	0.0743	0.0743	0.0000	0.0000	0.0744

Total	**5.0000e-005**	**4.0000e-005**	**4.0000e-004**	**0.0000**	**8.0000e-005**	**0.0000**	**8.0000e-005**	**2.0000e-005**	**0.0000**	**2.0000e-005**	**0.0000**	**0.0743**	**0.0743**	**0.0000**	**0.0000**	**0.0744**

3.3 Trenching - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0401	0.4209	0.3154	5.3000e-004		0.0220	0.0220		0.0203	0.0203	0.0000	47.1354	47.1354	0.0141	0.0000	47.4890
Total	**0.0401**	**0.4209**	**0.3154**	**5.3000e-004**		**0.0220**	**0.0220**		**0.0203**	**0.0203**	**0.0000**	**47.1354**	**47.1354**	**0.0141**	**0.0000**	**47.4890**

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	1.7700e-003	1.5300e-003	0.0140	3.0000e-005	2.8200e-003	2.0000e-005	2.8400e-003	7.5000e-004	2.0000e-005	7.7000e-004	0.0000	2.5996	2.5996	1.1000e-004	0.0000	2.6023
Total	**1.7700e-003**	**1.5300e-003**	**0.0140**	**3.0000e-005**	**2.8200e-003**	**2.0000e-005**	**2.8400e-003**	**7.5000e-004**	**2.0000e-005**	**7.7000e-004**	**0.0000**	**2.5996**	**2.5996**	**1.1000e-004**	**0.0000**	**2.6023**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0183	0.4320	0.3411	5.3000e-004		0.0135	0.0135		0.0135	0.0135	0.0000	47.1354	47.1354	0.0141	0.0000	47.4890
Total	**0.0183**	**0.4320**	**0.3411**	**5.3000e-004**		**0.0135**	**0.0135**		**0.0135**	**0.0135**	**0.0000**	**47.1354**	**47.1354**	**0.0141**	**0.0000**	**47.4890**

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	1.7700e-003	1.5300e-003	0.0140	3.0000e-005	2.8200e-003	2.0000e-005	2.8400e-003	7.5000e-004	2.0000e-005	7.7000e-004	0.0000	2.5996	2.5996	1.1000e-004	0.0000	2.6023
Total	**1.7700e-003**	**1.5300e-003**	**0.0140**	**3.0000e-005**	**2.8200e-003**	**2.0000e-005**	**2.8400e-003**	**7.5000e-004**	**2.0000e-005**	**7.7000e-004**	**0.0000**	**2.5996**	**2.5996**	**1.1000e-004**	**0.0000**	**2.6023**

3.4 Paving - 2018

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	6.2200e-003	0.0632	0.0534	8.0000e-005		3.8000e-003	3.8000e-003		3.5000e-003	3.5000e-003	0.0000	7.1548	7.1548	2.1900e-003	0.0000	7.2096
Paving	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**6.2200e-003**	**0.0632**	**0.0534**	**8.0000e-005**		**3.8000e-003**	**3.8000e-003**		**3.5000e-003**	**3.5000e-003**	**0.0000**	**7.1548**	**7.1548**	**2.1900e-003**	**0.0000**	**7.2096**

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	1.1400e-003	9.9000e-004	9.0200e-003	2.0000e-005	4.9600e-003	1.0000e-005	4.9700e-003	1.2500e-003	1.0000e-005	1.2700e-003	0.0000	1.6712	1.6712	7.0000e-005	0.0000	1.6729
Total	**1.1400e-003**	**9.9000e-004**	**9.0200e-003**	**2.0000e-005**	**4.9600e-003**	**1.0000e-005**	**4.9700e-003**	**1.2500e-003**	**1.0000e-005**	**1.2700e-003**	**0.0000**	**1.6712**	**1.6712**	**7.0000e-005**	**0.0000**	**1.6729**

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	3.2900e-003	0.0699	0.0579	8.0000e-005		2.5100e-003	2.5100e-003		2.5100e-003	2.5100e-003	0.0000	7.1548	7.1548	2.1900e-003	0.0000	7.2095
Paving	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**3.2900e-003**	**0.0699**	**0.0579**	**8.0000e-005**		**2.5100e-003**	**2.5100e-003**		**2.5100e-003**	**2.5100e-003**	**0.0000**	**7.1548**	**7.1548**	**2.1900e-003**	**0.0000**	**7.2095**

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	1.1400e-003	9.9000e-004	9.0200e-003	2.0000e-005	4.9600e-003	1.0000e-005	4.9700e-003	1.2500e-003	1.0000e-005	1.2700e-003	0.0000	1.6712	1.6712	7.0000e-005	0.0000	1.6729
Total	**1.1400e-003**	**9.9000e-004**	**9.0200e-003**	**2.0000e-005**	**4.9600e-003**	**1.0000e-005**	**4.9700e-003**	**1.2500e-003**	**1.0000e-005**	**1.2700e-003**	**0.0000**	**1.6712**	**1.6712**	**7.0000e-005**	**0.0000**	**1.6729**

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	3.6600e-003	0.0320	0.0408	1.4000e-004	8.7800e-003	1.3000e-004	8.9100e-003	2.3500e-003	1.2000e-004	2.4800e-003	0.0000	13.4219	13.4219	1.0900e-003	0.0000	13.4491
Unmitigated	3.6600e-003	0.0320	0.0408	1.4000e-004	8.7800e-003	1.3000e-004	8.9100e-003	2.3500e-003	1.2000e-004	2.4800e-003	0.0000	13.4219	13.4219	1.0900e-003	0.0000	13.4491

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
General Light Industry	11.00	0.00	0.00	22,939	22,939
Total	11.00	0.00	0.00	22,939	22,939

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 Light Industry	9.50	7.30	7.30	59.00	28.00	13.00	92	5	3

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
General Light Industry	0.528278	0.037539	0.171581	0.116384	0.021852	0.006015	0.010031	0.093311	0.001603	0.002174	0.008978	0.000895	0.001360

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	177.8704	177.8704	7.3400e-003	1.5200e-003	178.5068
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000	0.0000	177.8704	177.8704	7.3400e-003	1.5200e-003	178.5068
NaturalGas Mitigated	9.6400e-003	0.0876	0.0736	5.3000e-004		6.6600e-003	6.6600e-003		6.6600e-003	6.6600e-003	0.0000	95.3585	95.3585	1.8300e-003	1.7500e-003	95.9251
NaturalGas Unmitigated	9.6400e-003	0.0876	0.0736	5.3000e-004		6.6600e-003	6.6600e-003		6.6600e-003	6.6600e-003	0.0000	95.3585	95.3585	1.8300e-003	1.7500e-003	95.9251

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 Light Industry	1.78695e+006	9.6400e-003	0.0876	0.0736	5.3000e-004		6.6600e-003	6.6600e-003		6.6600e-003	6.6600e-003	0.0000	95.3585	95.3585	1.8300e-003	1.7500e-003	95.9251
Total		**9.6400e-003**	**0.0876**	**0.0736**	**5.3000e-004**		**6.6600e-003**	**6.6600e-003**		**6.6600e-003**	**6.6600e-003**	**0.0000**	**95.3585**	**95.3585**	**1.8300e-003**	**1.7500e-003**	**95.9251**

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 Light Industry	1.78695e+006	9.6400e-003	0.0876	0.0736	5.3000e-004		6.6600e-003	6.6600e-003		6.6600e-003	6.6600e-003	0.0000	95.3585	95.3585	1.8300e-003	1.7500e-003	95.9251
Total		**9.6400e-003**	**0.0876**	**0.0736**	**5.3000e-004**		**6.6600e-003**	**6.6600e-003**		**6.6600e-003**	**6.6600e-003**	**0.0000**	**95.3585**	**95.3585**	**1.8300e-003**	**1.7500e-003**	**95.9251**

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			

General Light Industry	558250	177.8704	7.3400e-003	1.5200e-003	178.5068
Total		**177.8704**	**7.3400e-003**	**1.5200e-003**	**178.5068**

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
General Light Industry	558250	177.8704	7.3400e-003	1.5200e-003	178.5068
Total		**177.8704**	**7.3400e-003**	**1.5200e-003**	**178.5068**

6.0 Area Detail

6.1 Mitigation Measures Area

Use Low VOC Paint - Residential Interior

Use Low VOC Paint - Residential Exterior

Use Low VOC Paint - Non-Residential Interior

Use Low VOC Paint - Non-Residential Exterior

Use Low VOC Cleaning Supplies

	ROG	NOx	CO	SO2	Fugitive 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	0.2625	0.0000	5.1000e-004	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	9.8000e-004	9.8000e-004	0.0000	0.0000	1.0500e-003
Unmitigated	0.2786	0.0000	5.1000e-004	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	9.8000e-004	9.8000e-004	0.0000	0.0000	1.0500e-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	0.0637					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.2148					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	5.0000e-005	0.0000	5.1000e-004	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	9.8000e-004	9.8000e-004	0.0000	0.0000	1.0500e-003
Total	**0.2786**	**0.0000**	**5.1000e-004**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**9.8000e-004**	**9.8000e-004**	**0.0000**	**0.0000**	**1.0500e-003**

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	0.0637					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.1987					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	5.0000e-005	0.0000	5.1000e-004	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	9.8000e-004	9.8000e-004	0.0000	0.0000	1.0500e-003

Total	**0.2625**	**0.0000**	**5.1000e-004**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**9.8000e-004**	**9.8000e-004**	**0.0000**	**0.0000**	**1.0500e-003**

7.0 Water Detail

7.1 Mitigation Measures Water

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

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
General Light Industry	0 / 0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
General Light Industry	0 / 0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

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

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e

Land Use	tons	MT/yr			
General Light 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 Light 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

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

Victorville Pipeline - Mojave Desert Air Basin, Summer

Victorville Pipeline

Mojave Desert Air Basin, Summer

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
General Light Industry	55.00	1000sqft	1.26	55,000.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.6	**Precipitation Freq (Days)**	31
Climate Zone	10			**Operational Year**	2019
Utility Company	Southern California Edison				
CO2 Intensity (lb/MWhr)	702.44	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - Assumed based on average trenching width of apparoximately 10 feet for a 24" pipeline alignment

Construction Phase - Construction assumptions based on information from applicant.

Off-road Equipment - Construction equipment based on information from client.

Off-road Equipment - Construction assumptions

Off-road Equipment - Construction assumptions

Vehicle Trips - 1 trip per week for maintenance

Water And Wastewater - No indoor or outdoor water usage

Solid Waste - No solid waste

Construction Off-road Equipment Mitigation - 'Per CARB Title 13 CCR Section 2520-2427, equipment required to be Tier 4 Final for new equipment. For conservative analysis, Project will
utilize Tier 2. Compliance with MDAQMD Dust control Rule 403.

Area Mitigation - MDAQMD Rule 1115 - Metal parts & Products Coating Operations

Water Mitigation -

Table Name	Column Name	Default Value	New Value
tblAreaMitigation	UseLowVOCPaintParkingCheck	False	True
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	4.00
tblConstEquipMitigation	Tier	No Change	Tier 2
tblConstEquipMitigation	Tier	No Change	Tier 2
tblConstEquipMitigation	Tier	No Change	Tier 2
tblConstEquipMitigation	Tier	No Change	Tier 2
tblConstEquipMitigation	Tier	No Change	Tier 2
tblConstEquipMitigation	Tier	No Change	Tier 2
tblConstEquipMitigation	Tier	No Change	Tier 2
tblConstEquipMitigation	Tier	No Change	Tier 2
tblConstEquipMitigation	Tier	No Change	Tier 2
tblConstEquipMitigation	Tier	No Change	Tier 2
tblConstEquipMitigation	Tier	No Change	Tier 2
tblConstEquipMitigation	Tier	No Change	Tier 2

tblGrading	AcresOfGrading	3.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	2.00
tblOffRoadEquipment	PhaseName		Trenching
tblOffRoadEquipment	PhaseName		Trenching
tblOffRoadEquipment	PhaseName		Trenching
tblOffRoadEquipment	PhaseName		Trenching
tblOffRoadEquipment	PhaseName		Site Preparation
tblOffRoadEquipment	PhaseName		Trenching
tblOffRoadEquipment	UsageHours	8.00	7.00
tblSolidWaste	SolidWasteGenerationRate	68.20	0.00
tblVehicleTrips	ST_TR	1.32	0.00
tblVehicleTrips	SU_TR	0.68	0.00
tblVehicleTrips	WD_TR	6.97	0.20
tblWater	IndoorWaterUseRate	12,718,750.00	0.00

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					

2018	3.9214	36.9435	31.7273	0.0518	5.8817	2.0208	7.3706	2.9755	1.8638	4.3452	0.0000	5,133.4092	5,133.4092	1.3988	0.0000	5,168.3790
Maximum	**3.9214**	**36.9435**	**31.7273**	**0.0518**	**5.8817**	**2.0208**	**7.3706**	**2.9755**	**1.8638**	**4.3452**	**0.0000**	**5,133.4092**	**5,133.4092**	**1.3988**	**0.0000**	**5,168.3790**

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					
2018	2.0858	38.9132	34.0952	0.0518	5.8817	1.2778	6.5152	2.9755	1.2775	3.6089	0.0000	5,133.4092	5,133.4092	1.3988	0.0000	5,168.3790
Maximum	**2.0858**	**38.9132**	**34.0952**	**0.0518**	**5.8817**	**1.2778**	**6.5152**	**2.9755**	**1.2775**	**3.6089**	**0.0000**	**5,133.4092**	**5,133.4092**	**1.3988**	**0.0000**	**5,168.3790**

	ROG	NOx	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	**46.81**	**-5.33**	**-7.46**	**0.00**	**0.00**	**36.77**	**11.60**	**0.00**	**31.46**	**16.94**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	1.5268	5.0000e-005	5.6700e-003	0.0000		2.0000e-005	2.0000e-005		2.0000e-005	2.0000e-005		0.0120	0.0120	3.0000e-005		0.0129
Energy	0.0528	0.4800	0.4032	2.8800e-003		0.0365	0.0365		0.0365	0.0365		575.9710	575.9710	0.0110	0.0106	579.3937

Mobile	0.0338	0.2418	0.3435	1.1900e-003	0.0688	9.9000e-004	0.0698	0.0184	9.3000e-004	0.0194		121.1845	121.1845	9.1300e-003		121.4127
Total	**1.6133**	**0.7218**	**0.7523**	**4.0700e-003**	**0.0688**	**0.0375**	**0.1063**	**0.0184**	**0.0374**	**0.0559**		**697.1676**	**697.1676**	**0.0202**	**0.0106**	**700.8192**

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	1.4388	5.0000e-005	5.6700e-003	0.0000		2.0000e-005	2.0000e-005		2.0000e-005	2.0000e-005		0.0120	0.0120	3.0000e-005		0.0129
Energy	0.0528	0.4800	0.4032	2.8800e-003		0.0365	0.0365		0.0365	0.0365		575.9710	575.9710	0.0110	0.0106	579.3937
Mobile	0.0338	0.2418	0.3435	1.1900e-003	0.0688	9.9000e-004	0.0698	0.0184	9.3000e-004	0.0194		121.1845	121.1845	9.1300e-003		121.4127
Total	**1.5253**	**0.7218**	**0.7523**	**4.0700e-003**	**0.0688**	**0.0375**	**0.1063**	**0.0184**	**0.0374**	**0.0559**		**697.1676**	**697.1676**	**0.0202**	**0.0106**	**700.8192**

	ROG	NOx	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	**5.45**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Site Preparation	Site Preparation	6/1/2018	6/4/2018	5	2	
2	Trenching	Trenching	6/5/2018	7/23/2018	5	35	
3	Paving	Paving	7/12/2018	7/25/2018	5	10	

Acres of Grading (Site Preparation Phase): 1

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

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Site Preparation	Graders	1	8.00	187	0.41
Site Preparation	Rubber Tired Dozers	1	7.00	247	0.40
Site Preparation	Scrapers	1	8.00	367	0.48
Site Preparation	Tractors/Loaders/Backhoes	1	7.00	97	0.37
Trenching	Cranes	1	10.00	231	0.29
Trenching	Dumpers/Tenders	1	10.00	16	0.38
Trenching	Excavators	2	10.00	158	0.38
Trenching	Plate Compactors	2	10.00	8	0.43
Trenching	Tractors/Loaders/Backhoes	2	10.00	97	0.37
Paving	Cement and Mortar Mixers	1	6.00	9	0.56
Paving	Pavers	1	6.00	130	0.42
Paving	Paving Equipment	1	8.00	132	0.36
Paving	Rollers	2	7.00	80	0.38
Paving	Tractors/Loaders/Backhoes	1	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
Site Preparation	4	10.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Trenching	8	20.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Paving	6	15.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Paving	6	15.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Paving	6	15.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Use Cleaner Engines for Construction Equipment

Reduce Vehicle Speed on Unpaved Roads

3.2 Site Preparation - 2018

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					5.7996	0.0000	5.7996	2.9537	0.0000	2.9537			0.0000			0.0000
Off-Road	2.9198	34.6100	16.5755	0.0320		1.4883	1.4883		1.3692	1.3692		3,221.0648	3,221.0648	1.0028		3,246.1339
Total	**2.9198**	**34.6100**	**16.5755**	**0.0320**	**5.7996**	**1.4883**	**7.2878**	**2.9537**	**1.3692**	**4.3229**		**3,221.0648**	**3,221.0648**	**1.0028**		**3,246.1339**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0590	0.0397	0.4643	9.1000e-004	0.0822	5.8000e-004	0.0827	0.0218	5.3000e-004	0.0223		90.3125	90.3125	3.8000e-003		90.4076
Total	**0.0590**	**0.0397**	**0.4643**	**9.1000e-004**	**0.0822**	**5.8000e-004**	**0.0827**	**0.0218**	**5.3000e-004**	**0.0223**		**90.3125**	**90.3125**	**3.8000e-003**		**90.4076**

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					5.7996	0.0000	5.7996	2.9537	0.0000	2.9537			0.0000			0.0000
Off-Road	0.8455	26.3455	17.6074	0.0320		0.6329	0.6329		0.6329	0.6329	0.0000	3,221.0648	3,221.0648	1.0028		3,246.1339
Total	**0.8455**	**26.3455**	**17.6074**	**0.0320**	**5.7996**	**0.6329**	**6.4325**	**2.9537**	**0.6329**	**3.5866**	**0.0000**	**3,221.0648**	**3,221.0648**	**1.0028**		**3,246.1339**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0590	0.0397	0.4643	9.1000e-004	0.0822	5.8000e-004	0.0827	0.0218	5.3000e-004	0.0223		90.3125	90.3125	3.8000e-003		90.4076
Total	**0.0590**	**0.0397**	**0.4643**	**9.1000e-004**	**0.0822**	**5.8000e-004**	**0.0827**	**0.0218**	**5.3000e-004**	**0.0223**		**90.3125**	**90.3125**	**3.8000e-003**		**90.4076**

3.3 Trenching - 2018

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	2.2938	24.0513	18.0231	0.0300		1.2572	1.2572		1.1604	1.1604		2,969.0240	2,969.0240	0.8909		2,991.2958
Total	**2.2938**	**24.0513**	**18.0231**	**0.0300**		**1.2572**	**1.2572**		**1.1604**	**1.1604**		**2,969.0240**	**2,969.0240**	**0.8909**		**2,991.2958**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.1181	0.0794	0.9286	1.8200e-003	0.1643	1.1600e-003	0.1655	0.0436	1.0700e-003	0.0447		180.6250	180.6250	7.6100e-003		180.8152
Total	**0.1181**	**0.0794**	**0.9286**	**1.8200e-003**	**0.1643**	**1.1600e-003**	**0.1655**	**0.0436**	**1.0700e-003**	**0.0447**		**180.6250**	**180.6250**	**7.6100e-003**		**180.8152**

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	1.0442	24.6851	19.4901	0.0300		0.7727	0.7727		0.7727	0.7727	0.0000	2,969.0240	2,969.0240	0.8909		2,991.2958
Total	**1.0442**	**24.6851**	**19.4901**	**0.0300**		**0.7727**	**0.7727**		**0.7727**	**0.7727**	**0.0000**	**2,969.0240**	**2,969.0240**	**0.8909**		**2,991.2958**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.1181	0.0794	0.9286	1.8200e-003	0.1643	1.1600e-003	0.1655	0.0436	1.0700e-003	0.0447		180.6250	180.6250	7.6100e-003		180.8152
Total	**0.1181**	**0.0794**	**0.9286**	**1.8200e-003**	**0.1643**	**1.1600e-003**	**0.1655**	**0.0436**	**1.0700e-003**	**0.0447**		**180.6250**	**180.6250**	**7.6100e-003**		**180.8152**

3.4 Paving - 2018

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	1.2439	12.6343	10.6861	0.0158		0.7599	0.7599		0.6999	0.6999		1,577.3541	1,577.3541	0.4832		1,589.4339
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**1.2439**	**12.6343**	**10.6861**	**0.0158**		**0.7599**	**0.7599**		**0.6999**	**0.6999**		**1,577.3541**	**1,577.3541**	**0.4832**		**1,589.4339**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e

Category	lb/day											lb/day				
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.2657	0.1786	2.0894	4.0900e-003	1.0122	2.6100e-003	1.0148	0.2558	2.4000e-003	0.2582		406.4062	406.4062	0.0171		406.8341
Total	**0.2657**	**0.1786**	**2.0894**	**4.0900e-003**	**1.0122**	**2.6100e-003**	**1.0148**	**0.2558**	**2.4000e-003**	**0.2582**		**406.4062**	**406.4062**	**0.0171**		**406.8341**

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	0.6579	13.9702	11.5870	0.0158		0.5014	0.5014		0.5014	0.5014	0.0000	1,577.3541	1,577.3541	0.4832		1,589.4339
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**0.6579**	**13.9702**	**11.5870**	**0.0158**		**0.5014**	**0.5014**		**0.5014**	**0.5014**	**0.0000**	**1,577.3541**	**1,577.3541**	**0.4832**		**1,589.4339**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.2657	0.1786	2.0894	4.0900e-003	1.0122	2.6100e-003	1.0148	0.2558	2.4000e-003	0.2582		406.4062	406.4062	0.0171		406.8341

Total	**0.2657**	**0.1786**	**2.0894**	**4.0900e-003**	**1.0122**	**2.6100e-003**	**1.0148**	**0.2558**	**2.4000e-003**	**0.2582**		**406.4062**	**406.4062**	**0.0171**		**406.8341**

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	0.0338	0.2418	0.3435	1.1900e-003	0.0688	9.9000e-004	0.0698	0.0184	9.3000e-004	0.0194		121.1845	121.1845	9.1300e-003		121.4127
Unmitigated	0.0338	0.2418	0.3435	1.1900e-003	0.0688	9.9000e-004	0.0698	0.0184	9.3000e-004	0.0194		121.1845	121.1845	9.1300e-003		121.4127

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
General Light Industry	11.00	0.00	0.00	22,939	22,939
Total	11.00	0.00	0.00	22,939	22,939

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 Light Industry	9.50	7.30	7.30	59.00	28.00	13.00	92	5	3

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
General Light Industry	0.528278	0.037539	0.171581	0.116384	0.021852	0.006015	0.010031	0.093311	0.001603	0.002174	0.008978	0.000895	0.001360

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	0.0528	0.4800	0.4032	2.8800e-003		0.0365	0.0365		0.0365	0.0365		575.9710	575.9710	0.0110	0.0106	579.3937
NaturalGas Unmitigated	0.0528	0.4800	0.4032	2.8800e-003		0.0365	0.0365		0.0365	0.0365		575.9710	575.9710	0.0110	0.0106	579.3937

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 Light Industry	4895.75	0.0528	0.4800	0.4032	2.8800e-003		0.0365	0.0365		0.0365	0.0365		575.9710	575.9710	0.0110	0.0106	579.3937
Total		**0.0528**	**0.4800**	**0.4032**	**2.8800e-003**		**0.0365**	**0.0365**		**0.0365**	**0.0365**		**575.9710**	**575.9710**	**0.0110**	**0.0106**	**579.3937**

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 Light Industry	4.89575	0.0528	0.4800	0.4032	2.8800e-003		0.0365	0.0365		0.0365	0.0365		575.9710	575.9710	0.0110	0.0106	579.3937
Total		**0.0528**	**0.4800**	**0.4032**	**2.8800e-003**		**0.0365**	**0.0365**		**0.0365**	**0.0365**		**575.9710**	**575.9710**	**0.0110**	**0.0106**	**579.3937**

6.0 Area Detail

6.1 Mitigation Measures Area

Use Low VOC Paint - Residential Interior

Use Low VOC Paint - Residential Exterior

Use Low VOC Paint - Non-Residential Interior

Use Low VOC Paint - Non-Residential Exterior

Use Low VOC Cleaning Supplies

	ROG	NOx	CO	SO2	Fugitive 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	1.4388	5.0000e-005	5.6700e-003	0.0000		2.0000e-005	2.0000e-005		2.0000e-005	2.0000e-005		0.0120	0.0120	3.0000e-005		0.0129
Unmitigated	1.5268	5.0000e-005	5.6700e-003	0.0000		2.0000e-005	2.0000e-005		2.0000e-005	2.0000e-005		0.0120	0.0120	3.0000e-005		0.0129

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	0.3492					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	1.1770					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	5.4000e-004	5.0000e-005	5.6700e-003	0.0000		2.0000e-005	2.0000e-005		2.0000e-005	2.0000e-005		0.0120	0.0120	3.0000e-005		0.0129
Total	**1.5268**	**5.0000e-005**	**5.6700e-003**	**0.0000**		**2.0000e-005**	**2.0000e-005**		**2.0000e-005**	**2.0000e-005**		**0.0120**	**0.0120**	**3.0000e-005**		**0.0129**

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	0.3492					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	1.0890					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	5.4000e-004	5.0000e-005	5.6700e-003	0.0000		2.0000e-005	2.0000e-005		2.0000e-005	2.0000e-005		0.0120	0.0120	3.0000e-005		0.0129
Total	**1.4388**	**5.0000e-005**	**5.6700e-003**	**0.0000**		**2.0000e-005**	**2.0000e-005**		**2.0000e-005**	**2.0000e-005**		**0.0120**	**0.0120**	**3.0000e-005**		**0.0129**

7.0 Water Detail

7.1 Mitigation Measures Water

8.0 Waste Detail

8.1 Mitigation Measures Waste

9.0 Operational Offroad

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

10.0 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

Victorville Pipeline - Mojave Desert Air Basin, Winter

Victorville Pipeline

Mojave Desert Air Basin, Winter

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
General Light Industry	55.00	1000sqft	1.26	55,000.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.6	**Precipitation Freq (Days)**	31
Climate Zone	10			**Operational Year**	2019
Utility Company	Southern California Edison				
CO2 Intensity (lb/MWhr)	702.44	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - Assumed based on average trenching width of apparoximately 10 feet for a 24" pipeline alignment

Construction Phase - Construction assumptions based on information from applicant.

Off-road Equipment - Construction equipment based on information from client.

Off-road Equipment - Construction assumptions

Off-road Equipment - Construction assumptions

Vehicle Trips - 1 trip per week for maintenance

Water And Wastewater - No indoor or outdoor water usage

Solid Waste - No solid waste

Construction Off-road Equipment Mitigation - 'Per CARB Title 13 CCR Section 2520-2427, equipment required to be Tier 4 Final for new equipment. For conservative analysis, Project will
utilize Tier 2. Compliance with MDAQMD Dust control Rule 403.

Area Mitigation - MDAQMD Rule 1115 - Metal parts & Products Coating Operations

Water Mitigation -

Table Name	Column Name	Default Value	New Value
tblAreaMitigation	UseLowVOCPaintParkingCheck	False	True
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	4.00
tblConstEquipMitigation	Tier	No Change	Tier 2
tblConstEquipMitigation	Tier	No Change	Tier 2
tblConstEquipMitigation	Tier	No Change	Tier 2
tblConstEquipMitigation	Tier	No Change	Tier 2
tblConstEquipMitigation	Tier	No Change	Tier 2
tblConstEquipMitigation	Tier	No Change	Tier 2
tblConstEquipMitigation	Tier	No Change	Tier 2
tblConstEquipMitigation	Tier	No Change	Tier 2
tblConstEquipMitigation	Tier	No Change	Tier 2
tblConstEquipMitigation	Tier	No Change	Tier 2
tblConstEquipMitigation	Tier	No Change	Tier 2

tblConstEquipMitigation	Tier	No Change	Tier 2
tblGrading	AcresOfGrading	3.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	2.00
tblOffRoadEquipment	PhaseName		Trenching
tblOffRoadEquipment	PhaseName		Trenching
tblOffRoadEquipment	PhaseName		Trenching
tblOffRoadEquipment	PhaseName		Trenching
tblOffRoadEquipment	PhaseName		Site Preparation
tblOffRoadEquipment	PhaseName		Trenching
tblOffRoadEquipment	UsageHours	8.00	7.00
tblSolidWaste	SolidWasteGenerationRate	68.20	0.00
tblVehicleTrips	ST_TR	1.32	0.00
tblVehicleTrips	SU_TR	0.68	0.00
tblVehicleTrips	WD_TR	6.97	0.20
tblWater	IndoorWaterUseRate	12,718,750.00	0.00

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					

2018	3.8971	36.9522	31.1389	0.0511	5.8817	2.0208	7.3706	2.9755	1.8638	4.3452	0.0000	5,062.6605	5,062.6605	1.3953	0.0000	5,097.5441
Maximum	**3.8971**	**36.9522**	**31.1389**	**0.0511**	**5.8817**	**2.0208**	**7.3706**	**2.9755**	**1.8638**	**4.3452**	**0.0000**	**5,062.6605**	**5,062.6605**	**1.3953**	**0.0000**	**5,097.5441**

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					
2018	2.0615	38.9219	33.5067	0.0511	5.8817	1.2778	6.5152	2.9755	1.2775	3.6089	0.0000	5,062.6605	5,062.6605	1.3953	0.0000	5,097.5441
Maximum	**2.0615**	**38.9219**	**33.5067**	**0.0511**	**5.8817**	**1.2778**	**6.5152**	**2.9755**	**1.2775**	**3.6089**	**0.0000**	**5,062.6605**	**5,062.6605**	**1.3953**	**0.0000**	**5,097.5441**

	ROG	NOx	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	**47.10**	**-5.33**	**-7.60**	**0.00**	**0.00**	**36.77**	**11.60**	**0.00**	**31.46**	**16.94**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	1.5268	5.0000e-005	5.6700e-003	0.0000		2.0000e-005	2.0000e-005		2.0000e-005	2.0000e-005		0.0120	0.0120	3.0000e-005		0.0129
Energy	0.0528	0.4800	0.4032	2.8800e-003		0.0365	0.0365		0.0365	0.0365		575.9710	575.9710	0.0110	0.0106	579.3937

Mobile	0.0288	0.2396	0.3005	1.0800e-003	0.0688	1.0000e-003	0.0698	0.0184	9.4000e-004	0.0194		110.4382	110.4382	9.5700e-003		110.6775
Total	**1.6083**	**0.7197**	**0.7093**	**3.9600e-003**	**0.0688**	**0.0375**	**0.1063**	**0.0184**	**0.0374**	**0.0559**		**686.4213**	**686.4213**	**0.0206**	**0.0106**	**690.0841**

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	1.4388	5.0000e-005	5.6700e-003	0.0000		2.0000e-005	2.0000e-005		2.0000e-005	2.0000e-005		0.0120	0.0120	3.0000e-005		0.0129
Energy	0.0528	0.4800	0.4032	2.8800e-003		0.0365	0.0365		0.0365	0.0365		575.9710	575.9710	0.0110	0.0106	579.3937
Mobile	0.0288	0.2396	0.3005	1.0800e-003	0.0688	1.0000e-003	0.0698	0.0184	9.4000e-004	0.0194		110.4382	110.4382	9.5700e-003		110.6775
Total	**1.5203**	**0.7197**	**0.7093**	**3.9600e-003**	**0.0688**	**0.0375**	**0.1063**	**0.0184**	**0.0374**	**0.0559**		**686.4213**	**686.4213**	**0.0206**	**0.0106**	**690.0841**

	ROG	NOx	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	**5.47**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Site Preparation	Site Preparation	6/1/2018	6/4/2018	5	2	
2	Trenching	Trenching	6/5/2018	7/23/2018	5	35	
3	Paving	Paving	7/12/2018	7/25/2018	5	10	

Acres of Grading (Site Preparation Phase): 1

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

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Site Preparation	Graders	1	8.00	187	0.41
Site Preparation	Rubber Tired Dozers	1	7.00	247	0.40
Site Preparation	Scrapers	1	8.00	367	0.48
Site Preparation	Tractors/Loaders/Backhoes	1	7.00	97	0.37
Trenching	Cranes	1	10.00	231	0.29
Trenching	Dumpers/Tenders	1	10.00	16	0.38
Trenching	Excavators	2	10.00	158	0.38
Trenching	Plate Compactors	2	10.00	8	0.43
Trenching	Tractors/Loaders/Backhoes	2	10.00	97	0.37
Paving	Cement and Mortar Mixers	1	6.00	9	0.56
Paving	Pavers	1	6.00	130	0.42
Paving	Paving Equipment	1	8.00	132	0.36
Paving	Rollers	2	7.00	80	0.38
Paving	Tractors/Loaders/Backhoes	1	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
Site Preparation	4	10.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Trenching	8	20.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Paving	6	15.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Paving	6	15.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Paving	6	15.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Use Cleaner Engines for Construction Equipment

Reduce Vehicle Speed on Unpaved Roads

3.2 Site Preparation - 2018

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					5.7996	0.0000	5.7996	2.9537	0.0000	2.9537			0.0000			0.0000
Off-Road	2.9198	34.6100	16.5755	0.0320		1.4883	1.4883		1.3692	1.3692		3,221.0648	3,221.0648	1.0028		3,246.1339
Total	**2.9198**	**34.6100**	**16.5755**	**0.0320**	**5.7996**	**1.4883**	**7.2878**	**2.9537**	**1.3692**	**4.3229**		**3,221.0648**	**3,221.0648**	**1.0028**		**3,246.1339**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0553	0.0410	0.3738	8.0000e-004	0.0822	5.8000e-004	0.0827	0.0218	5.3000e-004	0.0223		79.4281	79.4281	3.2700e-003		79.5099
Total	**0.0553**	**0.0410**	**0.3738**	**8.0000e-004**	**0.0822**	**5.8000e-004**	**0.0827**	**0.0218**	**5.3000e-004**	**0.0223**		**79.4281**	**79.4281**	**3.2700e-003**		**79.5099**

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					5.7996	0.0000	5.7996	2.9537	0.0000	2.9537			0.0000			0.0000
Off-Road	0.8455	26.3455	17.6074	0.0320		0.6329	0.6329		0.6329	0.6329	0.0000	3,221.0648	3,221.0648	1.0028		3,246.1339
Total	**0.8455**	**26.3455**	**17.6074**	**0.0320**	**5.7996**	**0.6329**	**6.4325**	**2.9537**	**0.6329**	**3.5866**	**0.0000**	**3,221.0648**	**3,221.0648**	**1.0028**		**3,246.1339**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0553	0.0410	0.3738	8.0000e-004	0.0822	5.8000e-004	0.0827	0.0218	5.3000e-004	0.0223		79.4281	79.4281	3.2700e-003		79.5099
Total	**0.0553**	**0.0410**	**0.3738**	**8.0000e-004**	**0.0822**	**5.8000e-004**	**0.0827**	**0.0218**	**5.3000e-004**	**0.0223**		**79.4281**	**79.4281**	**3.2700e-003**		**79.5099**

3.3 Trenching - 2018

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	2.2938	24.0513	18.0231	0.0300		1.2572	1.2572		1.1604	1.1604		2,969.0240	2,969.0240	0.8909		2,991.2958
Total	**2.2938**	**24.0513**	**18.0231**	**0.0300**		**1.2572**	**1.2572**		**1.1604**	**1.1604**		**2,969.0240**	**2,969.0240**	**0.8909**		**2,991.2958**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.1106	0.0820	0.7476	1.6000e-003	0.1643	1.1600e-003	0.1655	0.0436	1.0700e-003	0.0447		158.8561	158.8561	6.5500e-003		159.0198
Total	**0.1106**	**0.0820**	**0.7476**	**1.6000e-003**	**0.1643**	**1.1600e-003**	**0.1655**	**0.0436**	**1.0700e-003**	**0.0447**		**158.8561**	**158.8561**	**6.5500e-003**		**159.0198**

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	1.0442	24.6851	19.4901	0.0300		0.7727	0.7727		0.7727	0.7727	0.0000	2,969.0240	2,969.0240	0.8909		2,991.2958
Total	**1.0442**	**24.6851**	**19.4901**	**0.0300**		**0.7727**	**0.7727**		**0.7727**	**0.7727**	**0.0000**	**2,969.0240**	**2,969.0240**	**0.8909**		**2,991.2958**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.1106	0.0820	0.7476	1.6000e-003	0.1643	1.1600e-003	0.1655	0.0436	1.0700e-003	0.0447		158.8561	158.8561	6.5500e-003		159.0198
Total	**0.1106**	**0.0820**	**0.7476**	**1.6000e-003**	**0.1643**	**1.1600e-003**	**0.1655**	**0.0436**	**1.0700e-003**	**0.0447**		**158.8561**	**158.8561**	**6.5500e-003**		**159.0198**

3.4 Paving - 2018

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	1.2439	12.6343	10.6861	0.0158		0.7599	0.7599		0.6999	0.6999		1,577.3541	1,577.3541	0.4832		1,589.4339
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**1.2439**	**12.6343**	**10.6861**	**0.0158**		**0.7599**	**0.7599**		**0.6999**	**0.6999**		**1,577.3541**	**1,577.3541**	**0.4832**		**1,589.4339**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e

Category	lb/day											lb/day				
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.2489	0.1846	1.6821	3.6000e-003	1.0122	2.6100e-003	1.0148	0.2558	2.4000e-003	0.2582		357.4263	357.4263	0.0147		357.7946
Total	**0.2489**	**0.1846**	**1.6821**	**3.6000e-003**	**1.0122**	**2.6100e-003**	**1.0148**	**0.2558**	**2.4000e-003**	**0.2582**		**357.4263**	**357.4263**	**0.0147**		**357.7946**

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	0.6579	13.9702	11.5870	0.0158		0.5014	0.5014		0.5014	0.5014	0.0000	1,577.3541	1,577.3541	0.4832		1,589.4339
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**0.6579**	**13.9702**	**11.5870**	**0.0158**		**0.5014**	**0.5014**		**0.5014**	**0.5014**	**0.0000**	**1,577.3541**	**1,577.3541**	**0.4832**		**1,589.4339**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.2489	0.1846	1.6821	3.6000e-003	1.0122	2.6100e-003	1.0148	0.2558	2.4000e-003	0.2582		357.4263	357.4263	0.0147		357.7946

Total	**0.2489**	**0.1846**	**1.6821**	**3.6000e-003**	**1.0122**	**2.6100e-003**	**1.0148**	**0.2558**	**2.4000e-003**	**0.2582**		**357.4263**	**357.4263**	**0.0147**		**357.7946**

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	0.0288	0.2396	0.3005	1.0800e-003	0.0688	1.0000e-003	0.0698	0.0184	9.4000e-004	0.0194		110.4382	110.4382	9.5700e-003		110.6775
Unmitigated	0.0288	0.2396	0.3005	1.0800e-003	0.0688	1.0000e-003	0.0698	0.0184	9.4000e-004	0.0194		110.4382	110.4382	9.5700e-003		110.6775

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
General Light Industry	11.00	0.00	0.00	22,939	22,939
Total	11.00	0.00	0.00	22,939	22,939

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 Light Industry	9.50	7.30	7.30	59.00	28.00	13.00	92	5	3

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
General Light Industry	0.528278	0.037539	0.171581	0.116384	0.021852	0.006015	0.010031	0.093311	0.001603	0.002174	0.008978	0.000895	0.001360

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	0.0528	0.4800	0.4032	2.8800e-003		0.0365	0.0365		0.0365	0.0365		575.9710	575.9710	0.0110	0.0106	579.3937
NaturalGas Unmitigated	0.0528	0.4800	0.4032	2.8800e-003		0.0365	0.0365		0.0365	0.0365		575.9710	575.9710	0.0110	0.0106	579.3937

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 Light Industry	4895.75	0.0528	0.4800	0.4032	2.8800e-003		0.0365	0.0365		0.0365	0.0365		575.9710	575.9710	0.0110	0.0106	579.3937
Total		**0.0528**	**0.4800**	**0.4032**	**2.8800e-003**		**0.0365**	**0.0365**		**0.0365**	**0.0365**		**575.9710**	**575.9710**	**0.0110**	**0.0106**	**579.3937**

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 Light Industry	4.89575	0.0528	0.4800	0.4032	2.8800e-003		0.0365	0.0365		0.0365	0.0365		575.9710	575.9710	0.0110	0.0106	579.3937
Total		**0.0528**	**0.4800**	**0.4032**	**2.8800e-003**		**0.0365**	**0.0365**		**0.0365**	**0.0365**		**575.9710**	**575.9710**	**0.0110**	**0.0106**	**579.3937**

6.0 Area Detail

6.1 Mitigation Measures Area

Use Low VOC Paint - Residential Interior

Use Low VOC Paint - Residential Exterior

Use Low VOC Paint - Non-Residential Interior

Use Low VOC Paint - Non-Residential Exterior

Use Low VOC Cleaning Supplies

	ROG	NOx	CO	SO2	Fugitive 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	1.4388	5.0000e-005	5.6700e-003	0.0000		2.0000e-005	2.0000e-005		2.0000e-005	2.0000e-005		0.0120	0.0120	3.0000e-005		0.0129
Unmitigated	1.5268	5.0000e-005	5.6700e-003	0.0000		2.0000e-005	2.0000e-005		2.0000e-005	2.0000e-005		0.0120	0.0120	3.0000e-005		0.0129

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	0.3492					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	1.1770					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	5.4000e-004	5.0000e-005	5.6700e-003	0.0000		2.0000e-005	2.0000e-005		2.0000e-005	2.0000e-005		0.0120	0.0120	3.0000e-005		0.0129
Total	**1.5268**	**5.0000e-005**	**5.6700e-003**	**0.0000**		**2.0000e-005**	**2.0000e-005**		**2.0000e-005**	**2.0000e-005**		**0.0120**	**0.0120**	**3.0000e-005**		**0.0129**

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	0.3492					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	1.0890					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	5.4000e-004	5.0000e-005	5.6700e-003	0.0000		2.0000e-005	2.0000e-005		2.0000e-005	2.0000e-005		0.0120	0.0120	3.0000e-005		0.0129
Total	**1.4388**	**5.0000e-005**	**5.6700e-003**	**0.0000**		**2.0000e-005**	**2.0000e-005**		**2.0000e-005**	**2.0000e-005**		**0.0120**	**0.0120**	**3.0000e-005**		**0.0129**

7.0 Water Detail

7.1 Mitigation Measures Water

8.0 Waste Detail

8.1 Mitigation Measures Waste

9.0 Operational Offroad

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

10.0 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

APPENDIX B.1

Biological Resources Technical Report

BIOLOGICAL RESOURCES TECHNICAL REPORT FOR THE CITY OF VICTORVILLE WATER PIPELINE PROJECT

December 2018

SUBMITTED TO

Meridian Consultants
910 Hampshire Road, Suite V
Westlake Village, CA 91361

SUBMITTED BY

SWCA Environmental Consultants
51 West Dayton Street
Pasadena, CA 91105

Biological Resources Technical Report for the City of Victorville Water Pipeline Project

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SWCA Project No. 044131

December 2018

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Figures

Tables

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List of Abbreviations, Acronyms, and Initialisms

afy	acre feet per year
amsl	above mean sea level
BLM	Bureau of Land Management
BO	Biological Opinion
BRTR	Biological Resources Technical Report
CDFG	California Department of Fish and Game
CDFW	California Department of Fish and Wildlife
CDNPA	California Desert Native Plants Act
CEQA	California Environmental Quality Act
CESA	California Endangered Species Act
CFR	Code of Federal Regulations
City	City of Victorville
CNDDB	California Natural Diversity Database
CNPS	California Native Plant Society
CEQA	California Environmental Quality Act
CWA	Clean Water Act
District	Victorville Water District
EPA	United States Environmental Protection Agency
ESA	Endangered Species Act
ft	feet
GPS	global positioning system
I	Interstate
m	meters
MBTA	Migratory Bird Treaty Act
MCV	Manual of California Vegetation, Second Edition
mgd	million gallons per day
NEPA	National Environmental Policy Act
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NPDES	National Pollutant Discharge Elimination System
NPPA	Native Plant Protection Act
NRCS	Natural Resources Conservation Service
NWI	National Wetlands Inventory
OHWM	Ordinary High Water Mark
ORV	off-road vehicle
PRC	Public Resources Code
Project	City of Victorville Water Pipeline Project
RCRA	Resource Conservation and Recovery Act
RWQCB	Regional Water Quality Control Board
SCADA	supervisory control and data acquisition
SWANCC	*Solid Waste Agency of Northern Cook County v. U.S. Army Corps of Engineers*
SWCA	SWCA Environmental Consultants
TNW	traditional navigable waters
USACE	United States Army Corps of Engineers
USC	United States Code
USDA	United States Department of Agriculture
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey

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1 INTRODUCTION

SWCA Environmental Consultants (SWCA) was retained by Meridian Consultants on behalf of the Victorville Water District (District), a subsidiary of the City of Victorville (City), to provide biological resources services in support of the City of Victorville Water Pipeline Project (Project) located in the City of Victorville, San Bernardino County, California. SWCA assessed biological conditions throughout the Project area and reviewed relevant technical documents and agency-maintained databases on biological resources. The Biological Resources Technical Report (BRTR) provides the technical basis for the planning-level assessment of potential impacts to biological resources that may result from Project implementation and supported permitting and environmental compliance documents required for the Project. This BRTR is based on a desktop analysis and baseline level field survey.

The purpose of this BRTR is to identify the biological constraints associated with the Project through consideration of the sensitive resources in the area and the character of the Project. The assessment includes characterizing the current biological conditions of the Project area and determining the occurrence and distribution of sensitive resources within it. Sensitive resources generally include unique, jurisdictional, or sensitive habitats, special-status species, and wildlife movement corridors. Special-status species include those that are protected under federal and/or state endangered species legislation or other legislation that protects natural resources or appear on "watch lists" maintained by resource agencies, professional organizations, or both. Following the assessment of biological constraints for the Project, the Results section of this BRTR provides a summary of the anticipated impacts to natural resources, and recommendations for further studies of the area.

1.1 Project Location

The Study Area is located within the southwestern portion of the City of Victorville, San Bernardino County, California (Figure 1). The Survey Area is located approximately 200 feet west of Interstate (I) 15 and approximately half a mile south of Bear Valley Road (Figure 2). The Project extends north on Amethyst Road and then west in Sycamore Street to the intersection of Sycamore and Amethyst Road. The Survey Area is approximately 1 mile long, and is located between Sections 1, 2, 11, and 12 of Township 4 North, Range 5 West, found on the United States Geological Survey (USGS) *Hesperia* 7.5 minute quadrangle map (Figure 3).

1.2 Project Description

1.2.1 Amethyst Road Metering Station

The Victorville Water District (District), a subsidiary district of the City of Victorville (City), produces potable water through 36 active groundwater wells. The District relies solely on groundwater for the City's water source.

The proposed water connection will provide Mojave Water Agency water to the City's domestic water network. The metering station is proposed to be located within an existing public right of way, and will include a new masonry block building, electrical water controls including supervisory control and data acquisition (SCADA) communication, and mechanical piping and valves to allow control of the water flow and measurement at the metering station. A new 120/240V single phase electric service will be included as part of this portion of the Project. The metering station will be constructed within one of the four turnout options included in the preliminary Project layout (Figure 4).

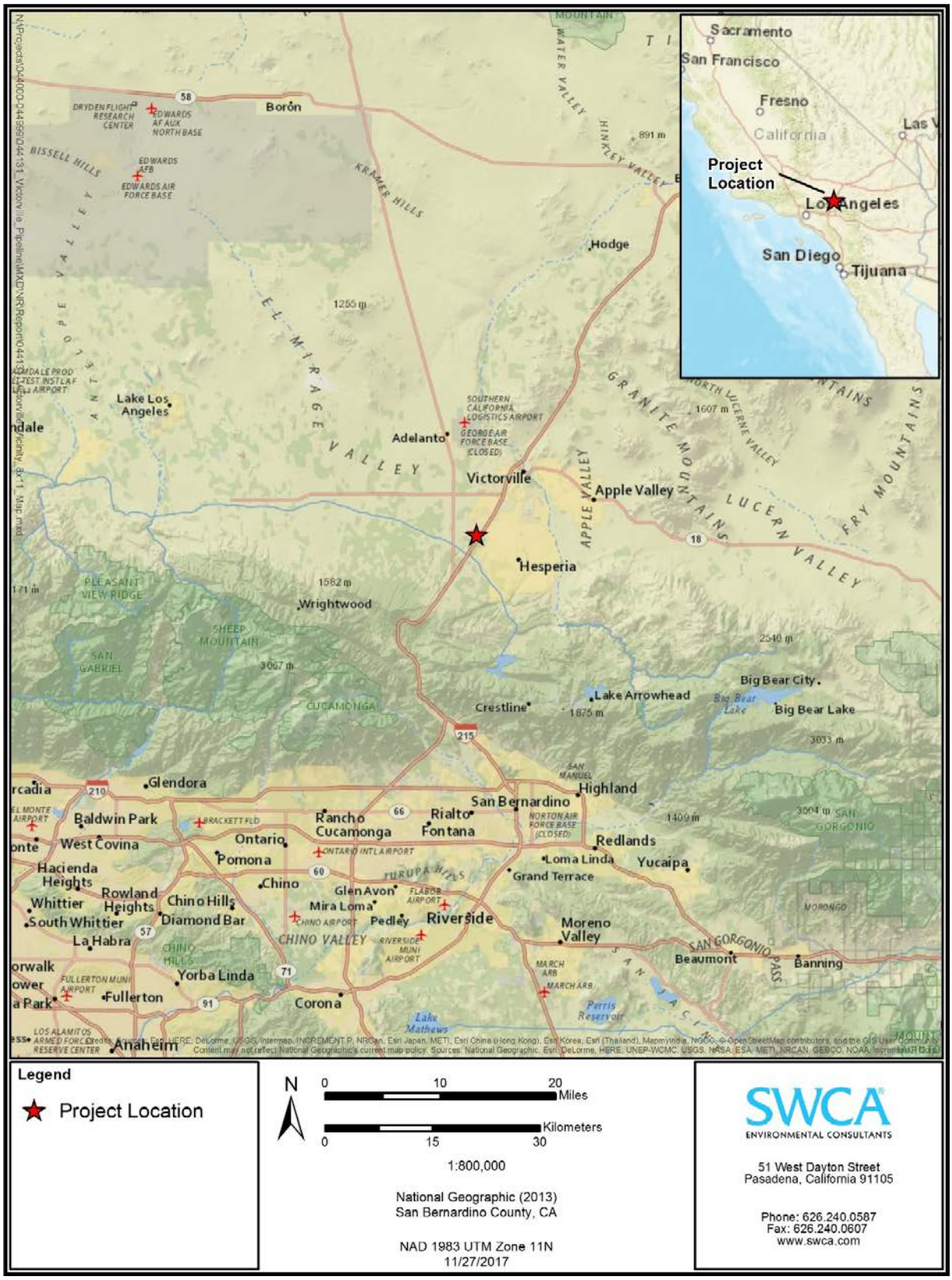

Figure 1. Regional vicinity map.

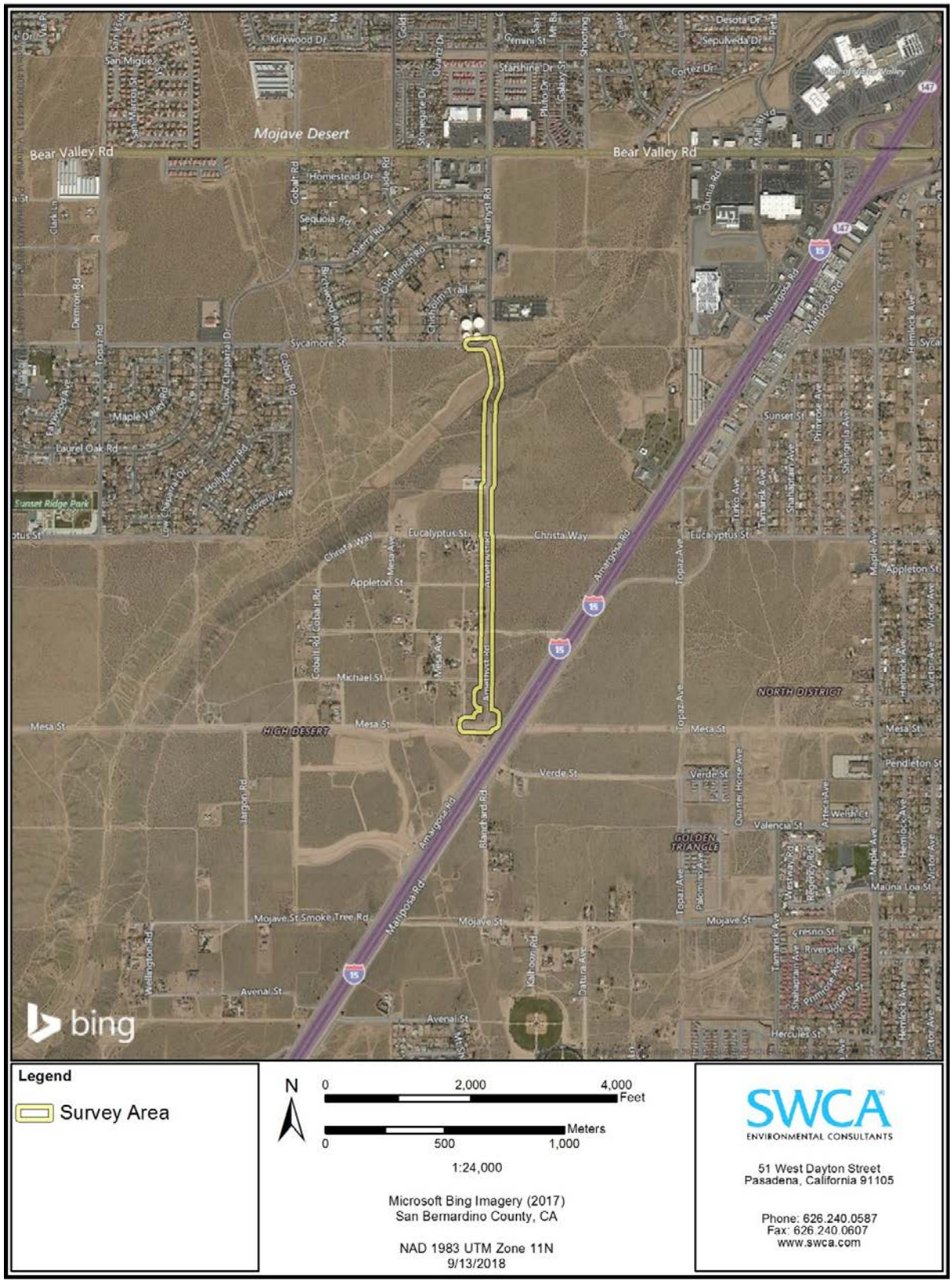

Figure 2. Project location with aerial photo background.

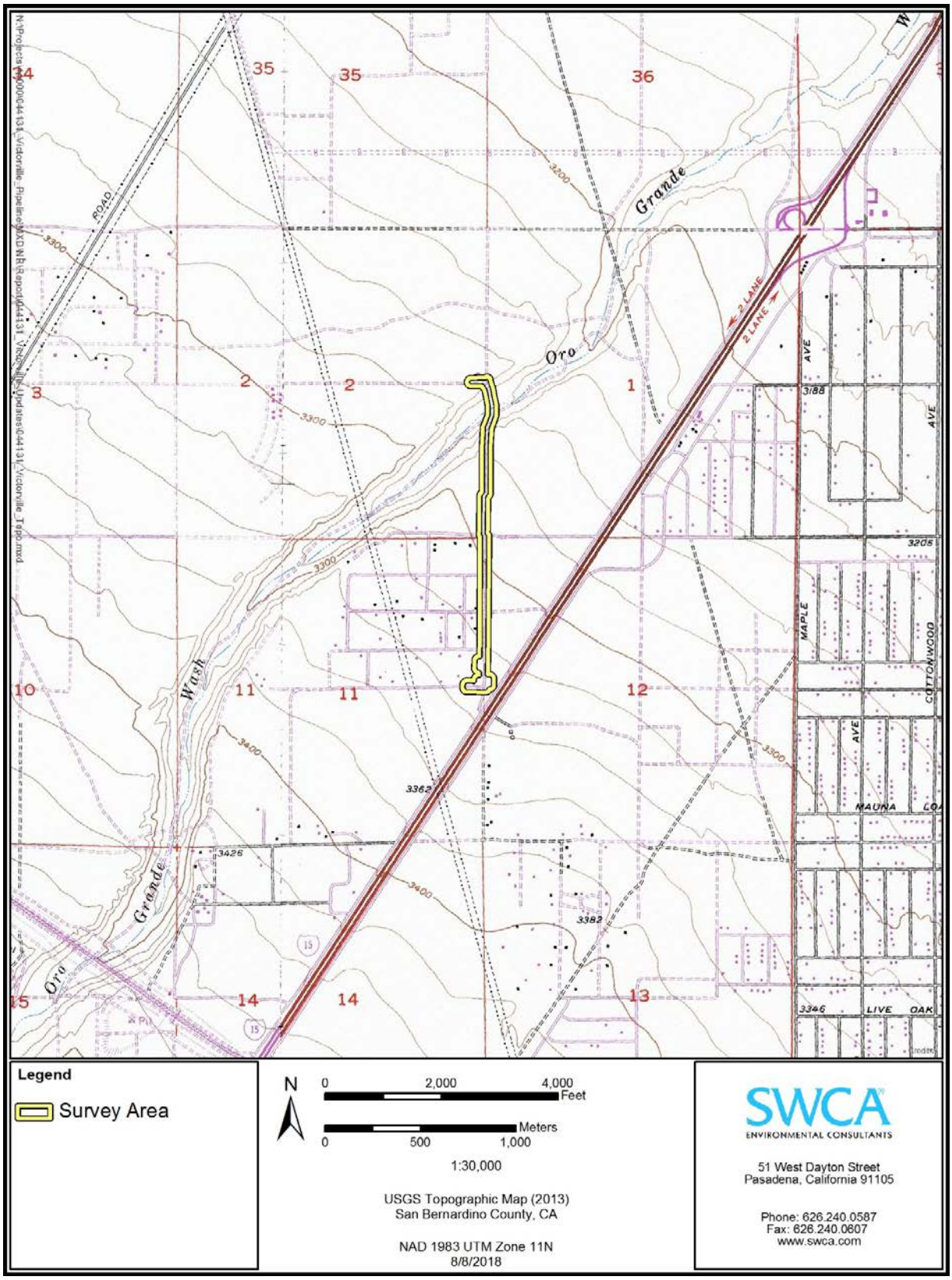

Figure 3. Project location with USGS quadrangle background.

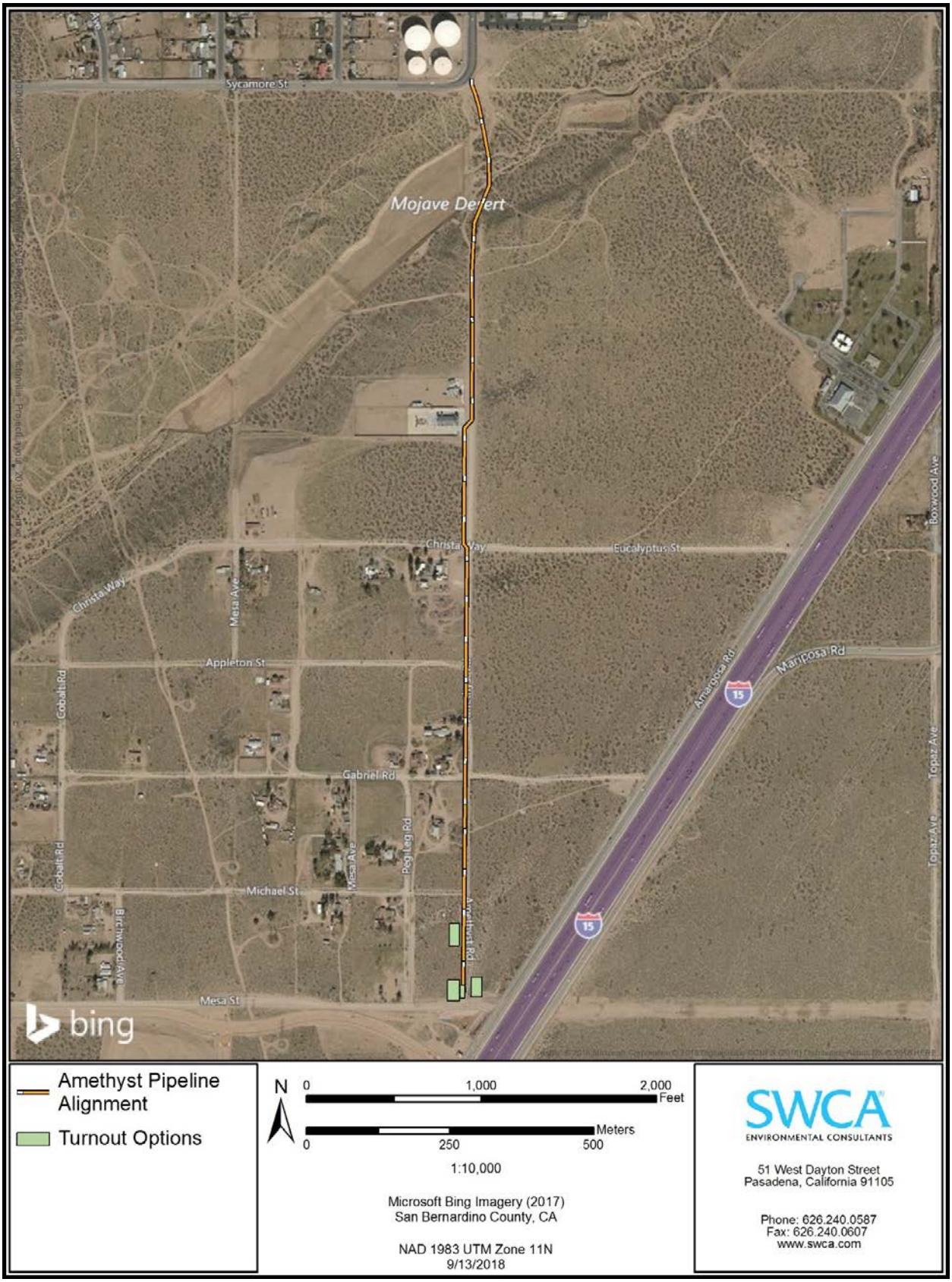

Figure 4. Preliminary Project layout.

The area that would be environmentally cleared for this portion of the Project would be a 150 by 150-foot area at the northeast corner intersection between Mesa Street and Mesa Avenue (see general area to be surveyed below). This would ensure adequate space for the storage of construction equipment during both portions of the Project. The metering station, once constructed, will be approximately 10 by 50 feet.

1.2.2 Amethyst Road Pipeline

The pipeline portion of the Project includes the construction of approximately 1 mile of 24-inch water pipeline within Amethyst Road, from the metering station to the District's Pumping Station at Sycamore Street and Amethyst Road (11734 Amethyst Road), for the conveyance of imported regional recharge and recovery water from the Mojave Water Agency (see Figure 4).

The pipeline alignment extends north on Amethyst Road and then curves west toward the intersection of Sycamore and Amethyst Road. The 24-inch pipeline would connect to the metering station at the southern end of the pipeline and the pump station at Sycamore Street.

The environmental analysis will clear an approximately 100-foot wide area along the proposed pipeline route to account for the area needed to construct the pipeline.

1.3 Site Characteristics

The Project area is relatively flat with a maximum elevation of approximately 3,326 feet above mean sea level (amsl) and a minimum elevation of approximately 3,230 feet amsl. The majority of the pipeline will be placed underneath Amethyst Road (which becomes Pegleg Road south of Verano Street) and surrounding disturbed areas. The Project had been sited to cause minimal disturbance to natural areas, and instead disturbance to disturbed or developed areas has been maximized. The Project passes through the Oro Grande Wash via graded dirt roads south of Sycamore Street, and immediately downstream of the Amethyst Basin recharge facility. Similar to the rest of the site, the wash has also been heavily disturbed by the construction of the Amethyst Basin, the construction of dirt roads, and off-road vehicle (ORV) traffic. Outside of the disturbed and developed areas, the surrounding landscape is primarily dominated by a native shrubland comprised of creosote bush (*Larrea tridentata*) and Nevada joint fir (*Ephedra nevadensis*).

1.4 Land Use in the Project Area

Historic land use in the Project vicinity includes cement manufacturing (due to the discovery of large limestone and granite deposits) and agriculture. The community of Victor was established in 1885 as a railroad station approximately one-mile northwest of the narrows of the Mojave River. The city was later renamed by the United States Post Office to Victorville in 1901. In 1926, U.S Route 66 was established to link California to the National Highway System until Interstate 15 (I-15) was constructed. During World War II, the Victorville Army Airfield, later renamed George Air Force Base, was constructed and supported two Tactical Fighter Wings of the Tactical Air Command. George Air Force Base was later deactivated in 1992 and is currently functioning as a public airport called the Southern California Logistics Airport. In recent history, the land use in the Project area is now primarily residential and commercial lands.

1.5 Regional Overview

The Project is located within the western Mojave Desert, a region that occurs between the southern, low elevation, hot Sonoran Desert and the northern, high elevation, relatively cool Great Basin. This approximately 25,000-square-mile region is located in southeastern California and portions of Arizona, Nevada, and Utah. The Mojave Desert's western boundary is formed by the convergence of the Tehachapi and San Gabriel Mountains, and its southern boundary extends east of the San Bernardino Mountains to the Salton Sea, where it gradually transitions into the Sonoran Desert. Most of the Mojave Desert lies at roughly

3,000 to 6,000 feet amsl, and it is therefore considered a high desert. However, the Mojave Desert encompasses a broad elevation range, including peaks that exceed 11,000 feet amsl and Death Valley, which has the lowest recorded elevation in North America, at 282 feet below mean sea level.

Much of the Mojave Desert consists of typical mountain and basin topography where basin-to-mountain transition zones support high levels of biodiversity and endemic species. Flatter portions of the desert floor are characterized by expansive playas, dry lakes and other ephemeral waters. These are interspersed with dunes, a geomorphology referred to as pan and dune complexes, that are covered with Joshua trees (*Yucca brevifolia*), saltbush (*Atriplex* spp.), and Great Basin sagebrush (*Artemisia tridentata*). Fine wind-blown sand from dry lakebeds and river channels can create hummocks and dunes that support unique species of insects, plants, and reptiles. Slopes and bajadas in the region are covered with creosote bush (*Larrea tridentata*), saltbush (*Atriplex* spp.), bursage (*Ambrosia* spp.), and bladdersage (*Salazaria mexicana*). In years with sufficient rainfall, the desert floor vegetation communities will include an abundance of annual wildflowers. Most cactus species are found in areas with coarse, sandy soils, and higher elevations support blackbush (*Coleogyne ramosissima*), Mojave yucca (*Y. schidigera*), and Spanish bayonet (*Y. baccata*).

1.6 Regional Climate and Weather

The Mojave Desert, which includes more than 40,000 square miles in California, Arizona, and Nevada, is characterized by hot summer temperatures (average daily maxima above 100 degrees Fahrenheit [°F]) and low annual precipitation (approximately 5 inches). Daily temperature swings of 40°F can occur, with lows in the winter below or near freezing temperatures. Precipitation extremes are also common with variations of 80 percent in annual precipitation, and summer thunderstorms can drop more precipitation on a site in one event than the mean yearly precipitation for that location. High winds can occur, with peak wind velocities above 50 miles per hour not being uncommon and winds of 100 miles per hour occurring yearly (BLM 2005). The Survey Area's elevation is approximately 3,300 amsl, with summer high temperatures averaging approximately 94.6°F and average annual rainfall averaging approximately 5.52 inches (NOAA 2010).

Deserts are defined by low rainfall, and the Mojave's latitude and location east and north of large mountains results in very low rainfall within the desert. The mountains on the western and southern boundaries of the desert result in a rain shadow on the desert side of the mountains where precipitation is far less than on the coastal side. Weather patterns and their resulting precipitation follow seasonal patterns and variations. During the summer, the western edge of the Mojave Desert where the Project is located is heavily influenced by the dry southwest airflows resulting in the typically very dry weather. The influence of the southwest winds diminishes toward the eastern Mojave Desert, and this portion of the Mojave has a more continental influence and a weak-to-moderate monsoonal influence with considerable inter-annual variability, with the monsoon rains occurring in late summer (BLM 2005).

2 REGULATORY OVERVIEW

Natural resources are protected by state and federal legislation intended to conserve and promote their recovery. Generally, these laws can be grouped into the following three categories:

- Laws such as state and federal endangered species acts that are intended to protect individual species and their habitat;
- Laws such as the federal Migratory Bird Treaty Act (MBTA) that are intended to protect taxa (groups) and,
- Laws such as portions of the federal Clean Water Act (CWA) and California Department of Fish and Game (CDFG) Code that are intended to protect habitats or natural communities critical to the maintenance of other vital resources.

On-site natural resources or those with a high occurrence probability in the Study Area may require mitigation for impacts that would, or could, result from Project development. Mitigation requirements are based on a number of federal, state, and local laws, regulations, and policies relating to listed and endangered plants and wildlife, migratory and nesting birds, environmental quality, and lake- or streambed alteration. The following discussion reviews these policies and how they pertain to any tasks implemented under the Project.

2.1 Federal Regulations

2.1.1 Federal Endangered Species Act

The U.S. Congress passed the Endangered Species Act (ESA) in 1973 to protect endangered species and species threatened with extinction (federally listed species). The ESA operates in conjunction with the National Environmental Policy Act (NEPA) to help protect the ecosystems upon which endangered and threatened species depend.

Section 9 of the ESA prohibits the "take" of endangered or threatened wildlife species. The legal definition of "take" is to "harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct" (16 United States Code [USC] 1532 [19]). Harm is further defined to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing behavioral patterns (50 Code of Federal Regulations [CFR] 17.3). Harassment is defined as actions that create the likelihood of injury to listed species to such an extent as to significantly disrupt normal behavior patterns (50 CFR 17.3). Actions that result in take can result in civil or criminal penalties.

The ESA authorizes the U.S. Fish and Wildlife Service (USFWS) to issue permits under Sections 7 and 10 of that act. Section 7 mandates that all federal agencies consult with the USFWS for terrestrial species and/or National Marine Fisheries Service (NMFS) for marine species to ensure that federal agency actions do not jeopardize the continued existence of a listed species or adversely modify critical habitat for listed species. Any anticipated adverse effects require preparation of a biological assessment to determine potential effects of the Project on listed species and critical habitat. If the Project adversely affects a listed species or its habitat, the USFWS or NMFS prepares a Biological Opinion (BO). The BO may recommend "reasonable and prudent alternatives" to the Project to avoid jeopardizing or adversely modifying habitat including "take" limits.

The ESA defines critical habitat as habitat deemed essential to the survival of a federally listed species. The ESA requires the federal government to designate "critical habitat" for any species it lists under the ESA. Under Section 7, all federal agencies must ensure that any actions they authorize, fund, or carry out are not likely to jeopardize the continued existence of a listed species, or destroy or adversely modify its designated

critical habitat. These complementary requirements apply only to federal agency actions, and the latter only to specifically designated habitat. A critical habitat designation does not set up a preserve or refuge, and applies only when federal funding, permits, or projects are involved. Critical habitat requirements do not apply to activities on private land and that do not involve a federal agency.

Non-federal projects may still pursue Section 7 permitting when a federal nexus, such as federal funding or permitting (e.g., through the U.S. Army Corps of Engineers [USACE] under Section 404 of the federal Clean Water Act [CWA]), is available. When no nexus is available, Section 10(a)(1)(B) authorizes issuance of permits to allow "incidental take" of listed species. "Incidental take" is defined by the ESA as take that is incidental to, and not for the purpose of, carrying out an otherwise lawful activity. To obtain an incidental take permit, an applicant must submit a habitat conservation plan outlining steps to minimize and mitigate permitted take impacts to listed species.

2.1.2 Clean Water Act

The CWA (33 USC 1251 et seq.), is the primary federal legislation that addresses water quality, pollution, and protection of the chemical, physical, and biological integrity of most waters in the United States. The CWA chiefly addresses the quality of surface waters, while groundwater contamination is addressed by other legislation, including the Resource Conservation and Recovery Act (RCRA). Section 402 of the CWA established a permit system, the National Pollutant Discharge Elimination System (NPDES), to regulate point sources of discharge into navigable waters of the United States.

The USACE and the U.S. Environmental Protection Agency (EPA) regulate discharge of dredged or fill material into traditional navigable waters (TNW) of the United States under Section 404 of the CWA. The general definition of navigable waters of the U.S. includes those waters of the U.S. that are subject to the ebb and flow of the tide shoreward to the mean high water mark and/or are presently used or have been used in the past, or may be susceptible to use, to transport interstate or foreign commerce. "Discharges of fill material" are defined as the addition of fill material into waters of the U.S., including, but not limited to the following: placement of fill that is necessary for the construction of any structure or impoundment requiring rock, sand, dirt, or other material for its construction; site-development fills for recreational, industrial, commercial, residential, and other uses; causeways or road fills; and fill for intake and outfall pipes and subaqueous utility lines (33 CFR 328.2(f)). Additionally, Section 401 of the CWA (33 USC 1341) requires any applicant for a federal license or permit to conduct any activity that may result in a discharge of a pollutant into waters of the U.S. to obtain a certification that the discharge will comply with applicable effluent limitations and water quality standards.

On January 9, 2001, the U.S. Supreme Court issued a decision in *Solid Waste Agency of Northern Cook County v. U.S. Army Corps of Engineers* (2001) 121 S. Ct. 675 (SWANCC) that held that the language of the CWA cannot be interpreted as conferring authority for the federal government to regulate "isolated, intrastate, and non-navigable waters" merely because migratory birds may frequent them. The Court emphasized the states' responsibility for regulating such waters. In the U.S. Supreme Court's decision in *Rapanos v. United States and Carabell v. United States*, the USACE and the EPA issued joint guidance regarding the USACE's jurisdiction over waters of the U.S. under the CWA. The guidance summarizes the Supreme Court's findings and provides how and when the USACE should apply the "significant nexus" test in its jurisdictional determinations. This test determines whether a waterway is substantially connected to a TNW tributary and thus falls within the USACE's jurisdiction. The guidance provides the factors and summarizes the significant nexus test as an assessment of "the flow characteristics and functions of the tributary itself and the functions performed by all wetlands adjacent to the tributary to determine if they significantly affect the chemical, physical, and biological integrity of downstream traditional navigable waters." Flow characteristics include the volume, duration, and frequency of the flow. Additionally,

ecological factors should be included, such as the shared hydrological and biological characteristics between a tributary and an adjacent wetland.

On June 29, 2015 the EPA and the USACE published (79 Fed. Reg. 76 (21 April 2014) a rule (Clean Water Rule) defining the scope of waters protected under the CWA, in light of the U.S. Supreme Court cases in *U.S. v. Riverside Bayview,* SWANCC, and *Rapanos*. The new rule will enhance protection for the nation's public health and aquatic resources and increase CWA program predictability and consistency by increasing clarity as to the scope of ''waters of the United States'' protected under the CWA. The final rule became effective on August 28, 2015, but has been put on a stay nationwide by the U.S. Court of Appeals for the Sixth Circuit, pending the resolution of several lawsuits. Following an executive order issued by President Donald Trump on February 28, 2017, the rule will be reviewed or revised.

2.1.3 Migratory Bird Treaty Act

The federal MBTA, first enacted in 1918, prohibits any person, unless permitted by regulations, to:

> "…pursue, hunt, take, capture, kill, attempt to take, capture or kill, possess, offer for sale, sell, offer to, purchase, deliver for shipment, ship, cause to be shipped, deliver for transportation, transport, cause to be transported, carry, or cause to be carried by any means whatsoever, receive for shipment, transportation or carriage, or export, at any time, or in any manner, any migratory bird, included in the terms of this Convention … for the protection of migratory birds ... or any part, nest, or egg of any such bird." (16 USC 703)

The list of migratory birds includes nearly all bird species native to the United States. The Migratory Bird Treaty Reform Act of 2004 further defined species protected under the act and excluded all non-native species. The statute was extended in 1974 to include parts of birds, as well as eggs and nests. Thus, it is illegal under MBTA to directly kill, or destroy a nest of, nearly any native bird species, not just endangered species. Activities that result in removal or destruction of an active nest (a nest with eggs or young being attended by one or more adults) would violate the MBTA. Removal of unoccupied nests, and bird mortality resulting indirectly from disturbance activities, are not considered violations of the MBTA.

2.1.4 Bald and Golden Eagle Protection Act

The Bald and Golden Eagle Protection Act (16 USC 668–668c), enacted in 1940, and amended several times since, prohibits anyone, without a permit issued by the Secretary of the Interior, from "taking" bald eagles (*Haliaeetus leucocephalus*), including their parts, nests, or eggs. In 1962, Congress amended the act to also cover golden eagles (*Aquila chrysaetos*).

The act provides criminal penalties for persons who "take, possess, sell, purchase, barter, offer to sell, purchase or barter, transport, export or import, at any time or any manner, any bald eagle ... [or any golden eagle], alive or dead, or any part, nest, or egg thereof." The act defines "take" as "pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest or disturb."

On November 10, 2009, the USFWS implemented new rules under the existing Bald and Golden Eagle Act requiring all activities that may disturb or incidentally take an eagle or its nest as a result of an otherwise legal activity to receive permits from the USFWS.

2.2 State Regulations

2.2.1 California Environmental Quality Act

The California Environmental Quality Act (CEQA) requires that a project's effects on environmental resources must be analyzed and assessed using criteria determined by the lead agency. The CEQA defines a rare species in a broader sense than do the definitions of threatened, endangered, or California species of concern. Under this definition, the California Department of Fish and Wildlife (CDFW, formerly the CDFG) can request additional consideration of species not otherwise protected.

2.2.2 CEQA Significance Criteria

Section 15064.7 of the CEQA guidelines encourages local agencies to develop and publish the thresholds the agency will use in determining the significance of environmental effects caused by projects or actions under its review. Appendix G of the CEQA guidelines provides examples of impacts that would normally be considered significant. Based upon these guidelines, impacts to biological resources would normally be considered significant if the Project

- has 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 CDFW or USFWS;
- has a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, and regulations, or by the CDFW or USFWS;
- has a substantial adverse effect on federally protected wetlands as defined by Section 404 of the CWA (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means;
- interferes substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impedes the use of native wildlife nursery sites; or,
- conflicts with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance, or conflicts with the provisions of an adopted habitat conservation plan, natural community conservation plan, or other approved local, regional, or state habitat conservation plan.

An evaluation of whether an impact to biological resources would be significant must consider both the resource itself and how that resource fits into a regional or local context. Significant impacts would be those that would diminish, or result in the loss of, an important biological resource, or those that would obviously conflict with local, state, or federal resource conservation plans, goals, or regulations. The evaluation of impacts considers direct impacts, indirect impacts, cumulative impacts, as well as temporary and permanent impacts.

2.2.3 California Endangered Species Act

The CDFW administers the California Endangered Species Act (CESA), which prohibits the "taking" of listed species except as otherwise provided in state law. Section 86 of the Fish and Game Code defines "take" as "hunt, pursue, catch, capture, or kill, or attempt to hunt, pursue, catch, capture, or kill." Under certain circumstances, the CESA applies these take prohibitions to species petitioned for listing (state candidates). Pursuant to the requirements of the CESA, State lead agencies (as defined under CEQA Public Resources Code [PRC] Section 21067) are required to consult with the CDFW to ensure that any action or project is not likely to jeopardize the continued existence of any endangered or threatened species or result

in destruction or adverse modification of essential habitat. Additionally, the CDFW encourages informal consultation on any proposed project that may impact a candidate species. The CESA requires the CDFW to maintain a list of threatened and endangered species. The CDFW also maintains a list of candidates for listing under the CESA and a list of species of special concern (or watch list species).

2.2.4 California Fully Protected Species

The CDFG Code provides protection from take for a variety of species, referred to as fully protected species. Section 5050 lists protected amphibians and reptiles, and Section 3515 prohibits take of fully protected fish species. Eggs and nests of fully protected birds are under Section 3511. Migratory nongame birds are protected under Section 3800, and mammals are protected under Section 4700. Except for take related to scientific research, all take of fully protected species is prohibited.

2.2.5 Nesting Birds and Raptors

Section 3503 of the CDFG Code states that it is unlawful to take, possess, or needlessly destroy the nest or eggs of any bird, except as otherwise provided by this code or any regulation made pursuant thereto. Section 3503.5 provides protection for all birds of prey, including their eggs and nests.

2.2.6 Migratory Bird Protection

Take or possession any migratory non-game bird as designated in the MBTA is prohibited by Section 3513 of the CDFG Code.

2.2.7 Native Plant Protection Act

The Native Plant Protection Act (NPPA) of 1977 (CDFG Code Section 1900-1913) directed the CDFG (now known as CDFW) to carry out the Legislature's intent to "preserve, protect and enhance rare and endangered plants in this State." The NPPA gave the California Fish and Game Commission the power to designate native plants as "endangered" or "rare" and protect endangered and rare plants from take. The NPPA thus includes measures to preserve, protect, and enhance rare and endangered native plants.

CESA has largely superseded NPPA for all plants designated as endangered by the NPPA. The NPPA nevertheless provides limitations on take of rare and endangered species as follows: "...no person will import into this state, or take, possess, or sell within this State" any rare or endangered native plant, except in compliance with provisions of the CESA. Individual landowners are required to notify the CDFW at least 10 days in advance of changing land uses to allow the CDFW to salvage any rare or endangered native plant material.

2.2.8 California Desert Native Plants Act

The California Desert Native Plants Act (CDNPA) protects non-listed California desert native plants from unlawful harvesting on public and private lands in the counties of Imperial, Inyo, Kern, Los Angeles, Mono, Riverside, San Bernardino, and San Diego (California Food and Agriculture Code, Sections 80001-80006, Division 23). A number of desert plants are protected under this act, including all species in the agave and cactus families. Harvest, transport, sale, or possession of specific native desert plants is prohibited unless a person has a valid permit, or wood receipt, and the required tags and seals. The fee for the permit to remove any of these plants will not be less than $1 per plant, except for Joshua trees (*Yucca brevifolia*), which will not be less than $2 per plant.

2.2.9 Porter-Cologne Water Quality Control Act

The Porter-Cologne Water Quality Control Act (California Water Code Section 13000 et seq.) provides guidance for the protection of water quality and beneficial uses of water throughout the state and, along with the CWA, provides the overarching legislation governing the California Regional Water Quality Control Boards (RWQCBs). Waters of the State are defined as any surface water or groundwater, including saline waters, which are within the boundaries of the state (California Codes: PRC Section 71200). The Porter-Cologne Act includes groundwater and waters outside the ordinary high water mark (OHWM) and thus differs from the CWA definition of waters of the U.S.

The Act requires that each regional board adopt a water quality control plan (basin plan) for their region. Pursuant to Porter-Cologne, these basin plans become part of the California Water Plan when such plans have been reported to the Legislature (Section 13141, California Water Code).

In 1972, amendments to the Porter-Cologne Act gave California the authority and ability to operate the federal NPDES permits program. Before a permit may be issued, Section 401 of the CWA requires that the local RWQCB certify that the discharge will comply with applicable water quality standards. In addition, under Porter-Cologne, the RWQCB may also issue waste discharge requirements, that set conditions on the discharge of a waste. These requirements must be consistent with the water quality control plan for the body of water that receives the waste discharge, as well as protect the beneficial uses of those receiving waters.

The RWQCBs also implement Section 402 of the CWA, which allows the State to issue a single discharge permit for storm water runoff for the purposes of both State and federal laws, as well as Section 303(d) of the CWA pursuant to the authority of the Porter-Cologne Act.

2.2.10 California Fish and Game Code (Sections 1600-1616)

These sections prohibit alteration of any lake or streambed under CDFW jurisdiction, including intermittent and seasonal channels and many artificial channels, without execution of a Lake and Streambed Alteration Agreement through the CDFW. This applies to any channel modifications that would be required to meet drainage, transportation, or flood control objectives of the project.

Sections 1600 through 1616 of the California Fish and Game Code require that "any activity that may substantially divert or obstruct the natural flow or substantially change the bed, channel, or bank of any river, stream, or lake, or deposit or dispose of debris, waste, or other material containing crumbled, flaked, or ground pavement where it may pass into any river, stream, or lake" be subject to a Lake and Streambed Alteration Agreement with CDFW. CDFW reviews the proposed actions and, if necessary, submits to the Applicant a proposal for measures to protect affected fish and wildlife resources. This applies to any channel modifications that would be required to meet drainage, transportation, or flood control objectives of the Project.

2.3 Local Regulations

2.3.1 City of Victorville General Plan

The City of Victorville General Plan 2030 contains the City's goals, objectives, policies and specific actions that provide the framework for achieving the community's long term vision (City of Victorville 2008). The General Plan was adopted on October 21, 2008 and includes the following elements or plans: land use, transportation, infrastructure systems, natural resources, community facilities, and community amenities. The plan for the Natural Resources, contained within the General Plan, specifies policies related to biological resources. Policies that relate to biological resources at and around the Survey Area are listed below:

Goal #4: Conservation of Important Habitat. Preserve land containing native habitat that sustains rare, threatened or endangered plants and wildlife species.

Objective 4.1: Preservation of natural communities that support rare, threatened and/or endangered plants and wildlife throughout the Planning Area.

Policies

- 4.1.1: Encourage development natural habitat that supports rare, threatened or endangered plants and wildlife (i.e., "sensitive" species), or require restoration of the same type of impacted habitat within an existing, planned or potential conservation area.
- 4.1.2: Support and participate in West Mojave Plan.

Objective 4.2: Permanent Conservation of Mojave River Corridor Ecological Values.

Policies

- 4.2.1 Generally prohibit private or public development projects or major infrastructure facilities on land within the Mojave River Corridor, where biological surveys have determined there is habitat that supports rare, threatened and/or endangered plants or wildlife. Allow minor encroachments into such habitat for critical public facilities and recreational trails, where reliable assurances are provided that no loss of sensitive species would occur.

3 METHODS

This section of the BRTR identifies the methods used to describe and evaluate the biological resources at the Victorville Water Pipeline Project. Information on the Project area's existing conditions was compiled from existing literature and available data on biological resources in the vicinity. Additionally, one site visit was conducted to assess the potential for occurrence of special-status species.

3.1 Database and Literature Reviews

Species occurrences from the CDFW California Natural Diversity Database (CNDDB) Rare Find 5 (CDFW 2017a) and the California Native Plant Society (CNPS) Online Inventory of Rare and Endangered Plants (CNPS 2017) were queried for Project-relevant data. The data search centered on the USGS 7.5-minute Hesperia quadrangle containing the Project, and also served as the center of a nine-quadrangle query within both the CNDDB and CNPS databases to determine which special-status plant and wildlife species required analysis within the survey area. In addition to the Hesperia quadrangle, the query included the Adelanto, Victorville, Apple Valley North, Apple Valley South, Lake Arrowhead, Silverwood Lake, Cajon, and Baldy Mesa quadrangles (collectively, the Study Area). This review further informed our understanding of the botanical species of concern and botanical survey recommendations for the Project.

Information regarding the biological and water resources in the Study Area was obtained by reviewing available data from a number of resources. The data review included a search of existing databases, inventories, lists, and collections that contain information regarding the occurrence of special-status species. Resources used in this review included the following:

- Special Animals Including California Species of Special Concern (CDFW 2017b)
- Special Vascular Plants, Bryophytes, and Lichens List (CDFW 2017c)
- Consortium of California Herbaria (2013)
- California Native Plant Society Inventory of Rare and Endangered Plants (CNPS 2017)
- USFWS critical habitat (USFWS 2017a)
- eBird's web-based bird database (eBird 2017)
- USFWS web-based Wetland Mapper (USFWS 2017b)
- EPA My Waters Mapper Google Earth plugin, available at https://www.epa.gov/waterdata
- California Soils Resource Lab's Soil Web Google Earth interface, queried to determine the soils that have been mapped on the Survey Area (California Soil Resources Lab 2010)
- Soil Survey Staff, U.S. Department of Agriculture (USDA) Natural Resources Conservation Service Web Soil Survey (NRCS 2017)

3.2 Field Surveys

A field survey was conducted on November 13, 2017 by SWCA biologists Alex Beakes and Ryan Myers. After the initial survey the Project layout was adjusted, therefore, a second survey was conducted by Mr. Beakes on May 29, 2018 to incorporate the adjusted Project layout. The results of field surveys are discussed in this report, including vegetation communities and jurisdictional waters, all of which reflect the conditions as of May 29, 2018. The Survey Area included the pipeline location as well as a 75-foot buffer. The intent of the surveys was to document biological diversity and the integrity of natural resources, and to note any drainage features on the site to evaluate potential impacts from the Project. Special attention was

focused on determining the possibility that species designated as rare, or which are afforded special legislative protection may occur in the Survey Area.

The survey on November 13, 2017 was conducted under hazy, sunny skies with calm winds from approximately 9:00 AM to 2:30 PM with temperatures between 62°F to 74°F. The survey on May 29, 2018 was conducted under clear skies with calm winds with temperatures between 72°F and 80°F. The Survey Area was accessible by vehicle and surveyed by foot. Wildlife observations were made directly and aided using binoculars or through sign including tracks, scat, and remains.

Prior to the site visit, desktop research was conducted to help guide the biologists in their field survey. During the site visit, all observed flora and fauna were noted. Taxonomic conventions for flora follow *The Jepson Manual: Vascular Plants of California, Second Edition* (Baldwin et al. 2012).

3.2.1 Jurisdictional Delineation

The delineation of waters of the State and CDFW jurisdictional areas in the Survey Area was completed by conducting a pre-survey literature review and field survey by SWCA biologist Alex Beakes. The literature review was used to guide the field survey, and to locate areas of potential jurisdictional waters.

Mr. Beakes conducted a survey on November 13, 2017 to determine the structure and composition of on-site hydrology, vegetation, and soils in the Survey Area. A second survey was conducted by Mr. Beakes on May 29, 2018 to incorporate the adjusted Project layout. Potential jurisdictional water features in the Survey Area were mapped using a Trimble GeoXT handheld global positioning system (GPS) unit with ESRI ArcPad 10 software. ESRI ArcGIS 10 was then used to compile the data into a database for future analysis. Plants that could not be identified in the field were collected and later identified using *The Jepson Manual: Vascular Plants of California, Second Edition* (Baldwin et al. 2012). Historically mapped features in the National Wetlands Inventory (NWI) were visited in the field for verification.

3.2.2 Vegetation and Habitat Mapping

Vegetation and habitat mapping were conducted through desktop research and field verification during the field survey. This information is used to characterize plant communities and other cover types that occur in the Survey Area. Vegetation communities were classified using *A Manual of California Vegetation* (MCV; Sawyer et al. 2009). Hydrologic features, geologic types, and sole exposures were observed and noted.

3.2.3 Assessment of Special-status Species Potential

Special-status species are plants and animals in one or more of the following categories:

- Species listed or proposed for listing as threatened or endangered under the federal ESA (50 CFR 17.12 [listed plants], 50 CFR 17.11 [listed animals], and various notices in the Federal Register [proposed species])
- Species that are candidates for possible future listing as threatened or endangered under ESA (67 *Federal Register* 40657, June 13, 2002)
- Species listed or proposed for listing by the State of California as threatened or endangered under the CESA (14 California Code of Regulations [CCR] 670.5)
- Species that meet the definitions of rare or endangered under the CEQA (State CEQA Guidelines Section 15380)
- Plants listed as rare under the California Native Plant Protection Act (CDFG Code Section 1900 et seq.) (CDFG 2010a)

- Plants considered by the CNPS to be "rare, threatened, or endangered in California" (Lists 1B and 2 in CNPS 2001)
- Animal species of special concern as listed by the CDFW (2017a)
- Animals fully protected in California (California Fish and Game Code Sections 3511 [birds], 4700 [mammals], 5050 [amphibians and reptiles], and 5515 [fish])
- Animals listed on the California Special Animals List such as Species of Special Concern, Fully Protected, and for invertebrates, all species regardless of the reason for inclusion

Potential for occurrence of special-status species in the Survey Area and the immediate vicinity was assessed following the database searches and field survey. During the assessment, each species was assigned to one of the categories listed below:

Present: Species is known to occur in the Survey Area, based on recent (within 20 years) CNDDB or other records, and there is suitable habitat present in the Survey Area, or the species was observed in the Survey Area during the field survey. The presence of bird species was distinguished further into those that 1) nest on the Study rea, 2) forage on the Study Area, and/or 3) occur on the Study Area only as transients during migratory flights or other dispersal events.

High Potential: Species is known to occur in the Project area (based on recent [within 20 years] CNDDB or other records or based on professional expertise specific to the area or species), and there is suitable habitat in the Survey Area that makes the probability of the species occurring there high. Alternatively, there is suitable habitat in the Survey Area and within the known range of the species. Bird species that fell in this category were differentiated on the basis of their occurrence in the Survey Area as breeding, foraging only, and/or transients.

Moderate Potential: Species is known to occur in the Project area (based on non-historic [within 40 years] CNDDB or other records or based on professional expertise specific to the area or species), and there is moderate quality habitat in the Survey Area that makes the probability of the species occurring there moderate. Alternatively, there is moderate quality habitat in the Survey Area and within the known range of the species. Bird species that fell in this category were differentiated on the basis of their occurrence in the Survey Area as breeding, foraging only, and/or transients.

Low Potential: Species is known to occur in the Study Area; however, there is only poor quality or marginal habitat in the Survey Area, and the probability of the species occurring is low.

Absent: There is no suitable habitat for the species in the Survey Area, or the area is located outside the known range of the species. Alternatively, a species was surveyed for during the appropriate season with unequivocal negative results for species occurrence.

4 RESULTS

The following section describes the current biological conditions at and around the Survey Area.

4.1 Regional Setting

The Project is located in southwestern San Bernardino County, in the southwestern edge of the Mojave Desert near the transition of the southern border of the Mojave Desert and the northern foothills of the San Gabriel Mountain range. The natural habitats of the City of Victorville and its surrounding areas have been highly fragmented due to historic land uses such as infrastructure development (i.e., the construction of residential and commercial properties, military land uses including George Air Force Base, I-15, and Highways 395 and 18). Current land use in the City of Victorville is primarily residential and commercial. George Air Force Base was decommissioned in 1992 and converted to a public airport now known as the Southern California Logistics Airport.

4.2 Local Setting

Desert plant communities in the vicinity of the Project have been subject to manmade disturbances, particularly housing developments and infrastructure. The Survey Area is primarily characterized by disturbed and developed land, but also includes sections of native plant communities such as Creosote Bush Scrub (*Larrea tridentata* Shrubland Alliance) and Nevada Joint Fir Scrub (*Ephedra nevadensis* Shrubland Alliance). In addition, the northern portion of the Project crosses the Oro Grande Wash. Man-made structures including dirt roads, the Amethyst basin, and occupied residences were observed during the survey. Some common native vegetation characteristic of the region was observed on the survey including Joshua tree (*Yucca brevifolia*) and California buckwheat (*Eriogonum fasciculatum*). Several common wildlife species observed on site included common raven (*Corvus corax*), black-tailed jackrabbit (*Lepus californicus*), house finch (*Carpodacus mexicanus*), and western meadowlark (*Sturnella neglecta*).

4.3 Local and Regional Conservation Plans

There are no state or local parks, designated wildlife corridors or conservation areas that overlap the Survey Area.

4.4 Jurisdictional Waters and Wetlands

A jurisdictional delineation was conducted in the Survey Area to identify any waters or other hydrological features and riparian habitat potentially subject to the jurisdiction of USACE, RWQCB, and/or CDFW (SWCA 2018, Figure 5). No portions of the Survey Area were found to support hydrophytic vegetation, show evidence of wetland hydrology, or contain hydric soils; therefore, no wetlands were documented in the Survey Area. Water moves through much of the Survey Area via sheet flow and produces erosional features, such as beds, banks, and OHWMs. Of the potentially jurisdictional features identified in the Survey Area, five (5) had characteristics of federal or state regulated jurisdictional water features (Table 1). Features 2, 4a, 5, 7, and 8 are potentially subject to USACE, RWQCB and/or CDFW jurisdiction. No features had vegetation associated with riparian habitat. Using a combination of vegetation mapping, bed/bank delineation, and field observations, 0.31 acre of CDFW jurisdictional waters, 0.18 acre of waters of the State, and 0.10 acre of Waters of the United States were identified within the Survey Area; please see the jurisdictional delineation report for more information (SWCA 2018).

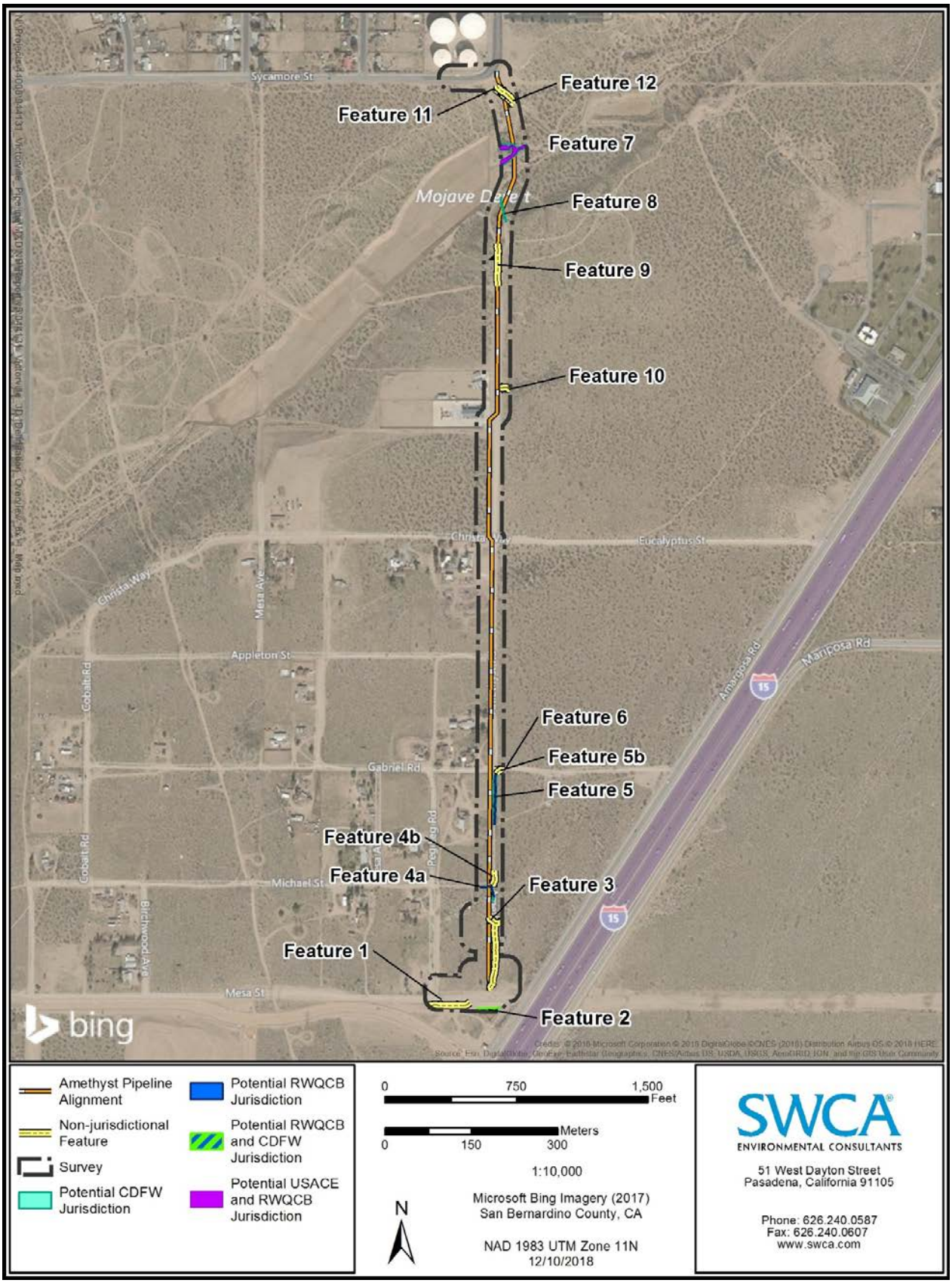

Figure 5. Linear hydrological features identified in the Survey Area.

Table 1. Jurisdictional Hydrological Features Delineated within the Survey Area

Location	Feature No.	Type	OHWM		USACE (acres)	RWQCB (acres)	CDFW (acres)
			Width (feet)	Length (feet)			
Mesa Street and Amethyst Road	2	Manmade Pond	110-124	25	N/A	0.06	0.06
Amethyst Road	4a	Discontinuous Ephemeral Stream	1	134	N/A	< 0.01	0.01
Amethyst Road	5	Discontinuous Ephemeral Stream	<1-1	295	N/A	0.01	0.08
Oro Grande Wash	7	Ephemeral Stream	7-38	285	0.10	0.10	0.15
Oro Grande Wash	8	Discontinuous Ephemeral Stream	3	153	N/A	N/A	0.01
Total				***892***	***0.10***	***0.18***	***0.31***

Note: Units are rounded to the nearest whole number for lengths, or to two decimal places for widths and acreages for presentation. The totals are calculated from un-rounded linear feet and acreages, which may differ slightly from the sum of linear feet and acres shown in the table.

4.5 Vegetation Communities and Flora

Vegetation in the Survey Area consists primarily of developed land with sections of native species interspersed with non-native species. Habitat conditions in the Survey Area can be considered poor due to the prevalence of highly disturbed and developed areas. The dominant species observed in the Survey Area included native creosote bush and Nevada joint fir, and the non-native grasses cheatgrass (*Bromus tectorum*) and ripgut grass (*Bromus diandrus*). Two vegetation communities were mapped within the Survey Area, Creosote Bush Scrub (*Larrea tridentata* Shrubland Alliance) and Nevada Joint Fir Scrub (*Ephedra nevadensis* Shrubland Alliance (Table 2, Figure 6 through Figure 11). These communities were classified using names and descriptions in the MCV (Sawyer et al. 2009). In addition to the vegetation types, two additional cover types were also mapped including disturbed/ruderal and developed. The vegetation alliances and cover types are described further below.

Table 2. Summary of Vegetation and Cover Types in the Survey Area

Vegetation Community	Global Rank	State Rank	Acres within the Survey Area
Nevada Joint Fir Scrub *Ephedra nevadensis* Shrubland Alliance	G4	S4.3	6.79
Creosote Bush Scrub *Larrea tridentata* Shrubland Alliance	G5	S5	3.77
Disturbed / Ruderal	NA	NA	0.99
Developed	NA	NA	10.60

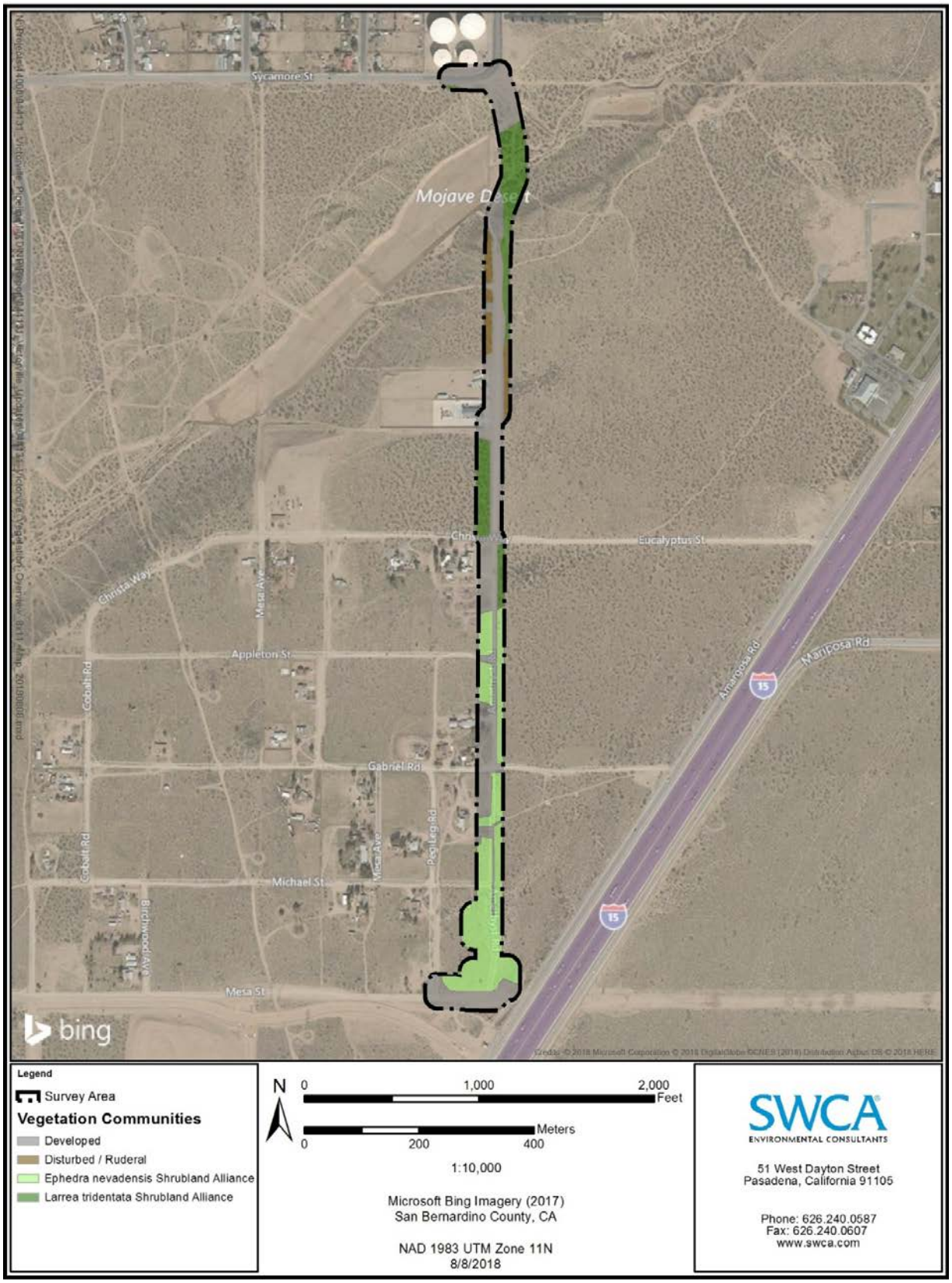

Figure 6. Vegetation communities and land cover overview.

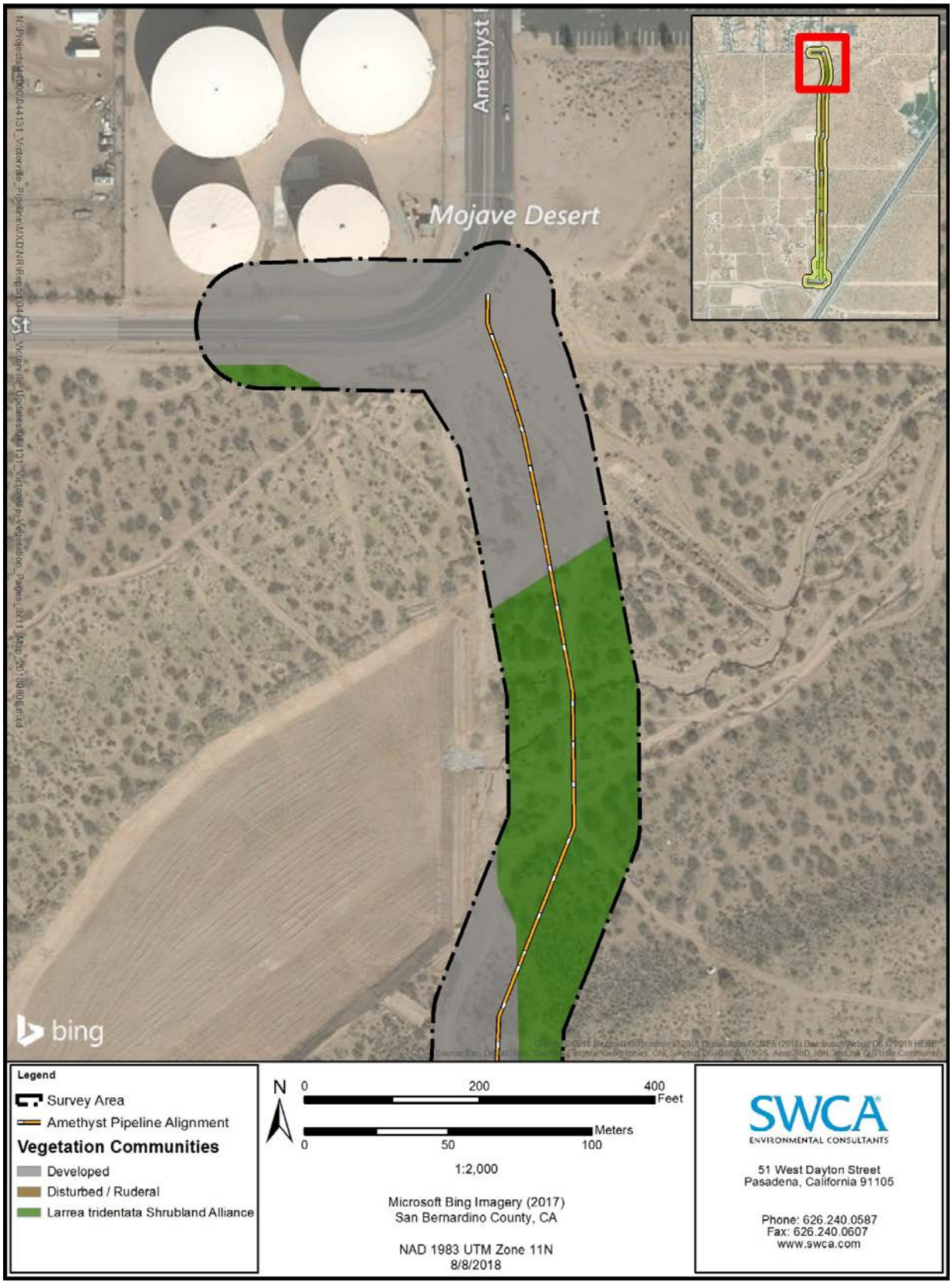

Figure 7. Vegetation communities and land cover detailed view, section 1.

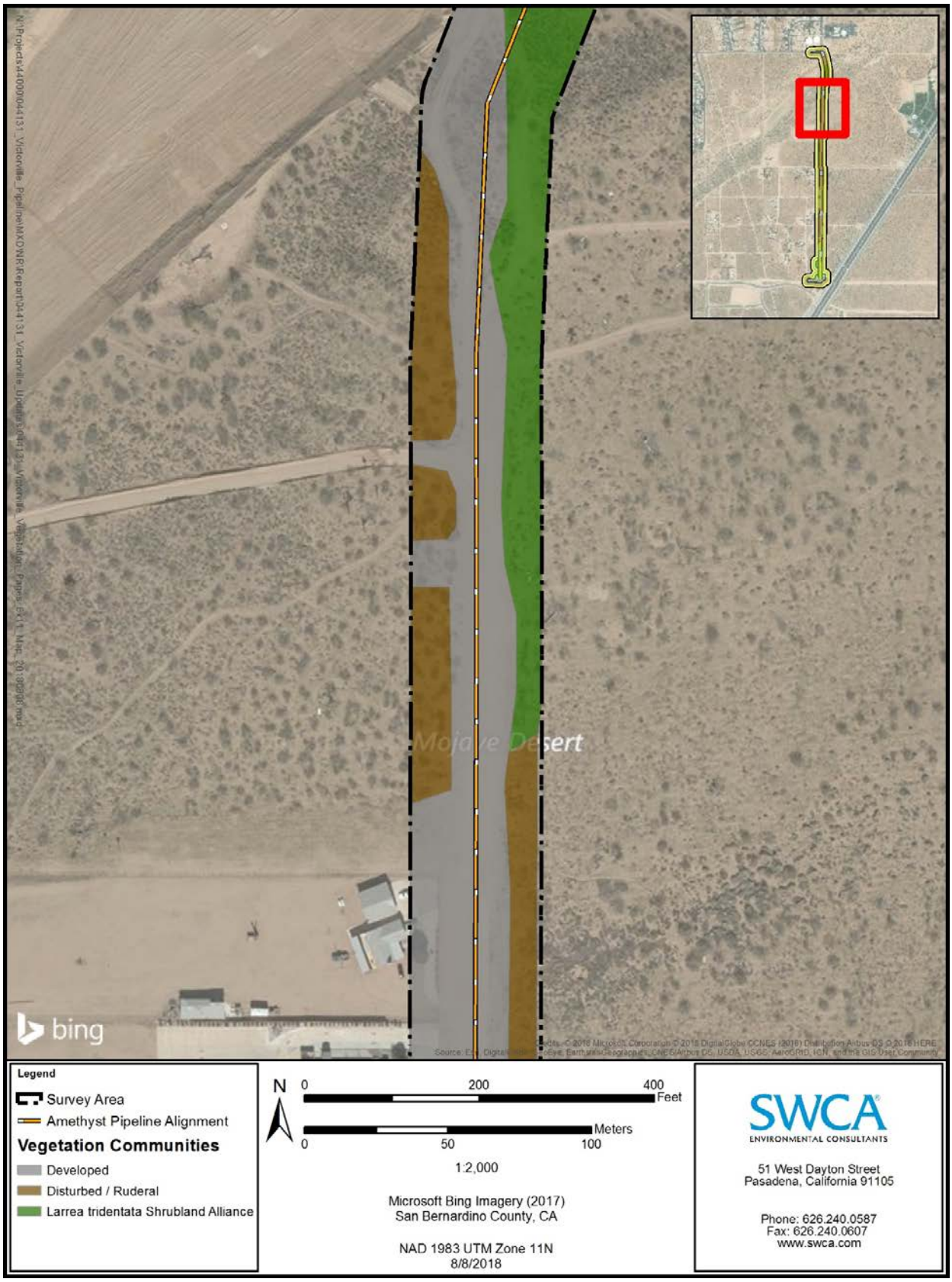

Figure 8. Vegetation communities and land cover detailed view, section 2.

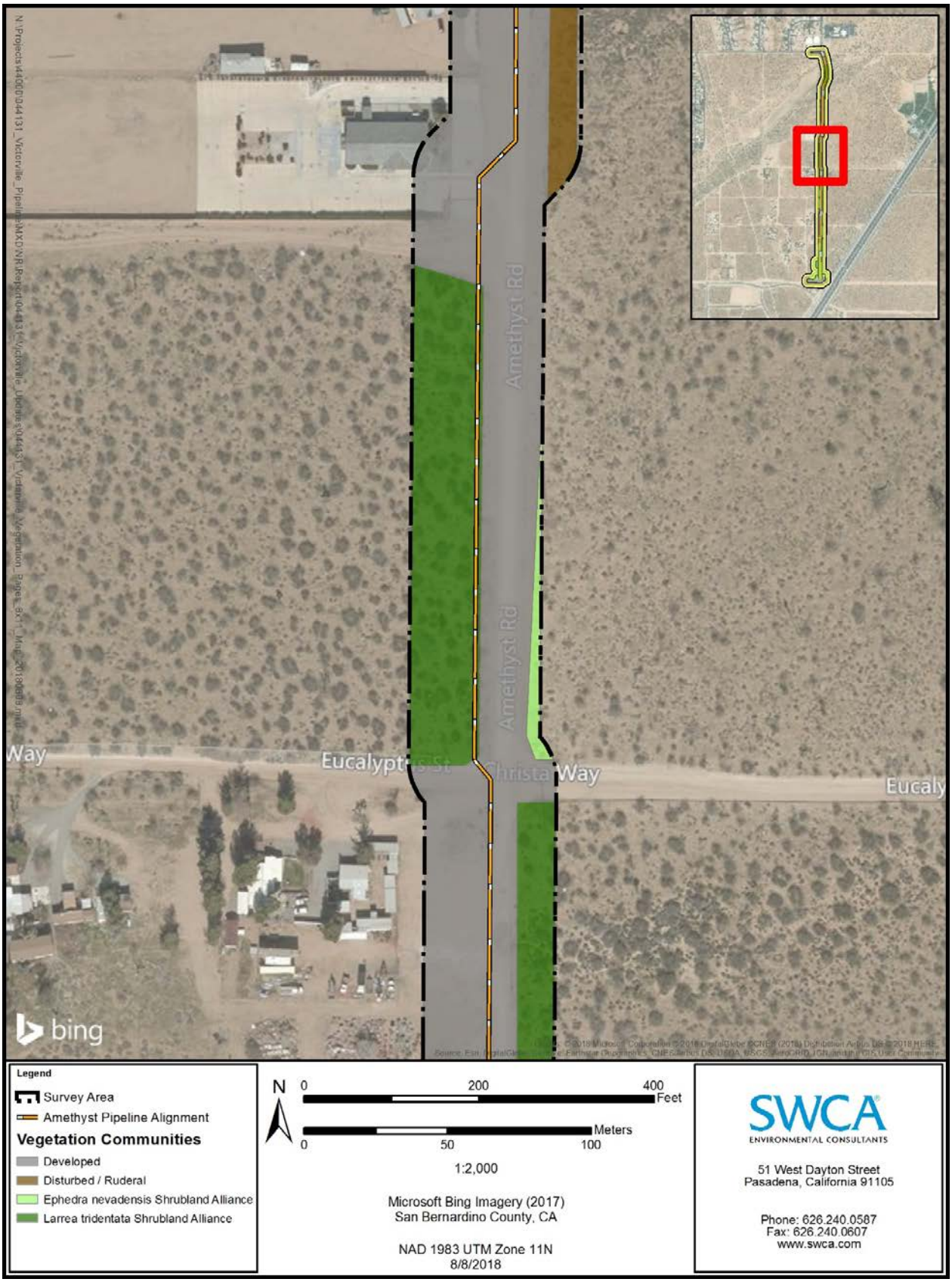

Figure 9. Vegetation communities and land cover detailed view, section 3.

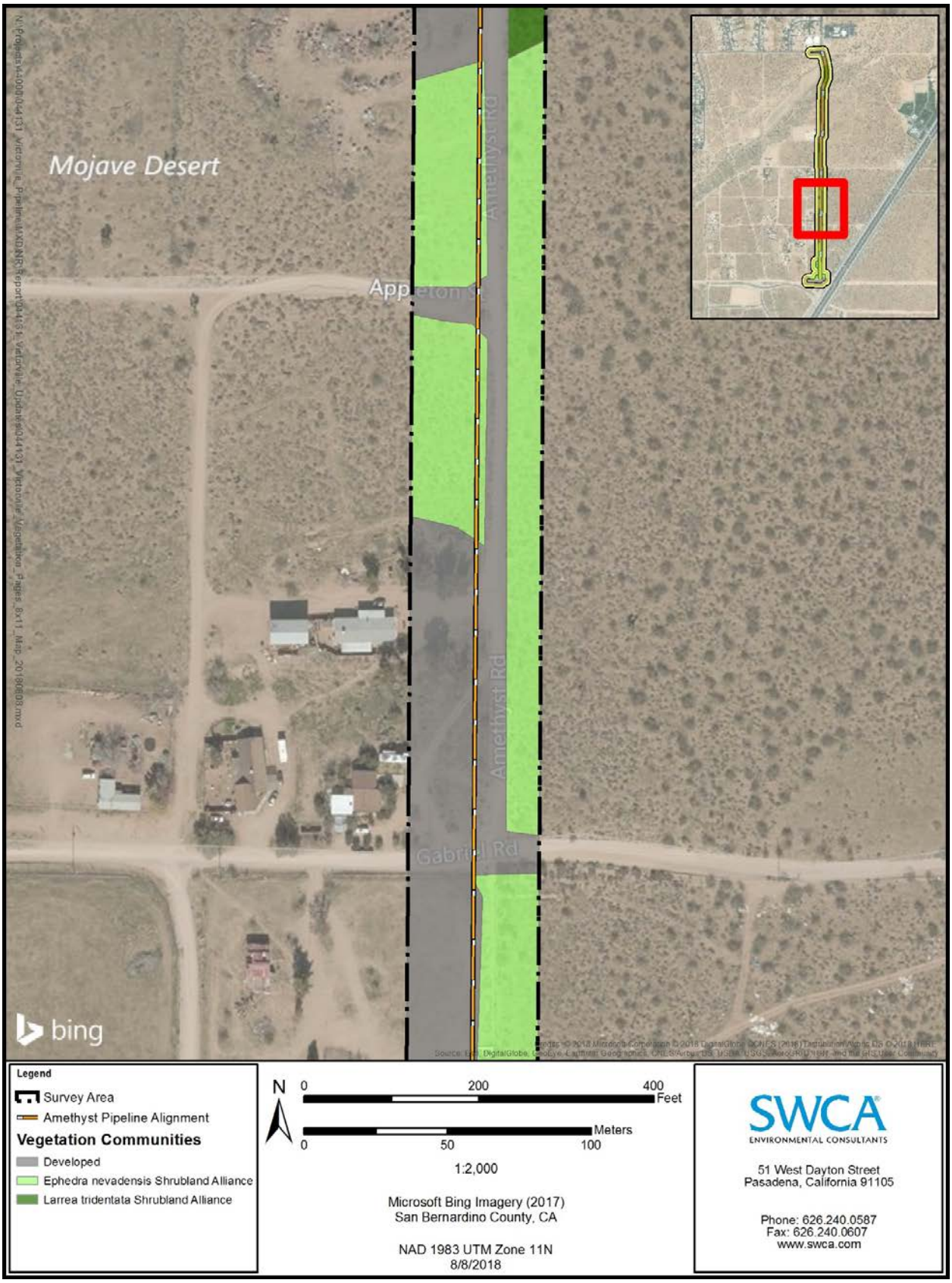

Figure 10. Vegetation communities and land cover detailed view, section 4.

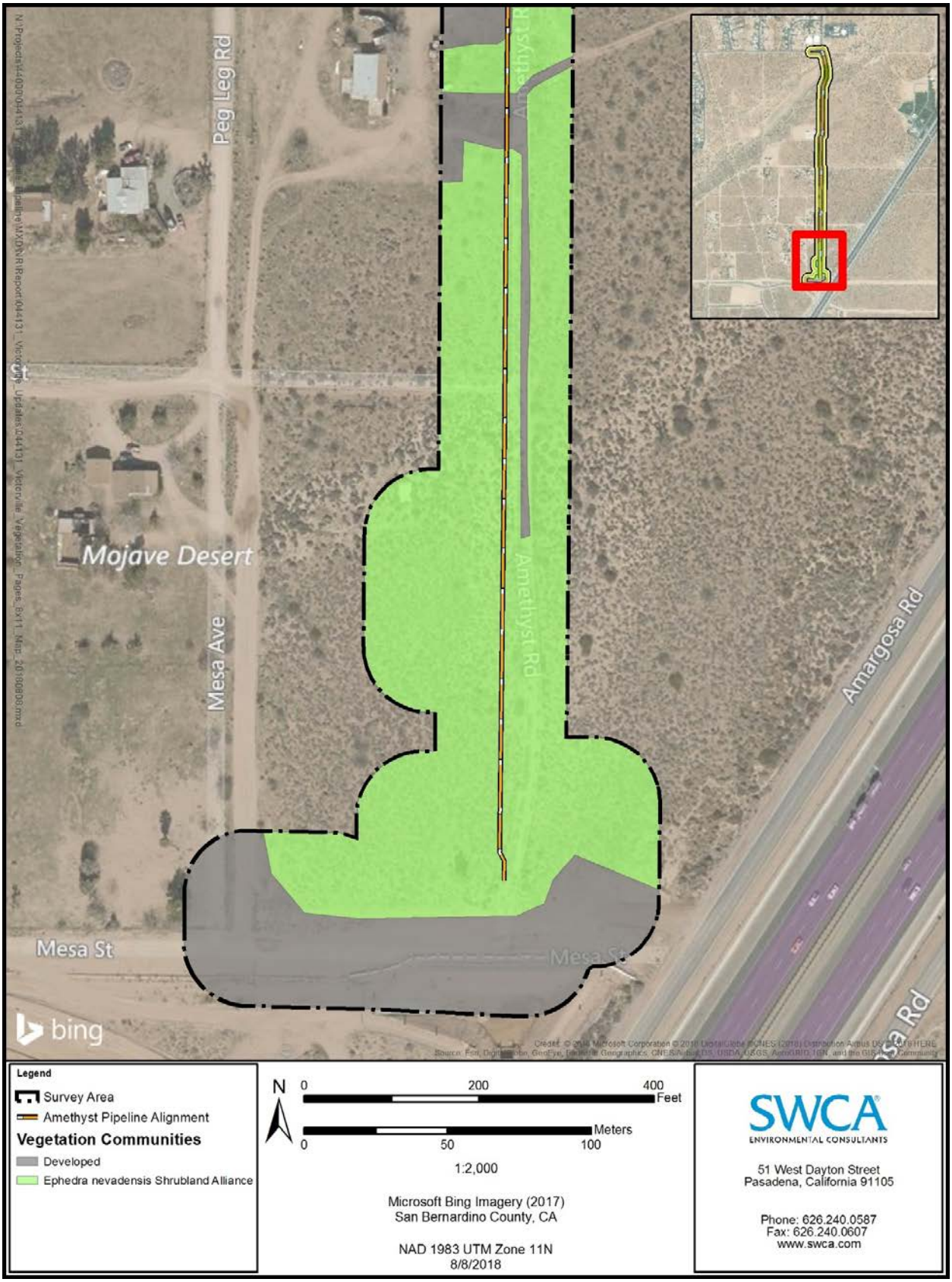

Figure 11. Vegetation communities and land cover detailed view, section 5.

Sensitive vegetation communities are defined by CDFW as communities with a Global or State rank of 3 through 1, which are "...communities that are of limited distribution statewide or within a county or region and are often vulnerable to environmental effects of Projects" (CDFW 2010). The literature review and vegetation mapping determined that no sensitive natural communities are present in the Study Area.

4.5.1 *Nevada Joint Fir Scrub (*Ephedra nevadensis *Shrubland Alliance)*

Nevada Joint Fir Scrub is a native shrubland that is widespread throughout the Mojave Desert. It typically occurs on soils that are well drained, gravelly, or rocky that may be alkaline. This shrubland is often found in dry, open slopes, ridges, canyons, and washes. The dominant species of this vegetation type is the Nevada ephedra (*Ephedra nevadensis*), a slow-growing, long-lived plant that is often used as forage for sheep and cattle. In the Survey Area, Nevada Joint Fir Scrub appears to be a successional vegetation community established following the disturbance of what was likely classified as Creosote Bush Scrub in the past.

4.5.2 *Creosote Bush Scrub (*Larrea tridentata *Shrubland Alliance)*

Creosote Bush Scrub is a native shrubland alliance that is commonly found in alluvial fans, bajadas, upland slopes, or minor intermittent washes. It is characterized by sparsely, but evenly spaced creosote bush and associated plants including white bur-sage (*Ambrosia dumosa*), brittlebush (*Encelia farinosa*), Mojave yucca (*Yucca schidigera*) and beavertail cactus (*Opuntia basilaris*). Though highly flammable due to its resinous foliage, Creosote Bush Scrub is poorly adapted to fire and often has a 100% mortality rate in low intensity fires. In the Mojave Desert, this shrubland is highly degraded due to fire, grazing, military operations, and ORV activities; these disturbances have likely resulted in the transition of Creosote Bush Scrub to Nevada Joint Fir Scrub and Disturbed/Ruderal.

4.5.3 *Disturbed/Ruderal*

Disturbed/Ruderal areas are characterized by modified soils and are usually dominated by non-native species or native species associated with disturbance. Areas mapped as Disturbed/Ruderal did not meet definitions as described in the MCV. Instead, they are characterized by a lack of naturally functioning vegetation communities and a high level of anthropogenic disturbance. This cover type is not a natural community.

4.5.4 *Developed*

This cover type is used to describe areas occupied by existing structures or infrastructure (i.e. houses, existing solar facilities, and roads). Vegetation in these areas is dominated by weedy annuals or ornamental species that may or may not have been intentionally planted. Developed lands are a common land cover along the proposed pipeline route. This cover type is the dominant cover type in the Survey Area, and is not a natural community.

4.6 Wildlife Movement and Migratory Corridors

The term "wildlife movement corridor" implies a continuous, unidirectional movement of individual animals. Although wildlife movement corridors may sometimes be used in this way, the most important functions of a wildlife movement corridor are the long-term dispersal of genetic material between population centers and the maintenance of balanced, viable populations in these areas. The term "habitat linkage" which can be defined as an undisturbed habitat which connects two or more reserve areas (generally public land holdings) with habitat suitable for movement of mobile terrestrial organisms between the reserves, better characterizes this concept. Habitat linkages are generally comprised of expanses of habitat rather than as narrow travel routes, which offer the greatest possible potential of facilitating short-

and long-term wildlife movement between reserve areas. The habitat linkages serve to both permit movement between isolated populations and maintain an integrated, functioning landscape-wide ecosystem (Lieberstein 1989).

Wildlife corridors and habitat linkages are important for the free movement of animals between population centers, for access to food and water sources during drought, as escape routes from wildland fires, and, in the longer term, for dispersal of genetic traits between population centers. Human encroachment fragments natural habitats into smaller and more isolated units. In the process, it destroys habitat of many species, modifies habitat of others, and creates new habitat for some (Adams and Dove 1989). Many studies have indicated that, in general, habitat size is the most important factor in determining terrestrial vertebrate species diversity (Adams and Dove 1989). The degree of habitat isolation and percentage of vegetative cover are other major factors in species variety and abundance.

There are no known studies or widespread analyses that have been conducted within or adjacent to the Project. Migratory birds may utilize the Survey Area for breeding, nesting, and foraging, or at a minimum, as transient rest sites during migration flights. Desert kit fox (*Vulpes macrotis arsipus*) and coyote (*Canis latrans*) likely use the Survey Area and surrounding lands in search of prey opportunities, water resources, and cover when moving across the valley floor. This region of the Mojave Desert has been highly fragmented by manmade barriers, including private property, residential housing, and commercial buildings. These barriers inhibit movement of some species that have limited home ranges or low dispersal ability but may also reduce the movement and mobility of some wide ranging species such as American badger (*Taxidea taxus*), desert kit fox, and coyote.

4.7 Plants

The Survey Area was dominated by native plants and several non-native plants, many of which are invasive species. Plants encountered during the botanical survey are listed in Appendix A.

4.7.1 Special Status Plants

Queries of the databases and lists, along with literature review identified a total of 26 special status plant taxa that have been documented within the Study Area (Table 3). There are no records of special status plants in the Survey Area itself in either the CNDDB or the CNPS Rare Plant Inventory. Eight (8) special status plants were determined to have a low, moderate, or high potential to occur; each of these is discussed in detail below. A habitat assessment was conducted in November 2017, and no special status plants were identified in the Survey Area; this is likely due to the nature and timing of the survey which did not consist of transects and was conducted outside of the blooming season, a lack of observation does not suggest the species do not occur and does not affect their potential to occur within the Survey Area.

Table 3. Occurrence Potential for Special Status Plants in the Study Area

Species	Status[1]	Habitat Description[2]	Blooming Period	Potential for Occurrence
Allium howellii var. *clokeyi* Mt. Pinos onion	1B.3	Great Basin scrub, pinyon and juniper woodland, meadows and seeps (edges).1,385-1,800 meters.	April - June	**Absent.** There is no suitable habitat in the Survey Area.
Asclepias nyctaginifolia Mojave milkweed	2B.1	Mojavean desert scrub, pinyon-juniper woodland. 875-1,700 meters.	May - June	**Absent.** There is no suitable habitat in the Survey Area.

Species	Status[1]	Habitat Description[2]	Blooming Period	Potential for Occurrence
Boechera dispar pinyon rockcress	2B.3	Joshua Tree Woodland, pinyon and juniper woodland, Mojavean desert scrub. Granitic, gravelly slopes & mesas. Often under desert shrubs which support it as it grows. 1005-2,805 meters.	March - June	**Low.** There is suitable habitat in the Survey Area, however the nearest recent (2011) record of this species is over 10 miles to the southeast.
Calochortus palmeri var. *palmeri* Palmer's mariposa-lily	1B.2	Meadows and seeps, chaparral, lower montane coniferous forest. Vernally moist places in yellow-pine forest, chaparral. 485-2,500 meters.	April - July	**Absent.** There is no suitable habitat in the Survey Area.
Castilleja lasiorhyncha San Bernardino Mountains owl's-clover	1B.2	Meadows and seeps, pebble plain, upper montane coniferous forest, chaparral, and riparian woodland. Mesic to drying soils in open areas of stream and meadow margins or in vernally wet areas. 1,140-2,320 meters.	May - August	**Absent.** There is no suitable habitat in the Survey Area.
Chorizanthe xanti var. *leucotheca* white-bracted spineflower	1B.2	Mojavean desert scrub, pinyon and juniper woodland, coastal scrub (alluvial fans).Sandy or gravelly places. 365-1,830 meters.	April - June	**Low.** There is suitable habitat in the Survey Area, the nearest record of this species is from 1993, 9.1 miles to the southwest.
Cymopterus deserticola desert cymopterus	1B.2	Joshua Tree Woodland, Mojavean desert scrub. On fine to coarse, loose, sandy soil of flats in old dune areas with well-drained sand. 630-1,500 meters.	March - May	**Low.** There is suitable habitat in the Survey Area, the nearest record of this species is from 1980, 9.1 miles to the northwest.
Deinandra mohavensis Mojave tarplant	1B.3	Riparian scrub, coastal scrub, chaparral. Low sand bars in river bed; mostly in riparian areas or in ephemeral grassy areas. 640-1,600 meters.	June - October	**Absent.** There is no suitable habitat in the Survey Area.
Diplacus mohavensis Mojave monkeyflower	1B.2	Joshua Tree Woodland, Mojavean desert scrub. Dry sandy or rocky washes along the Mojave River. 660-1,270 meters.	April - June	**Moderate.** There is moderate quality habitat in the Survey Area, the nearest record of this species is from 1998, 9.9 miles to the north.
Dodecahema leptoceras slender-horned spineflower	1B.2	Chaparral, cismontain woodland, coastal scrub (alluvial fan), sandy soil. 200-750m	April - June	**Absent.** There is no suitable habitat in the Survey Area.
Dudleya abramsii ssp. *affinis* San Bernardino Mountains dudleya	1B.2	Pebble (pavement) plain, upper montane coniferous forest, pinyon and juniper woodland. Outcrops, granite or quartzite, rarely limestone. 1200-2,425 meters.	March - August	**Absent.** There is no suitable habitat in the Survey Area.
Eremothera boothii ssp. *boothii* Booth's evening-primrose	2B.3	Joshua Tree Woodland, pinyon and juniper woodland. 290-2,410 meters.	June - August	**Low.** There is moderate quality habitat in the Survey Area, the nearest record of this species is from 1989, 6.7 miles to the northeast.

Species	Status[1]	Habitat Description[2]	Blooming Period	Potential for Occurrence
Heuchera parishii Parish's alumroot	1B.3	Lower montane coniferous forest, subalpine coniferous forest, upper montane coniferous forest, alpine boulder & rock field. Rocky places. Sometimes on carbonate. 1,340-3,505 meters.	June - August	**Absent.** There is no suitable habitat in the Survey Area.
Ivesia argyrocoma var. *argyrocoma* silver-haired ivesia	1B.2	Meadows and seeps, pebble plains, upper montane coniferous forest. In pebble plains and meadows with other rare plants. 1,490-2,960 meters.	June - August	**Absent.** There is no suitable habitat in the Survey Area.
Lilium parryi lemon lily	1B.2	Lower montane coniferous forest, meadows and seeps, riparian forest, upper montane coniferous forest. Wet, mountainous terrain; generally in forested areas; on shady edges of streams, in open boggy meadows & seeps. 625-2,930 meters.	July - August	**Absent.** There is no suitable habitat in the Survey Area.
Loeflingia squarrosa var. *artemisiarum* sagebrush loeflingia	2B.2	Great Basin scrub, Sonoran desert scrub, desert dunes. Sandy flats and dunes. Sandy areas around clay slicks with *Sarcobatus*, *Atriplex*, *Tetradymia*, etc. 700-1,615 meters.	April - May	**Low.** There is marginally suitable in the Survey Area, the nearest record of this species is from 2005, 2.6 miles to the northwest.
Lycium parishii Parish's desert-thorn	2B.3	Coastal scrub, Sonoran desert scrub.135-1,000 meters.	March - April	**Absent.** There is no suitable habitat in the Survey Area.
Opuntia basilaris var. *brachyclada* short-joint beavertail	1B.2	Chaparral, Joshua Tree Woodland, Mojavean desert scrub, pinyon-juniper woodland. Sandy soil or coarse, granitic loam. 425-1,800 meters.	April - June	**Moderate.** There is moderate quality habitat in the Survey Area, the nearest record from 1989 of this species is 3.8 miles to the southwest.
Pediomelum castoreum Beaver Dam breadroot	1B.2	Joshua Tree Woodland, Mojavean desert scrub. Sandy soils; washes and roadcuts. 610-1,065 meters.	April - May	**Moderate.** There is moderate quality habitat in the Survey Area, the nearest record of this species is from 1992, 6.1 miles to the northeast.
Perideridia parishii ssp. *parishii* Parish's yampah	2B.2	Lower montane coniferous forest, meadows and seeps, upper montane coniferous forest. Damp meadows or along streambeds-prefers an open pine canopy. 1470-2,530 meters.	June - August	**Absent.** There is no suitable habitat in the Survey Area.
Schoenus nigricans black bog-rush	2B.2	Marshes and swamps. Often in alkaline marshes. 120-1,525 meters.	August - September	**Absent.** There is no suitable habitat in the Survey Area.
Scutellaria bolanderi ssp. *austromontana* southern mountains skullcap	1B.2	Chaparral, cismontane woodland, lower montane coniferous forest. In gravelly soils on streambanks or in mesic sites in oak or pine woodland. 425-2,000 meters.	June - August	**Absent.** There is no suitable habitat in the Survey Area.
Streptanthus campestris southern jewelflower	1B.3	Chaparral, lower montane coniferous forest, pinyon and juniper woodland. Open, rocky areas. 605-2,590 meters.	May - July	**Absent.** There is no suitable habitat in the Survey Area.

Species	Status[1]	Habitat Description[2]	Blooming Period	Potential for Occurrence
Symphyotrichum defoliatum San Bernardino aster	1B.2	Meadows and seeps, cismontane woodland, coastal scrub, lower montane coniferous forest, marshes and swamps, valley and foothill grassland. Vernally mesic grassland or near ditches, streams and springs; disturbed areas. 2-2,040 meters.	July - November	**Absent.** There is no suitable habitat in the Survey Area.
Symphyotrichum greatae Greata's aster	1B.3	Chaparral, cismontane woodland, broad-leafed upland forest, lower montane coniferous forest, riparian woodland. Mesic canyons. 335-2,015 meters.	June - October	**Absent.** There is no suitable habitat in the Survey Area.
Viola purpurea ssp. *aurea* golden violet	2B.2	Great basin scrub, pinyon and juniper woodland, sandy soil. 1000-2,500m	April - June	**Absent.** There is no suitable habitat in the Survey Area.

1: Ranks for the species included in this list are sourced from CNDDB. All plants included in this list are limited to California Rare Plant Ranks (CRPR).
CRPR Rankings:
1B: Rare, threatened, or endangered in California and elsewhere.
2B: Rare, threatened, or endangered in California, but more common elsewhere.
0.1: Seriously threatened in California.
0.2: Fairly threatened in California.
0.3: Not very threatened in California

2: Habitat descriptions are direct quotes from CNDDB, consisting of the general and microhabitat descriptions of the corresponding element.

4.7.1.1 PINYON ROCKCRESS

Pinyon rockcress (*Boechera dispar)* is a California Rare Plant Rank (CRPR) 2B.3 perennial herb that flowers between March and June. CRPR 2B.3 species are rare, threatened, or endangered in California, but more commonly found elsewhere, and they are not very threatened in California. Pinyon rockcress is known to occur in granitic, gravelly slopes and mesas, often under desert shrubs at elevations between 1,005 and 2,805 meters (m) amsl. This species is threatened by off road vehicle activities and impact from non-native plants. Pinyon rockcress has a low potential to occur in the Survey Area. There is some suitable habitat at the site, and the nearest record from 2011 is over 10 miles to the southeast.

4.7.1.2 WHITE-BRACTED SPINEFLOWER

White-bracted spineflower (*Chorizanthe xanti* var. *leucotheca*) is a CRPR 1B.2 annual herb that flowers between April and June. CRPR 1B.2 species are rare, threatened, or endangered in its entire range, and is fairly threatened in California, and they are moderately threatened in California. White-bracted spineflower is known to occur within alluvial fans of coastal scrub, Mojavean desert scrub, pinyon and juniper woodland at elevations between 300 and 1,200 meters amsl. This species is threatened by development, flood control projects, mining and vehicles. The potential for white-bracted spineflower to occur in the Survey Area is low. The nearest record of occurrence from 1993 is, approximately 9.1 miles southwest of the Project.

4.7.1.3 DESERT CYMOTERUS

Desert cymopterus (*Cymopterus deserticola)* is a CRPR 1B.2 perennial herb that flowers between March and May. CRPR 1B.2 species are rare, threatened, or endangered in California and elsewhere, and is moderately threatened in California. Desert cymopterus is known to occur on loose, sandy soils within Joshua Tree Woodland and Mojavean desert scrub at elevations between 630 and 1,500 meters amsl. This species is threatened by military activities, sheep grazing, vehicles, utility construction and urbanization. The potential for Desert cymopterus to occur in the Survey Area is low; the nearest record is from 1980 and

is 9.1 miles to the northeast of the Project along highway 18. This species is possibly extirpated from the Apple Valley region.

4.7.1.4 MOJAVE MONKEYFLOWER

Mojave monkeyflower (*Diplacus mohavensis*) is a CRPR 1B.2 annual herb that flowers between April and May. CRPR 1B.2 species are rare, threatened, or endangered in California and elsewhere, and is moderately threatened in California. Mojave monkeyflower occurs commonly in washes in sandy or gravelly soil in Joshua Tree Woodland and Mojavean desert scrub, at elevations between 600 and 1,200 meters amsl. This species is threatened by development, mining, non-native plants, solar and wind energy projects, and vehicles. Potential for Mojave monkeyflower to occur in the Survey Area is moderate. There is suitable habitat located in the Oro Grande Wash, which traverses through a portion of the Survey Area. However; potential for this species to occur is reduced due to disturbance caused by nearby projects, such as the Amethyst Basin. The nearest record was documented in 1998 9.9 miles to the north.

4.7.1.5 BOOTH'S EVENING-PRIMROSE

Booth's evening-primrose (*Eremothera boothii* ssp. *boothii*) is a CRPR 2B.3 annual herb that flowers between June and August. CRPR 2B.3 species are rare, threatened, or endangered in California, but more commonly found elsewhere, and is not very threatened in California. Booth's evening-primrose occurs in sandy flats and steep loose slopes, primarily in Joshua tree woodland and pinyon/juniper woodland. While no areas were classified as Joshua Tree Woodland in the Survey Area, a moderate amount of Joshua trees (*Yucca brevifolia*) were observed within the Oro Grande Wash; however they were distributed at lower densities than is required for the area to be classified as Joshua Tree Woodland. Marginal habitat is present in the Survey Area, and the nearest observation is approximately Booth's evening-primrose was documented approximately 6.7 miles to the northeast. Booth's evening-primrose has a low potential to occur in the Survey Area.

4.7.1.6 SAGEBRUSH LOEFLINGIA

Sagebrush loeflingia (*Loeflingia squarrosa* var. *artemisiarum)* is a CRPR 2B.2 annual herb that flowers between April and May. CRPR 2B.2 species are rare, threatened, or endangered in California, but more commonly found elsewhere, and is moderately threatened in California. Sagebrush loeflingia is known to occur in sandy soils in desert dues, great basin scrub, and Sonoran desert scrub at elevations between 700 and 1,615 meters amsl. This species is threatened by grazing and vehicles. Sagebrush loeflingia has a low potential to occur in the Survey Area. There is some suitable habitat at the site and the nearest record from 2005 is located 2.6 miles to the northwest.

4.7.1.7 SHORT-JOINT BEAVERTAIL

Short-joint beavertail (*Opuntia basilaris* var. *brachyclada*) is a CRPR 1B.2 perennial stem succulent that flowers between April and June, and sometimes in August. CRPR 1B.2 species are rare, threatened, or endangered in California and elsewhere, and is moderately threatened in California. Short-joint beavertail is found in chaparral, Joshua Tree Woodland, Mojavean desert scrub, and pinyon and juniper woodland at elevations between 425 and 1,800 meters amsl. Urbanization, mining, horticultural collecting, grazing, and vehicles are the primary threats to this species. Other possible threats include powerline construction and non-native plants. The nearest CNDDB record of this species is from 1989, approximately 3.8 miles to the southwest. However, a more recent observation was recorded in 2006 approximately 5.1 miles to the southwest. Short-joint beavertail has a moderate potential to occur in the Survey Area.

4.7.1.8 BEAVER DAM BREADROOT

Beaver dam breadroot (*Pediomelum castoreum*) is a CRPR 1B.2 perennial herb that flowers between April and May. CRPR 1B.2 species are rare, threatened, or endangered in California and elsewhere, and is moderately threatened in California. Beaver dam breadroot occurs in sandy washes and roadcuts in Joshua Tree Woodland and Mojavean desert scrub at elevations between 610 and 1,525 meters amsl. Vehicles and road-widening projects are the primary threats to this species. Potential for Mojave monkeyflower to occur in the Survey Area is moderate. There is moderate quality habitat located in the Oro Grande Wash, which traverses through a portion of the Survey Area. However; potential for this species to occur is reduced due to disturbance caused by off road vehicles and the construction of the Amethyst Basin. The nearest record was documented in 1992, 6.1 miles to the northeast.

4.8 Wildlife

A species occurrence within a given habitat depends on the presence of the habitat conditions necessary to support that species. While some species are specialists, requiring highly specific habitat parameters to survive, others are generalists and may occupy several communities, especially if those communities are similar in overall species composition and physical structure. Some animals, especially birds and wide-ranging mammals, may use an array of dissimilar communities for forage and cover. The broader the range of topographic features and underlying environmental conditions within a region, the higher the species diversity is expected to be in that region. A full list of observed species during the field survey can be found in Appendix B.

4.8.1 Amphibians

Amphibians require moisture for at least a portion of their life cycle and many require standing or flowing water for reproduction. Most creeks and waterways in southern California are subject to periods of high water flow in winter and spring and little to no flow during late summer and fall. There are no streams in the Survey Area, only a few areas that experience ephemeral pooling after periods of rain. No amphibians are expected to occur at the Survey Area.

4.8.2 Reptiles

Reptilian diversity and abundance typically varies with vegetation community and character. Many species prefer only one or two vegetation communities; however, most species will forage in a variety of habitats. Most species occurring in open areas use rodent burrows (many of which were observed in the Survey Area) for cover, protection from predators, and refuge during extreme weather conditions. One reptile, western side-blotched lizard (*Uta sansburiana*), was observed during the survey. While unlikely, it is possible for desert tortoise (*Gopherus agassizii*) to occur in the Survey Area.

4.8.3 Birds

A variety of bird species are expected to be residents of the Survey Area, with some species using the vegetation communities throughout the year and others being present only during certain seasons. Common birds expected year-round in the Study Area include the common raven (*Corvus corax*) and red-tailed hawk (*Buteo jamaicensis*). Some common wintering-only species include white-crowned sparrow (*Zonotrichia leucophrys)* may also be found in the Survey Area. Birds observed during the field survey include: Say's phoebe (*Sayornis saya*), Bewick's wren (*Thryomanes bewickii*), loggerhead shrike (*Lanius ludovicianus*), common raven, western meadowlark (*Sturnella neglecta*), black-throated sparrow (*Amphispiza bilineata*), white-crowned sparrow (*Zonotrichia leucophrys*), and house finch (*Haemorhous mexicanus*).

4.8.4 Mammals

Common mammals expected in the Survey Area include desert cottontail (*Sylvilagus audubonii*), black-tailed jackrabbit (*Lepus californicus*), and coyote (*Canis latrans*). Small mammals, such as white-footed deer mouse (*Peromyscus maniculatus*), and Merriam's kangaroo rat (*Dipodomys merriami)* are also expected to occur in or near the Study Area. Black-tailed jackrabbit and desert cottontail were the only mammals observed during the November 2017 field survey.

4.8.5 Special Status Wildlife

Based on the results of the literature and database review, 35 species of wildlife were found to have occurrences within the Study Area. These species were evaluated for their potential to occur in the Survey Area, based on considerations of local records, habitat conditions, and environmental requirements (Table 4). After this assessment, 13 species were considered to have the potential to occur in the Survey Area. One (1) species, loggerhead shrike (*Lanius ludovicianus*), was confirmed to occur in the Survey Area during the November 2017 habitat assessment. Each of these 13 species are discussed in detail below.

Table 4. Occurrence Potential for Special Status Wildlife in the Study Area

Scientific Name	Status	Habitat Type	Occurrence Potential
INVERTEBRATES			
Crotch bumble bee *Bombus crotchii*	SA	Coastal California to Sierra-Cascade crest, and to Mexico. Food plant genera include *Antirrhinum*, *Phacelia*, *Clarkia*, *Dendromecon*, *Eschscholzia*, and *Eriogonum*.	**Low.** Food plant species present in the Survey Area.
Morrison bumble bee *Bombus morrisoni*	SA	Sierra-Cascade ranges, intermountain west. Food plant genera include *Cirsium, Cleome, Helianthus, Lupinus, Chrysothamnus*, and *Melilotus*	**Absent.** No suitable habitat or food source observed in the Survey Area.
Andrew's marble butterfly *Euchloe hyantis andrewsi*	SA	Yellow pine forest, 5,000-6,000 feet. Hostplants are *Streptanthus bernardinus & Arabis holboellii* var *pinetorum*; larval foodplant is *Descurainia richardsonii*	**Absent.** No suitable habitat or food source observed in the Survey Area.
San Emigdio blue butterfly *Plebulina emigdionis*	SA	Desert canyons & along riverbeds. Host plant is *Atriplex canescens*; possibly *Lotus purshianus.*	**Absent.** No suitable habitat or food source observed in the Survey Area.
FISH			
Mohave tui chub *Siphateles bicolor mohavensis*	CSSC	Endemic to the Mojave River basin, alkaline, mineralized waters. Needs deep pools, ponds, or slough-like areas. Needs vegetation for spawning.	**Absent.** No suitable habitat in the Survey Area.

Scientific Name	Status	Habitat Type	Occurrence Potential
AMPHIBIANS			
Arroyo toad *Anaxyrus californicus*	FE	Semi-arid regions near washes or intermittent streams, including valley-foothill and desert riparian, desert wash, etc.	**Absent.** No suitable habitat in the Survey Area. The Oro Grande Wash is potentially suitable, however the habitat has been highly disturbed due to the construction of the Amethyst Basin, which has removed the potential for potential breeding habitat to occur in the Survey Area.
California red-legged frog *Rana draytonii*	FT, CSSC	Lowlands & foothills in or near permanent sources of deep water with dense, shrubby or emergent riparian vegetation.	**Absent.** No suitable habitat in the Survey Area.
Southern mountain yellow-legged frog *Rana muscosa*	FE, SE	San Gabriel, San Jacinto and San Bernardino mountains. Always encountered within a few feet of water. Tadpoles may require 2-4 years to complete their aquatic development.	**Absent.** No suitable habitat in the Survey Area.
REPTILES			
Coastal whiptail *Aspidoscelis tigris stejnegeri*	CSSC	Deserts and semi-arid areas with sparse vegetation and open areas. Also found in woodland & riparian habitats. Firm soil, sandy, or rocky substrate.	**Low.** Suitable habitat exists in the Survey Area.
Western pond turtle *Emys marmorata*	CSSC	Ponds, marshes, rivers, streams & irrigation ditches, with aquatic vegetation, below 6,000 feet elevation. Need basking sites and suitable (sandy banks or grassy open fields) upland habitat up to 0.5 km from water for egg-laying.	**Absent.** No suitable habitat in the Survey Area.
Desert tortoise *Gopherus agassizii*	FT, ST	Desert scrub, desert wash, and Joshua tree habitats; occurs in almost every desert habitat. Requires friable soil for burrow and nest construction. Creosote bush habitat with annual wildflower blooms preferred.	**Low.** There is suitable habitat in the Survey Area. The nearest CNDDB record is from 2007 located 4 miles to the north.
Coast horned lizard *Phrynosoma blainvillii*	CSSC	Most common in lowlands along sandy washes with scattered low bushes. Open areas for sunning, bushes for cover, patches of loose soil for burial, & abundant supply of ants & other insects.	**Low.** There is suitable habitat in the Survey Area. The nearest record is from 1919 located 3.3 miles to the southeast. A more recent record exists from 2008 and is 9.5 miles to the south.
Two-striped gartersnake *Thamnophis hammondii*	CSSC	Highly aquatic, found in or near permanent fresh water. Often along streams with rocky beds and riparian growth.	**Absent.** No suitable habitat in the Survey Area.
BIRDS			
Tricolored blackbird *Agelaius tricolor*	SC, CSSC	Requires open water, protected nesting substrate, and foraging areas with insect prey within a few kilometers of colony.	**Absent.** Habitat is unsuitable for foraging; no nesting habitat is present. The nearest recent record is 4.7 miles to the west.

Scientific Name	Status	Habitat Type	Occurrence Potential
Golden eagle *Aquila chrysaetos*	CFP, WL	Forages in open grasslands, desert scrub and agricultural fields. Nests on ledges on cliff faces, rock outcrops and occasionally in large trees.	**High (foraging). Absent (nesting).** Suitable habitat for wintering and foraging eagles is present. No nesting habitat present.
Long-eared owl *Asio otus*	CSSC	Riparian bottomlands grown to tall willows and cottonwoods; require adjacent open land, with rodent food sources and raptor nests for breeding.	**Absent.** No suitable habitat in the Survey Area.
Burrowing owl *Athene cunicularia*	CSSC	Open grassland, shrublands and croplands	**High.** There is suitable habitat at the Survey Area. The nearest record of this species is from 2006 and is located 0.75 mile to the southeast.
Swainson's hawk *Buteo swainsoni*	ST	Breeds in stands with few trees in juniper-sage flats, riparian areas, and oak savannahs.	**Low (foraging), Absent (nesting).** Trees suitable for nesting are absent from the Survey Area. Local records are concentrated near the Mojave River and agriculture. Species may occur as a transient species, and has a low potential to forage in the Survey Area.
Western yellow-billed cuckoo *Coccyzus americanus occidentalis*	FT, SE	Riparian forest nester, along the broad, lower flood-bottoms of larger river systems; Nests in riparian jungles of willow, often mixed with cottonwoods, with lower story of blackberry, nettles, or wild grape.	**Absent.** No suitable habitat in the Survey Area.
Southwestern willow flycatcher *Empidonax traillii extimus*	FE, SE	Riparian woodlands in Southern California;	**Absent.** No suitable habitat in the Survey Area.
Bald eagle *Haliaeetus leucocephalus*	SE, CFP	Nests on large trees in the vicinity of large lakes, reservoirs and rivers. Wintering birds are most often found near large concentrations of waterfowl or fish.	**Absent.** No suitable habitat in the Survey Area.
Yellow-breasted chat *Icteria virens*	CSSC	Summer resident; inhabits riparian thickets of willow and other brushy tangles near watercourses. Nests in low, dense riparian, consisting of willow, blackberry, wild grape.	**Absent.** No suitable habitat in the Survey Area.
Loggerhead shrike *Lanius ludovicianus*	CSSC	Broken woodlands, savannah, pinyon-juniper, Joshua tree, and riparian woodlands, desert oases, scrub & washes. Prefers open country for hunting, with perches for scanning, and fairly dense shrubs and brush for nesting.	**Present.** Species was observed during the field survey in November 2017.

Scientific Name	Status	Habitat Type	Occurrence Potential
Summer tanager *Piranga rubra*	CSSC	Summer resident of desert riparian along lower Colorado River, and locally elsewhere in California deserts. Requires cottonwood-willow riparian for nesting and foraging; prefers older, dense stands along streams.	**Absent.** No suitable habitat in the Survey Area.
Yellow warbler *Setophaga petechia*	CSSC	Riparian plant associations. Nests and forages in willow shrubs and thickets, and in other riparian plants including cottonwoods, sycamores, ash, and alders.	**Absent.** No suitable habitat in the Survey Area.
Least Bell's vireo *Vireo bellii pusillus*	FE, SE	Summer resident of southern California. Low riparian habitats near of water or dry river bottoms, below 2,000 feet.	**Absent.** No suitable habitat in the Survey Area.
Gray vireo *Vireo vicinior*	CSSC	Dry chaparral; west of desert, in chamise-dominated habitat; mountains of Mojave Desert, associated with juniper & *Artemisia.*	**Absent.** No suitable habitat in the Survey Area.
MAMMALS			
Pallid bat *Antrozous pallidus*	CSSC	Deserts, grasslands, shrublands, woodlands and forests. Most common in open, dry habitats with rocky areas for roosting. Roosts must protect bats from high temperatures. Very sensitive to disturbance of roosting sites.	**Moderate (foraging only).** Habitat in the Survey Area is suitable for foraging; there is no roosting habitat present. This species has been record 8.2 miles east of the Survey Area in 2016.
Pallid San Diego pocket mouse *Chaetodipus fallax pallidus*	CSSC	San Diego County in desert wash, desert scrub, desert succulent scrub, pinyon-juniper, etc. Sandy, herbaceous areas, usually in association with rocks or coarse gravel.	**Low.** There is suitable habitat in the Survey Area. The nearest record of this species is from 1921 and is located 5.1 miles to the northeast.
Townsend's big-eared bat *Corynorhinus townsendii*	CSSC	Most common in mesic sites. Roosts in caves and mines, sometimes buildings, bridges, trees. Roosting sites limiting. Extremely sensitive to human disturbance.	**Moderate (foraging only).** Habitat in the Survey Area is suitable for foraging; there is no roosting habitat present. This species has been recorded 7.9 miles north of the Survey Area in 1930.
San Bernardino flying squirrel *Glaucomys oregonensis californicus*	CSSC	Black oak or white fir dominated woodlands between 5,200 – 8,500 feet in the San Bernardino and San Jacinto ranges. Needs nearby water and cavities in trees/snags for nests and cover.	**Absent.** No suitable habitat in the Survey Area.
Mohave river vole *Microtus californicus mohavensis*	CSSC	Weedy herbaceous growth in wet areas along Mojave River. Sometimes found in irrigated pastures. Burrows into soft soil. Feeds on leafy parts of grasses, sedges and herbs.	**Absent.** No suitable habitat in the Survey Area.

Scientific Name	Status	Habitat Type	Occurrence Potential
Desert kit fox *Vulpes macrotis arsipus*	CPF	Desert scrub, washes, and arid grasslands	**High.** Habitat in the Survey Area is suitable. Species not tracked in any public databases.
American badger *Taxidea taxus*	CSSC	Dry open stages of most shrub, forest, and herbaceous habitats, with friable soils. Needs sufficient food (rodents) and open uncultivated ground for burrows.	**Moderate.** Habitat in the Survey Area is suitable, and within the species' range. The most recent record is from 1987 and 8.7 miles south of the Survey Area.
Mohave ground squirrel *Xerospermophilus mohavensis*	ST	Open desert scrub, alkali scrub & Joshua tree woodland. Prefers sandy to gravelly soils, avoids rocky areas. Uses burrows at base of shrubs for cover.	**Low.** Suitable habitat in the Survey Area. Distribution "between Lancaster and Victorville is poorly understood… only one Mohave Ground Squirrel occurrence has been documented [since 2008]."[1] The closest record is from 2005 and is approximately 2.3 miles west of the Survey Area.

Federal Rankings:
FE = Federally Endangered
FT = Federally Threatened
FC = Federal Candidate for Listing
1: P. Leitner 2014.

State Rankings:
SE= State Endangered
SC = State Candidate for Endangered Listing
ST = State Threatened
CFP = California Fully Protected
CPF = California Protected Fur-bearer
SA = CDFW Special Animal
CSSC = California Species of Special Concern

4.8.5.1 INVERTEBRATES

Crotch Bumble Bee

The crotch bumble bee (*Bombus crotchii*) occurs primarily in Southern California, and was historically common in the Central Valley. It is included on the CDFW list of Special Animals, but does not have any formal state or federal protections. This species has been extirpated from most of its known range, because of intensification of agriculture and urbanization, among other factors. Known food plants include members of the following genera: *Antirrhinum*, *Phacelia*, *Clarkia*, *Dendromecon*, *Eschscholzia* (poppies), and *Eriogonum* (buckwheats).

The Survey Area includes *Eriogonum*, which may support the crotch bumble bee, although it was not observed during surveys. Local records of this species are from 1976 or earlier. The potential for crotch bumble bee to occur in the Survey Area is low.

4.8.5.2 REPTILES

Desert Tortoise

The desert tortoise (*Gopherus agassizii*) is a federally threatened and state threatened species. There is suitable habitat in the Survey Area. This species occurs in almost every desert habitat, but is most common in desert scrub, desert wash, and Joshua tree habitats. They require friable soil for burrowing and nest construction and prefer creosote bush habitat with large annual wildflower blooms. The nearest occurrence of the desert tortoise is from 2007 and is located 4 miles north of the Survey Area. This species has a very low potential to occur because the habitats in the vicinity of the Survey Area are mostly unsuitable due to development, primarily residential areas. Road traffic is a major hazard for this species and contributes substantially to population declines. The surrounding roads have most likely fragmented the Survey Area

from other more suitable locations; the already low potential for desert tortoise to occur is reduced even more due to the lack of a connection to higher quality habitat.

Coast Horned Lizard

The coast horned lizard (*Phrynosoma blainvillii*), a CDFW species of special concern, occurs in a wide range of habitats in California, including chaparral, valley-foothill hardwood, conifer, and riparian habitats, pine-cypress, juniper, and annual grasslands. Historically, this species has been found within the limits of the cities of Victorville and Hesperia, but may have been extirpated in some locations due to the development of residential areas. This species is threatened by off road vehicles, urban interference, and the presence of exotic ants.

The Project provides suitable habitat for this species, and the nearest CNDDB record is approximately 3.3 miles to the southeast, but is from 1919. A more recent record of this species is located 9.5 miles to the south and from 2008. While the habitat within the Survey Area is suitable for coast horned lizard the species profile by CDFW states that the historic populations in and near the Mojave River and the Oro Grande Wash are likely extinct (Jennings and Hayes 1994). The potential for coast horned lizard to occur is low.

4.8.5.3 BIRDS

Golden Eagle

The golden eagle (*Aquila chrysaetos*) is a CDFW fully protected species and a listed as endangered under CESA; it is also protected pursuant to the federal Bald and Golden Eagle Protection Act. This species has an extremely large global range that includes much of North America, Eurasia, and parts of northern Africa. The golden eagle is an uncommon but widespread resident in California, and is known to nest in the Tehachapi Mountains and occasionally on its southern foothills. Territories regularly span five to ten miles across depending on the availability of prey, nest sites, and wind resources. Breeding adults in desert settings may range up to 10 miles from the nest while foraging. Golden eagles nest on cliffs, rock outcrops, or in large trees, none of which are present in the Survey Area. Foraging golden eagles require large amounts of open space for hunting, such as grasslands, deserts, and savannahs. The entire Survey Area provides suitable habitat and may support a suitable prey base. Mid-sized mammals such as rabbits and marmots are preferred as prey, but prey may be as small as ground squirrels, or as large as deer (rarely), and golden eagles will consume carrion when it is available. The Survey Area supports some small to moderate-sized mammalian prey species, including black-tailed jackrabbits (*Lepus californicus*) and desert cottontail (*Sylvilagus audubonii*).

No golden eagles were observed incidentally by SWCA biologists in the Survey Area, and there is no suitable habitat for nesting within several miles. The Survey Area is suitable for foraging, and there are recent records of wintering golden eagles in the Project area. The potential for golden eagle to forage within the Survey Area is high. However, because there are no potential nest sites in the Survey Area, golden eagle is considered absent as a nesting species.

Burrowing Owl

Burrowing owl (*Athene cunicularia*) is listed as a Species of Special Concern by CDFW and occurs in a wide range of mostly open habitats in California, including grasslands, shrub-steppe, deserts, pastures, and agricultural areas. The migratory movements of this species are not well understood. Breeding populations from the northern range of the species are apparently migratory, though southern California populations are probably year-round residents (Thomsen 1971). Seasonal movements also occur in some parts of the southern range. Increases in winter population sizes within southern California are probably the result of immigration of owls from more northerly areas (Coulombe 1971). Male burrowing owls that reside year-

round in southern California may overwinter in burrows within nesting areas, which allows them to retain possession of their burrows and territories, and to maintain the burrows (Johnsgard 2002).

Suitable habitat for burrowing owl includes short vegetation and, in the breeding season, the presence of small mammal burrows. The California range of this species extends from Redding south to San Diego, east through the Mojave Desert and west to San Francisco and Monterey. The key characteristics of suitable habitat are moderately low and sparse vegetation, a prey base of small mammals during nesting, and burrows or similar sites for shelter. This species occurs at low densities in the City of Victorville and Hesperia area, where it is present in both the breeding and non-breeding seasons, as recorded in the CNDDB and eBird. CDFW considers burrows occupied within the last three years to be occupied for the purposes of documenting burrowing owls at a project and evaluating potential impacts (CDFW 2012). The nearest CNDDB record of this species is 0.75 mile to the southeast was recorded in 2006. Habitats in the Survey Area are suitable for this species, and therefore, the potential for occurrence is considered high.

Swainson's Hawk

Swainson's hawk (*Buteo swainsoni*) is listed as threatened under CESA, and is known as an uncommon breeding resident and migrant in the Mojave Desert. Historically, this species has been known to breed in Joshua tree Woodland habitat near Victorville, northwest of the Survey Area (Bloom 1980). This species forages in open habitats with little topographic relief, and in California is generally found in association with agricultural fields, where prey (small mammals such as gophers and mice) are numerous.

The CNDDB includes several records from 1920 of Swainson's hawk 5.5 miles northwest of the Project at the Mojave River. Observations in eBird show frequent observations in the Project vicinity, some as recent as 2017; however, no active nests have been documented within 5 miles of the Project. Swainson's hawk may occur in the Survey Area as a transient species, particularly during migration. However, due to the concentration of most records near the Mojave River and agricultural fields, and the marginal quality habitat in the Survey Area the potential for Swainson's hawk to forage in the Survey Area is low. Because there are no potential nest sites in the Survey Area, Swainson's hawk would not nest in the Project area.

Loggerhead Shrike

Loggerhead shrike is listed as a CDFW Species of Special Concern. This species occurs in areas with widely-spaced shrubs or low trees, such as scrub lands, steppes, deserts, savannahs, prairies, agricultural lands, and sometimes suburban areas. This species preys on large insects, lizards, small mammals, birds, and carrion. It requires open areas for hunting, shrubs or low trees for perches and nest sites.

The Survey Area includes suitable habitat for this species, and it was observed during the field survey in November. Therefore, the loggerhead shrike is considered present in the Survey Area.

4.8.5.4 MAMMALS

Pallid bat

The pallid bat (*Antrozous pallidus*) is a CDFW Species of Special Concern. This widespread species occurs as far south as Baja California and as far north as British Columbia. Populations of this species are severely fragmented, but may be locally common. Pallid bats are typically found in a wide range of habitats including deserts, grasslands, shrublands, woodlands and forests. They are most common in open, dry habitats with rocky areas for roosting. Pallid bats have been found to roost in mines, caves, and buildings. This species is sensitive to disturbance while roosting, and the main threats to the species include human activity such as vandalism, recreational activities, mine closures and reclamation.

Habitat in the Survey Area is suitable for foraging, but there is no potential roosting habitat for this species. There is a CNDDB record from 2016 of this species 8.2 miles to the east of the Survey Area. This species has a moderate potential to occur while foraging.

Pallid San Diego pocket mouse

The pallid San Diego pocket mouse (*Chaetodipus fallax pallidus*) is a CDFW Species of Special Concern. This species occurs in desert border areas in desert washes, desert scrub, desert succulent scrub, and pinyon-juniper. It is commonly associated with sandy, herbaceous areas with rocks or coarse gravel. This species forages on seeds of forbs and shrub seeds, with a preference for grass seeds. The major threat to this species is habitat destruction due to the expansion of urban areas.

The nearest CNDDB record of the pallid San Diego pocket mouse is from 1921 and is 5.1 miles to the northeast of the Project. The species has a low potential to occur in the Survey Area.

Townsend's Big-eared Bat

Townsend's big-eared bat (*Corynorhinus townsendii*) is a CDFW Species of Special Concern. Townsend's big-eared bat occurs throughout most of California, albeit with a patchy distribution. It is closely tied to caves and cave-like roost sites, which can include hollow trees and mines, and sometimes buildings or water diversion tunnels. This species is sensitive to disturbance while roosting, and the main threats to the species are likely human impacts to roosts. In the Mojave Desert, Townsend's big-eared bat is mostly dependent on mining infrastructure for roost sites.

Habitat in the Survey Area is suitable for foraging, but there is no potential roosting habitat for this species. There are records of this species 7.9 miles north of the Project, but they are from 1930. This species has a moderate potential to forage in the Survey Area.

Desert Kit Fox

Desert kit fox is afforded protection from take under California Fish and Game Code sections 460 and 4000-4003. Much of the Mojave Desert provides habitat for this species, although its population status and trends are unclear. The CNDDB does not maintain records for this species, so no location records are available for reference, although it is regularly encountered in desert habitats. Desert kit fox can be found in a wide range of habitat types, including desert scrub, washes, and arid grasslands. In the western Mojave, desert kit fox dens are frequently located on west- and northwest-facing slopes on friable soils with an absence of stones, caliche, or hardpan. Kit foxes use multiple dens, and switch dens frequently throughout the year. Breeding typically occurs in December and January, and pups have usually left the natal den by May.

The entirety of the Survey Area is suitable habitat for desert kit fox. No kit fox signs were observed during the survey. Kit fox is considered to have a high potential to occur in the Survey Area.

American Badger

American badger, a CDFW Species of Special Concern, is generally found in open areas, including open woodlands, desert scrub, and grasslands. This species requires friable soils and a sufficient prey base of small rodents. The Survey Area is considered potential habitat for this species, which is widespread but uncommon throughout North America. Badger dens are distinctive due to their size and the presence of claw marks on the sides created when the den was dug. Badgers are often killed by farmers because their dens and diggings pose a hazard to livestock.

The entire Survey Area is suitable habitat for this American badger. No badger signs were observed during the survey. The most recent record of this species was recorded in 1987, approximately 8.7 miles to the south. The potential for American badger to occur in the Survey Area is moderate.

Mohave Ground Squirrel

Mohave ground squirrel (*Xerospermophilus mojavensis*) is a CDFW threatened species that occurs in open desert scrub, alkali scrub, and Joshua Tree Woodland. It prefers sandy to gravelly soils, and feeds primarily on seeds, green vegetation, and possibly carrion. The major threat to this species is habitat loss and fragmentation due to the development of urban, suburban, agriculture, military and other human use. The nearest CNDDB record of the Mohave ground squirrel, from 2005, is 2.3 miles to the west of the Project; this record describes capture and release of one juvenile individual. The habitat at the CNDDB record location was Mojave Creosote Bush Scrub with Joshua trees, on loamy sand/gravel soils (CNDDB 2017). This description, and review of satellite imagery in the area from 2005 shows that the occurrence location and the Survey Area are generally similar, although the Project is surrounded by more development (Google Earth 2017).

A study by Leitner describes the distribution of the Mohave ground squirrel between Lancaster and Victorville as poorly understood. Despite several protocol surveys in the area, only one individual was documented since 2008, and it was interpreted as being representative of a relict population in Adelanto (Leitner 2014). The Survey Area is suitable habitat for Mohave ground squirrel, and the nearest CNDDB record from 2005 is generally comparable.

At the more local scale, a protocol-level survey was conducted prior to the development of the Amethyst Basin groundwater recharge and detention basis, which borders the Project's western edge, and is situated in the Oro Grande Wash. That survey, which utilized at least one trapping grid consistent with the CDFW survey protocol, was negative for Mohave ground squirrel (CDFG 2010b, San Bernardino County Public Works 2012). The results of a negative survey are generally accepted as a presence/absence determination by the agencies for one year; after that period new surveys may be required to determine the current species status.

While the habitat at the Project is suitable for Mohave ground squirrel, the development in the surrounding area and recent local negative survey results suggest that it does not occur. Mohave ground squirrel is considered to have a low potential to occur.

5 POTENTIAL IMPACTS AND RECOMMENDATIONS

This section describes the anticipated direct and indirect impacts to biological resources at the proposed Survey Area that may result from implementation of the proposed Project. This analysis was based on the results of the biological resources surveys conducted at the site, information from literature and database resources, and the proposed Project design and layout.

The primary impact associated with the implementation of the Project would be the direct removal of on-site plant communities and the wildlife for which they provide habitat. Additionally, there is a potential for indirect impacts to the biotic resources remaining on-site after the Project's completion. An example is vegetation communities and wildlife near the Project may be adversely affected by impacts such as deposition of dust on vegetation, and subsidized predators in the area could be attracted to trash produced by a project's construction or maintenance. Under CEQA, a mitigation plan would need to be developed to avoid, minimize, and mitigate for impacts associated with the implementation of the Project. As the lead agency responsible for authorizing project implementation, the City of Victorville is responsible for ensuring that the measures for avoiding, minimizing, and reducing impacts sufficient and compliant with CEQA and CESA requirements, and other applicable state, federal, and local regulations.

If impacts to certain types of sensitive biological resources (e.g., threatened or endangered species, jurisdictional waters) would occur, permits from the applicable regulatory agencies may be required. Pre-construction and protocol-level surveys would minimize impacts to sensitive wildlife that can be avoided or translocated off-site. Potential impacts that may result from Project implementation and recommended measures pertinent to specific resources types are discussed below.

5.1 Impacts to Vegetation Communities

The Project will clear vegetation within approximately 50 feet of the pipeline and will require the use of a turnout location for equipment and materials storage, resulting in approximately 11.38 acres temporary impacts, and construction and maintenance of the pipeline will result in approximately 1.03 acres of permanent impacts (Table 5 and Table 6). The Project is considering four turnout locations that will result in temporary impacts and overlap with the pipeline impact area to varying degrees; Table 5 summarizes the maximum potential impacts (using Turnout Option 1) to vegetation communities and land covers (Figure 12).

Table 5. Maximum Acres of Impacts to Vegetation Communities and Land Covers

Vegetation Communities	*Permanent*	*Temporary*
Ephedra nevadensis Shrubland Alliance	0.27	3.17
Larrea tridentata Shrubland Alliance	0.11	1.24
Disturbed / Ruderal	-	0.41
Developed	0.65	6.57
Total*	**1.03**	**11.38**

Note: Impacts listed above were rounded to two decimal places for display purposes. Impact totals were calculated using unrounded numbers and may differ from the sum impacts included in the table due to rounding errors.

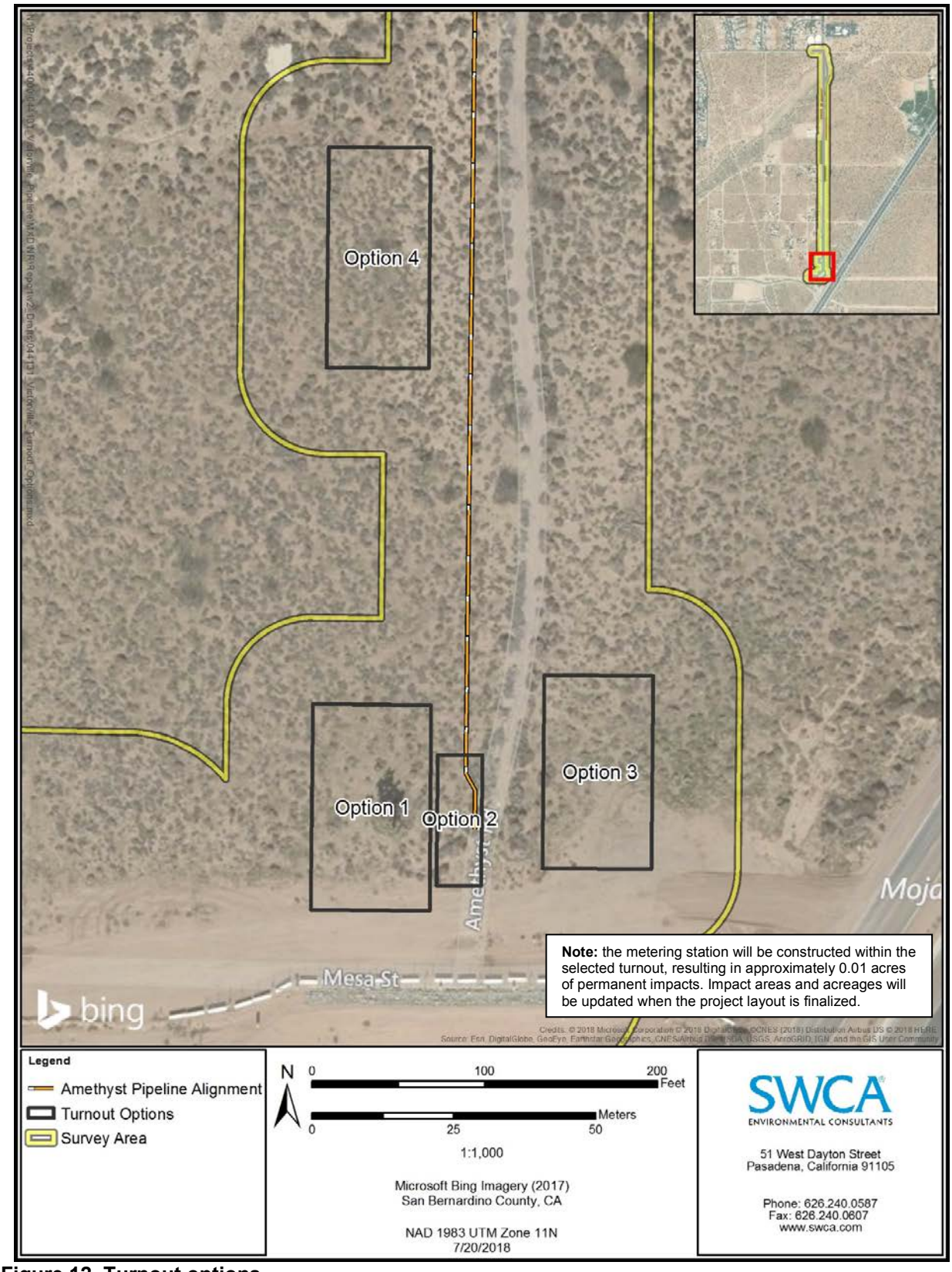

Figure 12. Turnout options.

Table 6. Temporary Impacts to Vegetation Communities and Land Covers by Turnout Option

	Vegetation Communities	
Turnout Options	*Ephedra nevadensis* Shrubland Alliance	*Developed*
Option 1	0.11	0.01
Option 2*	-	-
Option 3	0.09	0.05
Option 4	0.1	-

Note: Impacts listed above are representative of the additional impacts that would result outside of the pipeline impact area if the given option were chosen; Option 2 completely overlaps the pipeline impact area and would result in no additional impacts. The metering station will be constructed within the selected turnout, resulting in approximately 0.01 acres of permanent impacts. Impact areas and acreages will be updated when the project layout is finalized.

5.2 Natural Communities and Jurisdictional Waters

No sensitive natural communities were identified in the Survey Area. Aquatic resources were identified by SWCA biologists in the Survey Area which may be impacted by the Project.

Due to the location of the potentially jurisdictional features and the proposed impacts of the Project, it is unlikely that impacts to the drainages can be avoided. Therefore, impacts to drainages subject to CDFW jurisdiction will require a Lake and Streambed Alteration Agreement. Impacts to drainages subject to USACE and/or RWQCB will require permitting under section 401 and/or 404 of the CWA. Please see the jurisdictional delineation report for more information (SWCA 2018).

5.3 Special Status Plants

Eight (8) species of special status plants were determined to have potential to occur in the Survey Area, based on an evaluation of local occurrence records, habitat conditions, elevation, and other factors. No special status plant species were detected during the field survey; however, this is likely due to the nature and timing of the survey, and not necessarily an indication that special status plants do not occur within the Project site. In order to avoid or minimize impacts to rare plants a focused rare plant survey should be conducted to determine the presence or absence of any special status plants. Impacts to rare plants would be minimized by establishing avoidance areas during the rare plant survey. Fencing or visual indicators would be used to delineate disturbance free areas.

5.3.1 Rare Plant Survey

Prior to construction a focused rare plant survey consistent with CDFW and CNPS guidelines should be conducted to determine the presence of sensitive plants in the Survey Area. Reproductive parts are often required to identify species to the taxonomic level required to determine whether or not the species is a rare or sensitive species; because of this, plants are often identifiable only while they are blooming. Conducting a rare plant survey in April and June would be sufficient to capture the blooming period of all rare plants with potential to occur in the Survey Area. Avoidance areas will be recorded using a GPS unit with sufficient accuracy for reliable relocation and they will be established using fencing or visible indicators.

5.3.2 California Native Plants

The Survey Area contains Joshua trees and cactus species, which should be avoided when possible. Impacts to any plant regulated by the CDNPA (regulated plants) shall comply with regulations regarding the harvest of native desert plants. The following species were observed in the Survey Area and are subject to regulations under CDNPA: Joshua trees, and members of Cactaceae (*Opuntia basilaris* var. *basilaris* and *Cylindropuntia echinocarpa*). These plants may be impacted when vegetation is cleared within 50 feet of the pipeline. Potential impacts to regulated plants will be mitigated by a combination of avoidance and a cactus relocation plan. During the rare plant survey, regulated plants will be flagged for avoidance and their location will be documented using a GPS with sufficient accuracy for reliable relocation. During construction, impacts to regulated plants will be avoided whenever possible. If impacts to regulated plants are unavoidable, the Project proponent should develop a cactus relocation plan to offset impacts to Joshua trees and other protected species impacted by the implementation of the Project.

5.4 Special Status Wildlife

A total of 13 species of special status wildlife were determined to have the potential to occur in the Survey Area, based on the assessment of local occurrence records, habitat conditions, elevation, and other factors. Of these, one (1) species, loggerhead shrike, was confirmed to be present. In addition, 12 wildlife species were not observed during the survey, but have the potential to occur:

- Crotch bumble bee
- Desert tortoise
- Coast horned lizard
- Coastal whiptail
- Golden eagle (foraging only)
- Burrowing owl
- Swainson's hawk (foraging only)
- Pallid bat (foraging only)
- Pallid San Diego pocket mouse
- Townsend's big-eared bat (foraging only)
- Desert kit fox
- American badger
- Mohave ground squirrel

5.4.1 Non-listed Reptiles

Suitable habitat for coast horned lizard and coastal whiptail is present in the Project area. Impacts to these non-listed species could be minimized by the implementation of a pre-construction survey and relocation effort. Within 14 days of construction, a preconstruction survey should occur to captured and release or otherwise relocate any coast horned lizards or coastal whiptails outside of the impact area.

5.4.2 Desert Tortoise

The Project is within range of the desert tortoise. However, no desert tortoise, or their sign were observed in the Survey Area. To avoid potential impacts to desert tortoise, a pre-construction survey is recommended in areas with suitable habitat for the species. If desert tortoise, or their sign is observed during the pre-construction survey then USFWS and CDFW will be contacted prior to construction initiation. Alternatively, coordination with USFWS and CDFW may result in the determination that surveys are not required if the agencies have reason to believe that desert tortoise would not occur in the Project area.

5.4.3 Non-nesting Birds

Special status birds that may occur in the Survey Area while foraging, but do not have the potential to nest at the site, include golden eagle and Swainson's hawk. Birds that do not have the potential to nest in the Survey Area are not anticipated to be directly impacted by the Project. Because of their mobility, birds generally move out of harm's way and would not be injured or killed during grading, construction, or Project operations; therefore, specific measures for non-nesting birds are not required to avoid direct impacts. Removal of vegetation within 50 feet of the pipeline would result in a minor indirect impact by reducing foraging habitat; restoring these impact areas would reduce indirect impacts to these species.

5.4.4 Burrowing Owl

No activity should occur within 50 meters (approximately 160 feet) of occupied burrows during the non-breeding season, and within 75 meters (approximately 250 feet) during the nesting season. If avoidance is not feasible, passive relocation of burrowing owls during the non-nesting period may be possible following the development of a Burrowing Owl Relocation Plan approved by the City of Victorville.

5.4.5 Nesting Raptors

The Survey Area supports suitable foraging habitat for several species of raptors but lacks nesting habitat for those species that nest in trees. Raptors that nest in trees in the vicinity of the City of Victorville and Hesperia, and which therefore have the potential to nest in the periphery of the Survey Area, include: red-tailed hawk (*Buteo jamaicensis*), American kestrel (*Falco sparverius*), and Swainson's hawk. Due to the lack of nesting habitat, these species are not expected to nest within the Project footprint. Active raptor nests near the Project may be directly impacted by construction, because these species are sensitive to human activity and disturbance, especially when nesting. Indirect impacts such as loss of foraging habitat would also occur. Nesting season for most raptors lasts from February 1 until July 31, and for Swainson's hawks the local nesting season is March 1 through September 15.

Construction within 0.5 mile of active Swainson's hawk nests, and within 500 feet of active nests for other raptors should be avoided. Identification of active nests during the breeding season may require preconstruction surveys. At the discretion of a qualified biologist with significant experience working with raptors, visual barriers, lighting, noise, and/or dust restrictions may allow for reduction of the construction avoidance buffers. If take of Swainson's hawks would occur, permitting through CESA would be required; however, this is very unlikely as there are no documented nest sites within several miles or any observed suitable nesting sites in the Project area.

5.4.6 MBTA and CDFW Nesting Bird Compliance

If construction of the Project is scheduled to commence during the non-nesting season (approximately September 1 to January 31), preconstruction surveys or additional measures with regard to nesting birds and other raptors may not be required. If construction is scheduled during the nesting season (approximately February 1 to August 31), a qualified wildlife biologist should conduct preconstruction surveys of all potential nesting habitat in the Survey Area and within a 300-foot buffer to avoid impacts to nesting birds. Surveys should be conducted no more than 14 days prior to construction activities. The surveying biologist must be qualified to determine the status and stage of nesting by migratory birds and all locally breeding raptor species without causing intrusive disturbance. Active nests will be avoided and monitored, and the qualified biologists will have authority to stop all Project work should it be determined that a nest is being impacted by Project activities. If nests are not detected during the preconstruction survey then no biological monitor will be required to avoid direct impacts to nesting birds. If an undocumented active nest is detected during construction then construction will stop work within a 300-foot buffer until a qualified biologist can determine if the species is protected under the MBTA and to resize the buffer as appropriate. Additionally,

any potential impacts to loggerhead shrike would be minimized through the use of a nesting bird survey; therefore, no species specific mitigation measure should be required to reduce impacts to loggerhead shrike.

5.4.7 Mohave Ground Squirrel

Mohave ground squirrel has not been directly observed in the Survey Area during the field survey or the protocol level trappings conducted in support of the adjacent Amethyst Basin project in the Oro Grande Wash in 2012 (San Bernardino County Public Works 2012). Habitat is suitable for Mohave ground squirrel; however, the potential is considered low due to habitat fragmentation, disturbance from development and off road vehicles. Additionally, the Amethyst Basin project conducted protocol-level surveys with a negative result. It is recommended that the Project proponent discusses the Project and any potential impacts to Mohave ground squirrel with CDFW. A protocol-level survey may be required to determine the presence of absence of Mohave ground squirrel at the Project; however, CDFW may determine that the available data support an absence determination.

5.4.8 Desert Kit Fox and American Badger

Neither desert kit fox nor American badger has been directly observed in the Survey Area. There is no protocol survey required for these species. Instead, measures to ensure they are not directly impacted during construction are typically implemented. Preconstruction surveys for the presence of desert kit fox and American badger dens should be conducted by a qualified biologist with species-specific experience no more than 30 days prior to commencement of construction activities. Should potential dens of desert kit fox or American badger be identified during the surveys, the qualified biologist will follow standard monitoring procedures to determine the occupancy status, species, and type (potential, active, natal) of burrow. Surveys need not be conducted for all areas of suitable habitat at one time; they may be phased so that surveys occur within 30 days prior to that portion of the site being disturbed. If no potential desert kit fox or American badger dens are present, no further mitigation is required. If potential dens are observed and avoidance is feasible, the following buffer distances shall be established prior to construction activities:

- Desert kit fox or American badger potential den: 30 feet
- Desert kit fox active den: 100 feet
- Desert kit fox or American badger natal den: 500 feet

If avoidance of the potential dens is not possible, the following measures are recommended to avoid potential adverse effects to desert kit fox and American badger:

- If the qualified biologist determines that potential dens are inactive, the biologist shall excavate and collapse these dens with a shovel to prevent foxes or badgers from re-using them during construction.
- If the qualified biologist determines that potential dens may be active, an on-site passive relocation program shall be implemented. This program shall consist of excluding foxes and badgers from occupied burrows by installation of one-way doors at burrow entrances, monitoring of the burrow for one week to confirm usage has been discontinued, and excavation and collapse of the burrow to prevent reoccupation. After the qualified biologist determines that foxes and badgers have stopped using active dens within the Project boundary, the dens shall be excavated and collapsed with a shovel to prevent re-use during construction.
- If active maternal dens are located, the den will be avoided during construction by an establishment of a 500 foot-buffer. Smaller buffer for construction would be established in coordination with a qualified biologist.

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Appendix A.
Floral Compendium

Scientific Name	Common Name
GYMNOSPERMS	
EPHEDRACEAE	**EPHEDRA FAMILY**
Ephedra nevadensis	Nevada ephedra, Nevada joint fir
ANGIOSPERMS (EUDICOTS)	
ASTERACEAE	**SUNFLOWER FAMILY**
Ambrosia acanthicarpa	annual bur-sage
Ambrosia psilostachya	western ragweed
Ambrosia sp.	
Artemisia tridentata	common sagebrush
Ericameria cooperi var. *cooperi*	Cooper's goldenbush
Ericameria nauseosa	rubber rabbitbrush
Heterotheca sp.	
Lessingia sp.	lessingia
Tetradymia sp	
BORAGINACEAE	**BORAGE FAMILY**
Amsinckia tessellata	devil's lettuce
BRASSICACEAE	**MUSTARD FAMILY**
Descurainia pinnata	western tansy-mustard
*Hirschfeldia incana**	shortpod mustard
Sisymbrium sp.	mustard
CACTACEAE	**CACTUS FAMILY**
Cylindropuntia echinocarpa	silver cholla
Opuntia basilaris var *basilaris*	Beavertail cactus
CHENOPODIACEAE	**GOOSEFOOT FAMILY**
Krascheninnikovia lanata	winter fat
*Salsola tragus**	Russian thistle
GERANIACEAE	**GERANIUM FAMILY**
*Erodium cicutarium**	red-stemmed filaree
LAMIACEAE	**MINT FAMILY**
Scutellaria mexicana	bladder sage
Mentzelia sp.	
MYRTACEAE	**MYRTLE FAMILY**
Eucalyptus sp.*	gum tree
POLEMONIACEAE	**PHLOX FAMILY**
Eriastrum densifolium	woollystar
POLYGONACEAE	**BUCKWHEAT FAMILY**
Eriogonum sp.	
Eriogonum fasciculatum var. *foliolosum*	inland California buckwheat
Eriogonum viridescens	bright green buckwheat
SOLANACEAE	**NIGHTSHADE FAMILY**

Scientific Name	Common Name
Lycium sp.	
ZYGOPHYLLACEAE	**CALTROP FAMILY**
Larrea tridentata	creosote bush
ANGIOSPERMS (MONOCOTS)	
AGAVACEAE	**AGAVE FAMILY**
Yucca brevifolia	Joshua tree
POACEAE	**GRASS FAMILY**
*Bromus diandrus**	ripgut grass
*Bromus tectorum**	cheat grass
*Schismus barbatus**	Mediterranean schismus

*Non-Native Species

Appendix B.
Faunal Compendium

Scientific Name	Common Name
CLASS REPTILIA	**REPTILES**
PHRYNOSOMATIDAE	***BLOTCHED & HORNED LIZARDS***
Uta stansburiana	*Side-blotched lizard*
CLASS AVES	**BIRDS**
TYRANNIDAE	***TYRANT FLYCATCHERS***
Sayornis saya	Say's phoebe
CORVIDAE	***JAYS & CROWS***
Corvus corax	common raven
TROGLODYTIDAE	***WRENS***
Thryomanes bewickii	Bewick's wren
LANIIDAE	***SHRIKES***
Lanius ludovicianus	Loggerhead shrike
ICTERIDAE	***BLACKBIRDS***
Sturnella neglecta	western meadowlark
EMBERIZIDAE	***EMBERIZIDS***
Amphispiza bilineata	Black-throated sparrow
Zonotrichia leucophrys	white-crowned sparrow
FRINGILLIDAE	***FINCHES***
Haemorhous mexicanus	house finch
CLASS MAMMALIA	**MAMMALS**
LEPORIDAE	***HARES & RABBITS***
Lepus californicus	black-tailed jackrabbit
Sylvilagus audubonii	desert cottontail

Appendix C.
Site Photo Compendium

Photo 1. Oro Grande Wash and Amethyst Basin taken on November 13, 2017.

Photo 2. Oro Grande Wash and Amethyst Basin taken on May 29, 2018.

Photo 2. Creosote Bush Scrub and disturbed habitat along Amethyst Road taken on November 13, 2017.

Photo 3. Nevada Joint Fir Scrub taken on November 13, 2017.

Photo 4. Loggerhead shrike (*Lanius ludovicianus*) taken on November 13, 2017.

APPENDIX B.2

Preliminary Jurisdictional Delineation

EXISTING CONDITIONS JURISDICTIONAL DELINEATION REPORT FOR THE CITY OF VICTORVILLE WATER PIPELINE PROJECT
SAN BERNARDINO COUNTY, CALIFORNIA

December 2018

SUBMITTED TO

Meridian Consultants
910 Hampshire Road, Suite V
Westlake Village, CA 91361

SUBMITTED BY

SWCA Environmental Consultants
51 West Dayton Street
Pasadena, CA 91105

Existing Conditions Jurisdictional Delineation Report for the City of Victorville Water Pipeline Project

San Bernardino County, California

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SWCA Project No. 44131

December 2018

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List of Abbreviations, Acronyms, and Initialisms

afy	acre feet per year
amsl	above mean sea level
BLM	Bureau of Land Management
CDFW	California Department of Fish and Wildlife
CEQA	California Environmental Quality Act
CFR	Code of Federal Regulations
City	City of Victorville
CWA	Clean Water Act
District	Victorville Water District
EPA	United States Environmental Protection Agency
F	Fahrenheit
FAC	Facultative
FACU	Facultative Upland
FACW	Facultative Wetland
ft	feet
GPS	global positioning system
I	Interstate
LSAA	Lake and Streambed Alteration Agreement
MESA	mapping episodic stream activity
mgd	million gallons per day
NOAA	National Oceanic and Atmospheric Administration
NPDES	National Pollutant Discharge Elimination System
NRCS	Natural Resources Conservation Service
NWI	National Wetlands Inventory
OBL	Obligate Wetland
OHW	Ordinary High Water
OHWM	Ordinary High Water Mark
ORV	off-road vehicle
Project	City of Victorville Water Pipeline Project
Rapanos	*Rapanos v. United States* and *Carabell v. United States*
RPW	relatively permanent water
RWQCB	Regional Water Quality Control Board
SCADA	supervisory control and data acquisition
SWANCC	*Solid Waste Agency of Northern Cook County v. U.S. Army Corps of Engineers*
SWCA	SWCA Environmental Consultants
SWRCB	State Water Resources Control Board
TNW	traditional navigable waters
UPL	Obligate Upland
USACE	United States Army Corps of Engineers
USDA	United States Department of Agriculture
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
WDR	Waste Discharge Requirements
WIS	Wetland Indicator Species

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1 INTRODUCTION

Meridian Consultants retained SWCA Environmental Consultants (SWCA) to conduct a jurisdictional waters study and delineation in support of the City of Victorville Water Pipeline Project (Project) located in San Bernardino County, California within the City of Victorville, northwest of Interstate (I) 15. The purpose of conducting a jurisdictional delineation was to determine the location and extent of the areas, if any, that meet the definition of waters of the U.S., waters of the State, or lakes, streams, or riparian habitat subject to the jurisdiction of the California Department of Fish and Wildlife (CDFW). It is important to note that the regulating agencies make the final decision regarding what features are, or are not, subject to their jurisdiction; this report represents the best effort made by the delineator. The collected data will be used to determine which jurisdictional regulations apply and to calculate potential Project impacts to jurisdictional waters and habitat. The purpose of this report is not to assign mitigation measures, but rather it is to establish the baseline conditions that will be incorporated in future permit applications and California Environmental Quality Act (CEQA) analysis.

1.1 Project Location

The Project is located within the City of Victorville, San Bernardino County, California (Figure 1). The southern tip of the Project is located approximately 200 feet west of I-15 and runs north along Amethyst Road approximately 1.0 mile to the intersection of Amethyst Road and Sycamore Street (about 0.5 miles south of Bear Valley Road; Figure 2). The Project is located in Sections 1, 2, 11, and 12 of Township 4 North, Range 5 West, found on the United States Geological Survey (USGS) *Hesperia* 7.5-minute quadrangle map (Figure 3).

1.2 Project Description

1.2.1 Amethyst Road Metering Station

The Victorville Water District (District), a subsidiary district of the City of Victorville (City), produces potable water through 36 active groundwater wells. The District relies solely on groundwater for the water source.

The proposed water connection will provide Mojave Water Agency water to the City of Victorville's domestic water network. The metering station is proposed to be located within an existing public right-of-way, and will include a new masonry block building, electrical water controls including supervisory control and data acquisition (SCADA) communication, and mechanical piping and valves to allow control of the water flow and measurement at the metering station. A new 120/240V single phase electric service will be included for this portion of the Project. The metering station will be constructed within one of the four turnout options included in the preliminary Project layout (Figure 4).

The area that would be cleared of vegetation for this portion of the Project would be a 150 × 150-foot area at the northeast corner intersection between Mesa Street and Mesa Avenue (see general area to be surveyed below). This would ensure adequate space for the storage of construction equipment during both portions of the Project. The metering station, once constructed, will be approximately 10 by 50 feet.

1.2.2 Amethyst Road Pipeline

The pipeline portion of the Project includes the construction of approximately 1.0 mile of a 24-inch water pipeline under Amethyst Road, from the metering station to the District's Pumping Station at Sycamore Street and Amethyst Road (11734 Amethyst Road), for the conveyance of imported regional recharge and recovery water from the Mojave Water Agency (see Figure 4).

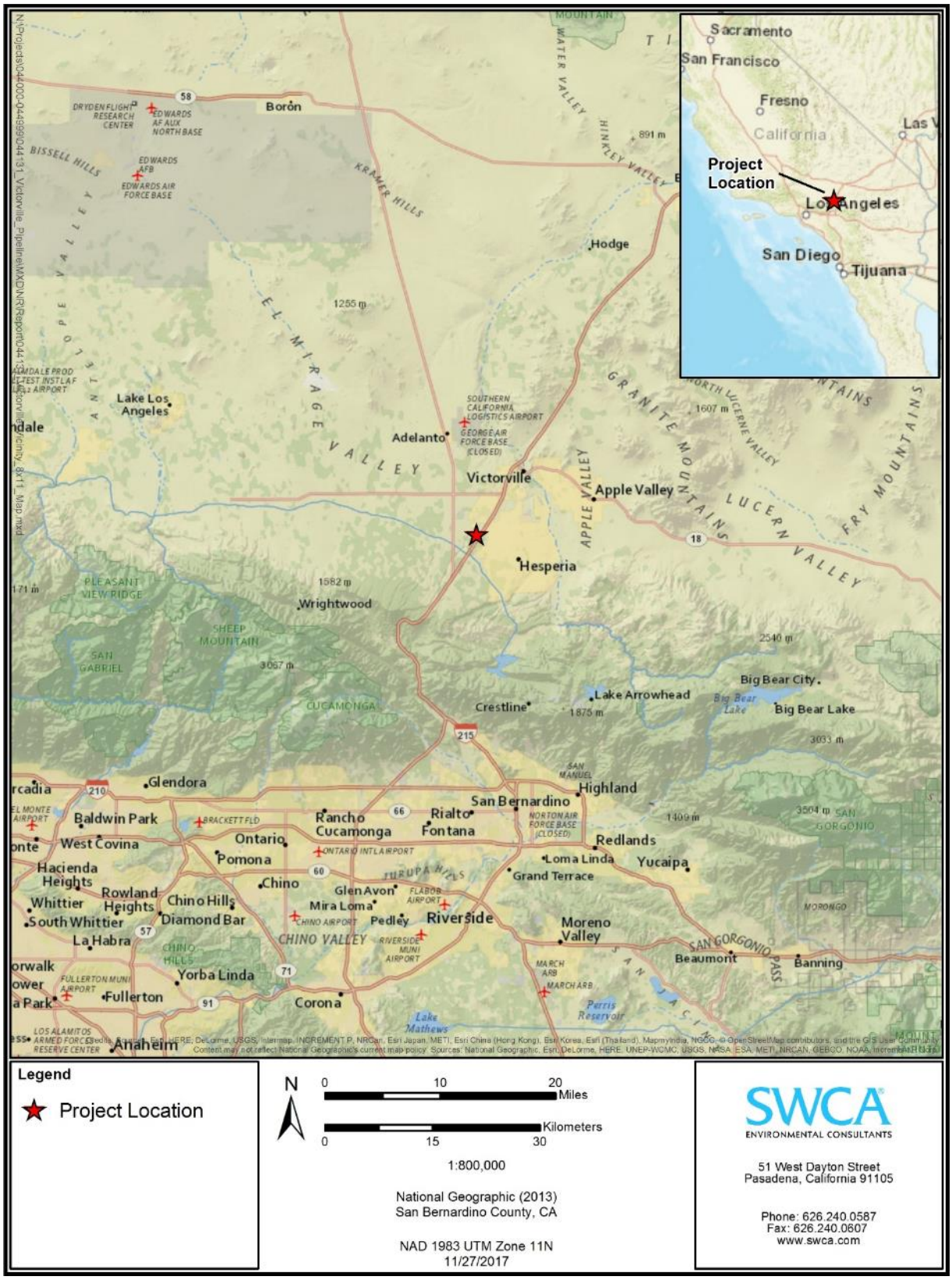

Figure 1. Regional vicinity map.

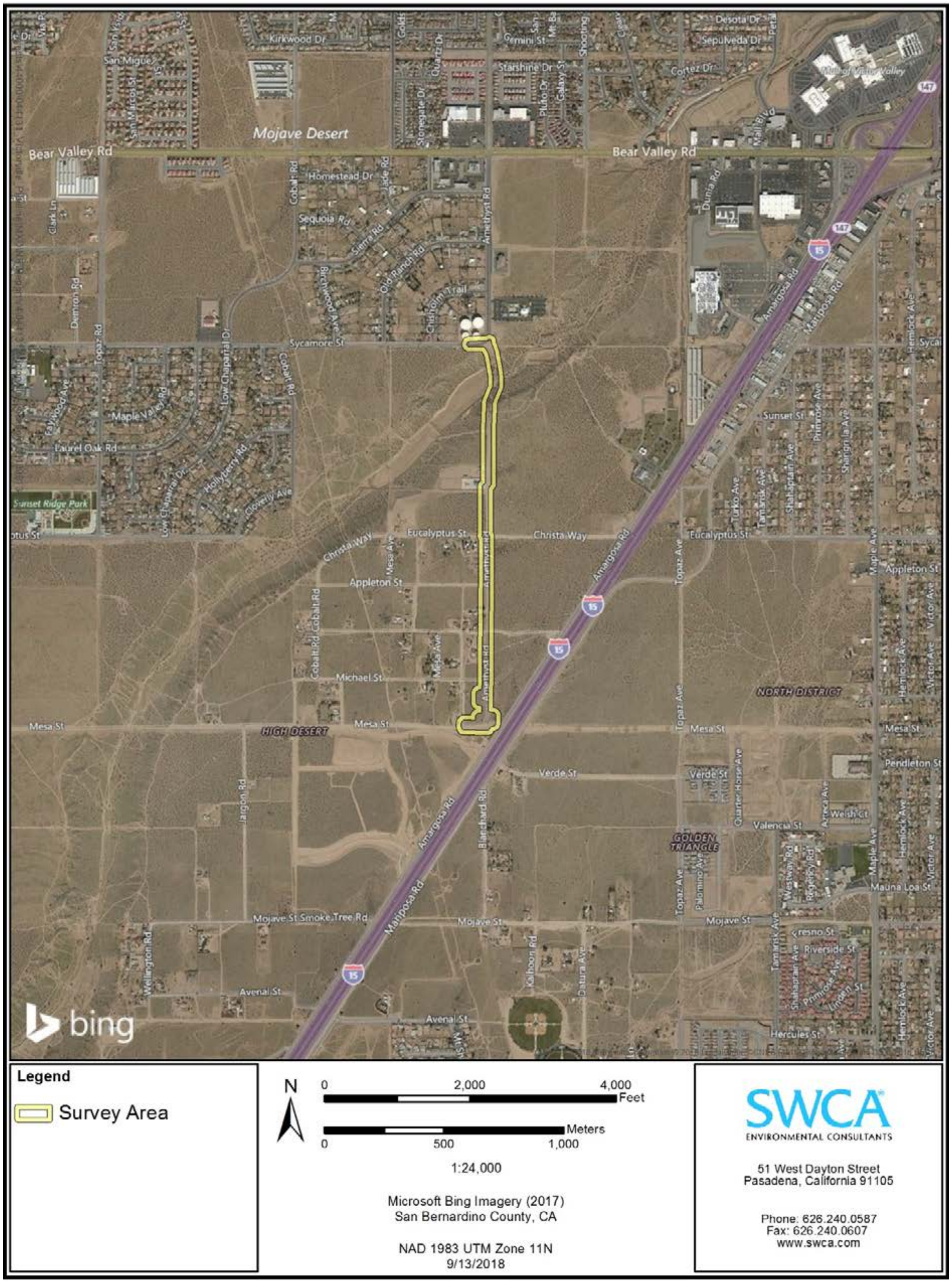

Figure 2. Project location with aerial background.

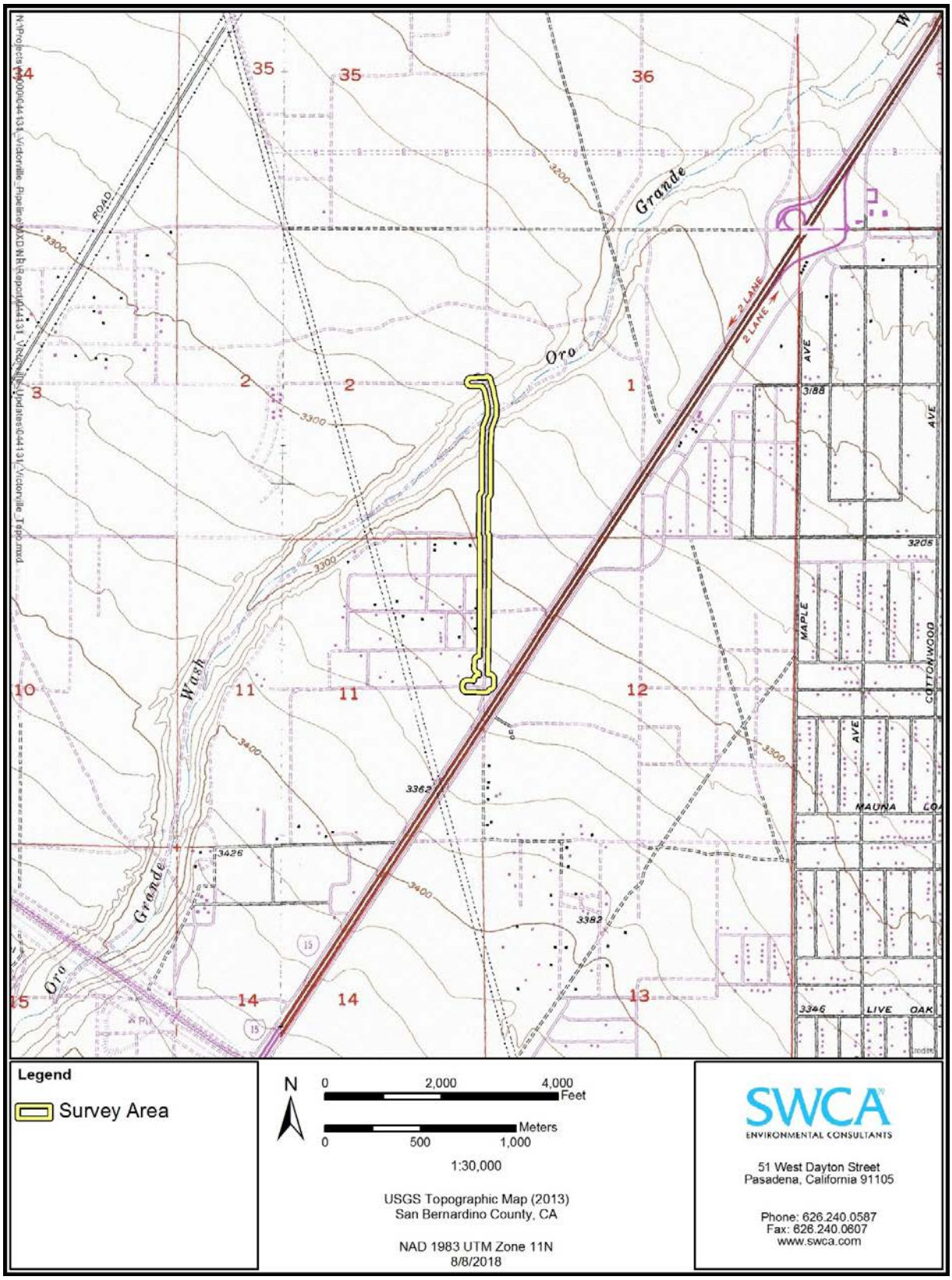

Figure 3. Project location with USGS quadrangle background.

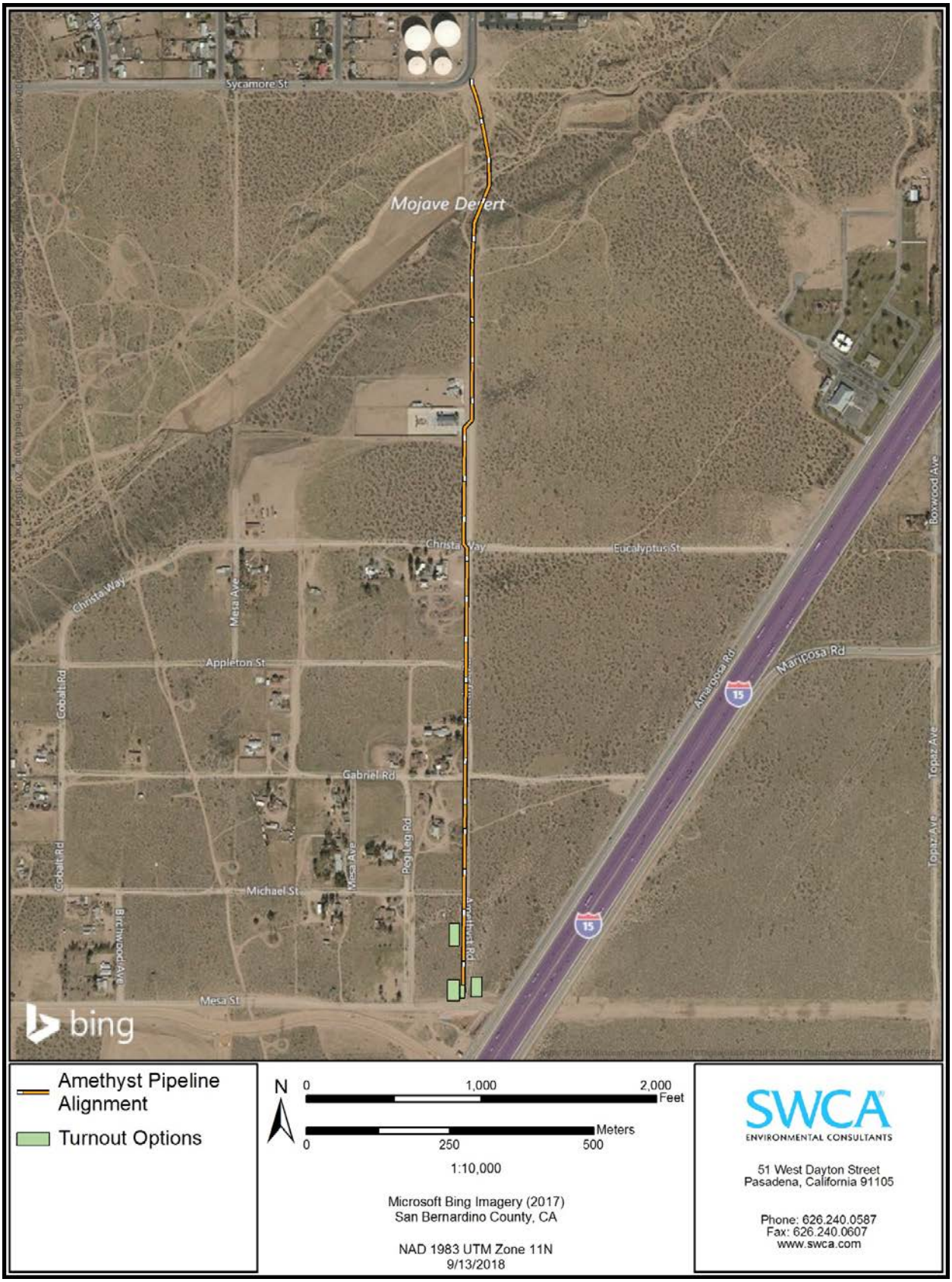

Figure 4. Preliminary Project layout.

The pipeline alignment extends north on Amethyst Road and then west on Sycamore Street to the intersection of Sycamore and Amethyst Road. The 24-inch pipeline would connect to the metering station at the southern end of the pipeline and the pump station at Sycamore Street.

An approximately 100-foot-wide area along the proposed pipeline route would be cleared of vegetation to account for the area needed to construct the pipeline.

1.3 Site Characteristics

The Project area is relatively flat with a maximum elevation of approximately 3,326 feet above mean sea level (amsl) and a minimum elevation of approximately 3,230 feet amsl. The majority of the pipeline will be placed underneath Amethyst Road (which becomes Pegleg Road south of Verano Street) and surrounding disturbed areas. The Project passes through the Amethyst Basin, which was constructed in the Oro Grande Wash, via graded dirt roads south of Sycamore Street and immediately downstream of the Amethyst Basin recharge facility. The wash has also been heavily disturbed by the construction of the Amethyst Basin, the construction of dirt roads, and off-road vehicle (ORV) traffic. Outside of the disturbed and developed areas, the surrounding landscape is primarily dominated by a native shrubland comprised of creosote bush (*Larrea tridentata*) and Nevada joint fir (*Ephedra nevadensis*).

1.4 Geographical Information

The Project is located in the Mojave Desert, between the San Bernardino Mountain Range and the Mojave River (approximately 8.0 miles north of the San Bernardino mountain range and approximately 6.3 miles southeast of the Mojave River) within the southern portion of Victorville, San Bernardino County, California. The arid region of the southwestern Mojave Desert and north of the San Gabriel and San Bernardino mountain ranges is known as high desert. The human development of high desert areas surrounding the project typically range from sparsely developed to relatively dense neighborhoods.

1.5 Regional Climate and Weather

The Mojave Desert is characterized by hot summer temperatures (average daily highs above 100 degrees Fahrenheit [°F]) and low annual precipitation (approximately 5 inches). Daily temperature variations up to 40°F can occur, with lows in the winter below or near freezing. Precipitation extremes are also common, with variations of 80 percent in annual precipitation and occasional high-volume storm events. Summer thunderstorms can drop more precipitation on a site in one event than the mean yearly precipitation for that location. High winds can occur, with peak wind velocities above 50 miles per hour not being uncommon and winds of 100 miles per hour occurring yearly (Bureau of Land Management [BLM] 2005). The Project's elevation is approximately 3,300 feet amsl, with summer high temperatures averaging approximately 94.6°F and average annual rainfall averaging approximately 5.52 inches (National Oceanic and Atmospheric Administration [NOAA] 2010).

Deserts in general are defined by the low rainfall they experience, and the Mojave's latitude and location east and north of large mountains results in very low rainfall within the desert. The mountains on the western and southern boundaries of the desert result in a rain shadow on the desert side of the mountains where precipitation is far less than on the coastal side. Weather patterns and their resulting precipitation follow the seasonal patterns and variations. During the summer, the western edge of the Mojave Desert is heavily influenced by the dry southwest airflows resulting in typically very dry weather. The influence of the southwest winds diminishes toward the eastern Mojave Desert, and this portion of the Mojave experiences a more continental influence and monsoon weather patterns (BLM 2005).

2 REGULATORY OVERVIEW

Activities within inland streams, wetlands, and riparian areas in California are regulated by agencies at the federal, state, and regional levels. At the federal level, the U.S. Army Corps of Engineers (USACE) Regulatory Program regulates activities within wetlands and waters of the U.S. pursuant to Section 404 of the federal Clean Water Act (CWA). At the state level, the CDFW regulates activities within the bed, bank, and associated habitat of a stream under the Fish and Game Code §§ 1600–1616. At the regional level, the California Regional Water Quality Control Board regulates discharge into waters of the U.S. under Section 401 of the federal CWA and waters of the State under the California Porter-Cologne Water Quality Act.

2.1 Clean Water Act – Section 404

Under provisions of the CWA, the USACE administers the day-to-day activities required by Section 404. These include the individual permit decisions, jurisdictional determinations, developing policy and guidance, and enforcing provisions of Section 404. Waters of the U.S. are defined in section 33 Code of Federal Regulations (CFR) 328.3, implementing the CWA, as follows:

328.3 - Definitions.
For the purpose of this regulation these terms are defined as follows:
(a) The term waters of the United States means
(1) All waters which are currently used, or were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters which are subject to the ebb and flow of the tide;
(2) All interstate waters including interstate wetlands;
(3) All other waters such as intrastate lakes, rivers, streams (including intermittent streams), mudflats, sandflats, wetlands, sloughs, prairie potholes, wet meadows, playa lakes, or natural ponds, the use, degradation or destruction of which could affect interstate or foreign commerce including any such waters:
(i) which are or could be used by interstate or foreign travelers for recreational or other purposes; or
(ii) from which fish or shellfish are or could be taken and sold in interstate or foreign commerce; or
(iii) which are used or could be used for industrial purpose by industries in interstate commerce.
(4) All impoundments of waters otherwise defined as waters of the United States under the definition;
(5) Tributaries of waters identified in paragraphs (a) (1) through (4) of this section;
(6) The territorial seas;
(7) Wetlands adjacent to waters (other than waters that are themselves wetlands) identified in paragraphs (a) (1) through (6) of this section.
(8) Waters of the United States do not include prior converted cropland. Notwithstanding the determination of an area's status as prior converted cropland by any other Federal agency, for the purposes of the Clean Water Act, the final authority regarding Clean Water Act jurisdiction remains with Environmental Protection Agency (EPA).

2.1.1 Supreme Court Decisions

2.1.1.1 SOLID WASTE AGENCY OF NORTH COOK COUNTY

On January 9, 2001, the Supreme Court of the United States issued a decision on *Solid Waste Agency of Northern Cook County v. United States Army Corps of Engineers* (*SWANCC*), et al. with respect to whether the USACE could assert jurisdiction over isolated waters. The *SWANCC* ruling stated that the USACE does not have jurisdiction over "non-navigable, isolated, intrastate" waters.

2.1.1.2 RAPANOS/CARABELL

In 2006, the Supreme Court addressed the jurisdictional scope of Section 404 of the CWA, specifically the term "the waters of the U.S.," in their consolidated decision in *Rapanos v. United States* and in *Carabell v. United States* (hereafter referred to as *Rapanos*), the purpose of which was to provide guidance on determining what constitutes "waters of the U.S."

The following is taken from the *Jurisdictional Determination Form Instructional Guidebook* (USACE 2007):

> The *Rapanos* decision provides two new analytical standards for determining whether water bodies that are not traditional navigable waters (TNWs), including wetlands adjacent to those non-TNWs, are subject to CWA jurisdiction:
>
> 1) if the water body is relatively permanent, or if the water body is a wetland that directly abuts (e.g., the wetland is not separated from the tributary by uplands, a berm, dike, or similar feature) a relatively permanent water body (RPW), or
>
> 2) if a water body, in combination with all wetlands adjacent to that water body, has a significant nexus with TNWs.

CWA jurisdiction over TNWs and their adjacent wetlands was not in question in *Rapanos*, and therefore was not affected by the *Rapanos* decision. In addition, at least five of the justices in *Rapanos* agreed that CWA jurisdiction exists over all TNWs and over all wetlands adjacent to TNWs. As a consequence of the U.S. Supreme Court decision in *Rapanos*, the EPA and the USACE in coordination with the Office of Management and Budget and the President's Council on Environmental Quality, developed the *Memorandum Regarding CWA Jurisdiction Following Rapanos v. United States*. This guidance requires the application of the two new standards described above, as well as a greater level of documentation, to support an agency jurisdictional determination for a particular water body. Furthermore, this guidance required the USACE and EPA to develop a revised jurisdictional delineation form to be used by field staff for documenting assertion or declination of CWA jurisdiction.

The Memo states that the agencies will assert jurisdiction over the following categories of water bodies:

- TNWs;
- all wetlands adjacent to TNWs;
- non-navigable tributaries of TNWs that are relatively permanent (i.e., tributaries that typically flow year-round or have continuous flow at least seasonally); and
- wetlands that directly abut such tributaries.

In addition, the agencies will assert jurisdiction over every water body that is not an RPW if that water body is determined (on the basis of a fact-specific analysis) to have a significant nexus with a TNW. The classes of water body that are subject to CWA jurisdiction only if such a significant nexus is demonstrated are

- non-navigable tributaries that do not typically flow year-round or have continuous flow at least seasonally;
- wetlands adjacent to such tributaries; and
- wetlands adjacent to but that do not directly abut a relatively permanent, non-navigable tributary.

A significant nexus exists if the tributary, in combination with all of its adjacent wetlands, has more than a speculative or an insubstantial effect on the chemical, physical, and/or biological, integrity of a TNW. Principal considerations when evaluating a significant nexus include the volume, duration, and frequency of the flow of water in the tributary and the proximity of the tributary to a TNW, plus the hydrologic, ecologic, and other functions performed by the tributary and all of its adjacent wetlands.

2.1.1.3 DEFINING THE SCOPE OF WATERS PROTECTED UNDER THE CLEAN WATER ACT

On June 29, 2015 the EPA and the USACE published (79 Fed. Reg. 76 (21 April 2014) a rule (Clean Water Rule) defining the scope of waters protected under the CWA, in light of the U.S. Supreme Court cases in *U.S. v. Riverside Bayview*, *SWANCC*, and *Rapanos*. This rule enhances protection for the nation's public health and aquatic resources, and increases CWA program predictability and consistency by increasing clarity as to the scope of "waters of the United States" protected under the CWA.

The final rule has been issued but is on stay nationwide pending resolution of several lawsuits. In March 2017, the Trump administration announced its intention to review the rule and either revise or rescind it.

In this final rule, the agencies clarify the definition of "waters of the United States" to include eight categories of jurisdictional waters. Three types of jurisdictional waters, traditional navigable waters, interstate waters, and the territorial seas, are jurisdictional by rule in all cases. Another type, impoundments of jurisdictional waters, is also jurisdictional by rule. Two types of waters, "tributaries" and "adjacent" waters, are jurisdictional by rule, as defined, because the science confirms that they have a significant nexus to traditional navigable waters, interstate waters, or territorial seas. For waters that are jurisdictional by rule, no additional analysis is required.

The final two types of jurisdictional waters are those waters found after a case-specific analysis to have a significant nexus to traditional navigable waters, interstate waters, or the territorial seas, either alone or in combination with similarly situated waters in the region. Justice Kennedy acknowledged the agencies could establish more specific regulations or establish a significant nexus on a case-by-case basis, "Rapanos at 782," and for these waters the agencies will continue to assess significant nexus on a case-specific basis.

2.2 Clean Water Act Section 401 and the California Porter-Cologne Water Quality Act

The California State Water Resources Control Board (SWRCB) and its Regional Water Quality Control Boards (RWQCBs) regulate discharge of waste in any region that could affect the waters of the State under the California Porter-Cologne Water Quality Act or waters of the U.S. under Section 401 of the federal CWA. Under the Porter-Cologne Act, a Report of Waste Discharge must be submitted prior to discharging waste, or proposing to discharge waste, within any region that could affect the quality of the waters of the State (California Water Code § 13260). Waste Discharge Requirements (WDRs) or a waiver of WDRs will then be issued by the RWQCB. Waters of the State are defined as "Any surface water or groundwater, including saline waters that are within the boundaries of the state" (California Water Code § 13050). This differs from the CWA definition of waters of the U.S. by its inclusion of groundwater and waters outside the ordinary high water mark (OHWM) in its jurisdiction.

Although all waters of the U.S. also fall under the category of waters of the State, some waters of the State may be identified beyond the delineation of waters of the U.S., and the RWQCB may exert authority to regulate waste discharge into these waters even if the waters do not fall under USACE federal jurisdiction. All projects that have a federal component and may affect waters of the U.S., including those that require a Section 404 Permit from the USACE, must also comply with Section 401 of the CWA. If discharge into

waters of the U.S. is proposed, a 401 Water Quality Certification from the RWQCB is required (23 California Code of Regulation §§ 3830–3869) in addition to obtaining WDRs for impacts to waters of the State.

The federal CWA prohibits certain discharges of stormwater containing pollutants except in compliance with a National Pollutant Discharge Elimination System (NPDES) Permit (33 United States Code §§ 1311 and 1342[p]; also referred to as CWA §§ 301 and 402[p]). The EPA promulgates federal regulations to implement the CWA's mandate to control pollutants in stormwater runoff discharges (40 CFR Parts 122, 123, and 124). The federal statutes and regulations require discharges to surface waters composed of stormwater associated with construction activity, including demolition, clearing, grading, and excavation, and other land disturbance activities (except operations that result in disturbance of less than 1.0 acre of total land area and that are not part of a larger common plan of development or sale), to obtain coverage under an NPDES Permit. The NPDES Permit must require implementation of best available technology economically achievable and best conventional pollutant control technology to reduce or eliminate pollutants in stormwater runoff. The NPDES Permit must also include additional requirements necessary to implement applicable water quality standards.

2.3 California Fish and Game Code Sections 1600-1616: Streambeds and Banks and Riparian Habitats

The CDFW asserts jurisdiction over the bed and bank of a stream and associated wildlife and habitats as established in California Fish and Game Code Sections 1600–1616. In accordance with Section 1602 of the code (Streambed Alteration), the CDFW regulates activities that will "substantially divert or obstruct the natural flow of, or substantially change or use any material from the bed, channel, or bank of, any river, stream, or lake, or deposit or dispose of debris, waste, or other material containing crumbled, flaked, or ground pavement where it may pass into any river, stream, or lake" and requires notification prior to such activities. In addition, Section 1603 of the code states that "after the notification is complete, the department shall determine whether the activity may substantially adversely affect an existing fish and wildlife resource," and a Lake and Streambed Alteration Agreement (LSAA) may be pursued. These regulations were established to protect the wildlife resources that are associated with the riparian habitats that occur within and adjacent to ephemeral or year-round drainage systems. The CDFW jurisdiction area is often defined in practice as the top of bank of the stream or to the limit (outer dripline) of the adjacent riparian vegetation.

3 DELINEATION METHODOLOGY

The delineation of waters of the U.S., State, and CDFW jurisdictional areas in the Survey Area was completed by conducting a pre-survey literature review and field survey. The literature review was used to guide the field survey and to locate areas of potential jurisdictional waters.

3.1 Literature Review

Review of relevant literature and materials was used to preliminarily identify areas that may fall under agency jurisdiction. The following resources were reviewed or used prior to the field surveys:

- *Wetlands Delineation Manual* (USACE 1987);
- *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region* (Version 2.0) (USACE 2008);
- *A Field Guide to the Identification of the Ordinary High Water Mark (OHWM) in the Arid West Region of the Western United States* (Lichvar and McColley 2008);
- *A Review of Stream Processes and Forms in Dryland Watersheds* (Vyverberg 2010);
- *Methods to Describe and Delineate Episodic Stream Processes on Arid Landscapes for Permitting Utility-Scale Solar Power Plants: with the MESA Field Guide* (Brady and Vyverberg 2014);
- National Wetlands Inventory, Wetland Geodatabase (U.S. Fish and Wildlife Service [USFWS] 2017);
- The National Wetland Plant List: 2016 wetland ratings (Lichvar et al. 2016);
- California Soils Resource Lab's Soil Web Google Earth interface, queried to determine the soils that have been mapped in the Survey Area (California Soil Resources Lab 2017);
- Hydric Soils List of California, 2017 (Natural Resources Conservation Service [NRCS] 2017b);
- Aerial imagery from 1994-2015 (Google Earth 2017);

3.2 Field Surveys

SWCA biologist Alex Beakes conducted a field delineation survey on November 13, 2017 to determine the structure and composition of on-site hydrology, vegetation, and soils at the Project site. The Survey Area is defined as the footprint of the pipeline route and the turnout options, plus a 75-foot buffer around these Project elements. Potential jurisdictional water features in the Survey Area were mapped using a Trimble GeoXT handheld global positioning system (GPS) unit with ESRI ArcPad 10 software, then ESRI ArcGIS 10 was used to compile the data into a database for future analysis. Plants that could not be identified in the field were collected and later identified using *The Jepson Manual: Vascular Plants of California, Second Edition* (Baldwin et al. 2012).

3.2.1 Potential Waters of the U.S. and State

Federal jurisdiction over non-wetland waters of the U.S. extends to the OHWM, defined in 33 CFR § 328.3 as the line on the shore established by fluctuations of water and indicated by physical characteristics such as a clear, natural line impressed on the bank, shelving, changes in the character of the soil, destruction of terrestrial vegetation, or the presence of litter and debris. In the Arid West region of the United States, waters are variable and include ephemeral/intermittent and perennial channel forms. The most problematic ordinary high water (OHW) delineations are associated with the commonly occurring ephemeral/intermittent channel forms that predominate in the Arid West.

The climate of the region drastically influences the hydrology, channel-forming processes, and distribution of OHWM indicators such that delineations can be inconsistent (over space and time) and problematic. The OHW zone in low-gradient, alluvial ephemeral/intermittent channel forms in the Arid West is the active floodplain. The dynamics of arid channel forms and the transitory nature of traditional OHWM indicators in arid environments render the limit of the active floodplain the only reliable and repeatable feature in terms of OHW delineation (Lichvar and McColley 2008). This was supported by recent additional research in *Vegetation and Channel Morphology Responses to Ordinary High Water Discharge Events in Arid West Stream Channels* (Lichvar et al. 2009).

3.2.2 Jurisdictional Wetlands

To determine the extent of potential jurisdictional wetlands on a project site, the Corps of Engineers *Wetlands Delineation Manual* (USACE 1987) and *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region* (Version 2.0; USACE 2008) were used as guides for identifying wetland characteristics. The following three indicators are typically present in wetlands:

- Hydrophytic vegetation
- Hydrology providing permanent or periodic inundation by groundwater or surface water
- Hydric soils

To meet USACE definition of a wetland, an area must exhibit at least minimal hydric conditions within all three parameters, except as specifically described in the USACE guidance. RWQCB and CDFW wetlands are equivalent to the limits of USACE wetlands.

3.2.2.1 WETLAND HYDROLOGY

Wetland hydrology indicators are classified into four groups:

- **Group A** – Observation of Surface Water or Saturated Soils: This group is based on the direct observation of surface water or saturated soils.
- **Group B** – Evidence of Recent Inundation: This group consists of evidence that the site is subject to flooding or ponding, although the inundation may not be recent. Indicators include water marks, drift deposits, sediment deposits, and similar characteristics.
- **Group C** – Evidence of Recent Soil Saturation: This group consists of indirect evidence of recent soil saturation. Indicators include oxidized rhizospheres around living roots and the presence of reduced iron and sulfur in the soil profile.
- **Group D** – Evidence from Other Site Conditions or Data: This group consists of soil and vegetation features that indicate current rather than historical hydric conditions.

The presence of wetland hydrology is assessed at each location where the wetland criteria are met. Data recorded include the extent of surface flows, depth of inundation, depth to saturated soils, and depth to free water in the soil test pit.

3.2.2.2 HYDROPHYTIC VEGETATION

Hydrophytic plants grow partially or completely in water and are indicators of wetland environments. Hydrophytic vegetation occurs only in areas where frequent or sustained inundations are sufficient to produce soil saturation that exerts a controlling influence on plant species. These periodic events must occur for sufficient duration to result in anaerobic soil conditions. Wetlands are characterized by communities of

plants, so that the occurrence of individual hydrophytic species in an area otherwise dominated by upland species is insufficient to characterize the area as a wetland. In arid environments, specific indicator species are important in identification of wetlands (e.g., halophytes and phreatophytes are associated with many wetland settings in the Arid West), but in general, the totality of plant species growing on a site is of greater importance than the presence or absence of particular indicator species.

Species that are indicators of wetlands have been classified in the *National Wetland Plant List* (Lichvar 2016). Frequency of a species occurrence in wetlands has been divided into the following five categories:

1. **Obligate Wetland (OBL):** Occurs almost always (estimated probability > 99%) under natural conditions in wetlands.
2. **Facultative Wetland (FACW):** Usually occurs in wetlands (estimated probability 67%–99%) but occasionally found in non-wetlands.
3. **Facultative (FAC):** Equally likely to occur in wetlands or non-wetlands (estimated probability 34%–66%).
4. **Facultative Upland (FACU):** Usually occurs in non-wetlands (estimated probability 67%–99%) but occasionally found in wetlands (estimated probability 1%–33%).
5. **Obligate Upland (UPL):** Occurs in wetlands in another region but occurs almost always (estimated probability > 99%) under natural conditions in non-wetlands in the region specified.

The USACE considers species that fall into the OBL, FACW, and FAC categories as being positive indicators of wetland vegetation. The prevalent vegetation that occurs in a wetland may be associated with more than one community and is characterized by the dominant species. A dominance test (Indicator 1) is the basic hydrophytic vegetation indicator and is used to determine the dominant species of a given plant community. The 50/20 Rule is used to determine wetland status by examining the species that dominate a community. This method involves identifying the species type that makes up at least 50% of the stratum of the community, and then identifying a second species type that makes up at least 20% of the stratum. This method should be applied in every wetland determination. Although some plant communities cannot be characterized by the dominance test, most wetlands in the Arid West have plant communities that will pass the dominance test, and therefore this test provides a sufficient indicator in most situations. If the plant community passes the dominance test for wetland species, then the vegetation is characterized as hydrophytic and no further vegetation analysis is required.

The prevalence index (Indicator 2) is used when the vegetation fails the dominance test, but hydric soils and wetland hydrology are present. The prevalence index weighs all of the plant species in a community, rather than just the dominant species. The prevalence index is a weighted-average wetland indicator status of the plant species in a sampling plot. Each indicator status is given a numeric code (OBL = 1, FACW = 2, FAC = 3, FACU = 4, and UPL = 5) and is weighted by the percent cover. Hydrophytic vegetation is present if the prevalence index is 3.0 or less.

Plant morphological adaptations (Indicator 3) can be used to distinguish certain wetland plant communities in the Arid West in the presence of hydric soils and wetland hydrology. Some hydrophytes develop easily recognized physical characteristics due to their adaption to wetland conditions. Common morphological adaptations include adventitious roots and shallow root systems developed on or in the upper layers of the soil. This indicator is applied when the wetland morphological adaptations are found on 50% or more of the FACU species present.

3.2.2.3 HYDRIC SOILS

The National Technical Committee for Hydric Soils defines a hydric soil as “a soil that formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic

conditions in the upper part" (U.S. Department of Agriculture [USDA] 1994). Soils that are sufficiently wet because of artificial measures are included in the concept of hydric soils. This classification includes soils that were historically hydric but have since become non-hydric as a result of artificial modification of the hydrologic system that originally created the hydric soil. Some series designated as hydric have phases that are not hydric, depending on water table, flooding, and ponding characteristics.

Hydric soils are identified using soil indicators presented in the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region* (Version 2.0; USACE 2008) and the *Field Indicators of Hydric Soils in the United States*, Version 7.0, 2010 (NRCS 2010). Indicators of non-sandy hydric soils include an organic composition that is greater than 50% (formed in oversaturated conditions where the decomposition of plant debris is inhibited and accumulates slowly), the presence of sulfides in the soil composition that emanate a strong sulfur odor, and soils with peraquic (groundwater always at or near the soil surface) moisture regimes. The soil coloration produced by soil components is also an indicator that can be used to identify hydric soils while performing field observations. Gleyed (sticky, water-logged, and blue-gray in color) soils are produced when anaerobic soil conditions result in the pronounced chemical reduction of iron, manganese, and other elements, thereby producing grayish, bluish, and greenish soil colors. Mineral hydric soils that are saturated for substantial periods of the growing season (but not long enough to produce gleyed soils) will have bright mottles (marked with spots of contrasting colors) and a dark coloration matrix (the portion of the soil that makes up more than 50% of the composition that has the predominant color). In some mineral hydric soils, mottling may be absent and only the dark coloration occurs.

The coloration of the soil samples, matrix, and mottles is assessed using the *Munsell Soil Color Charts* (Munsell 2000). The Munsell Color System is the field and laboratory standard for classifying soil color, rocks, and archaeological specimens. The system has three components: hue (a specific color), value (lightness and darkness), and chroma (color intensity). Samples of these components are arranged in books of color chips, each of which is labeled to indicate the assigned value of each of these components. The soil sample is viewed through an aperture below each chip to compare and contrast the coloration until a best-match determination is made.

3.2.3 Identification of CDFW Jurisdictional Areas

There are no published or formalized guidelines for delineating the limits of CDFW jurisdictional waters in the field. Many who conduct field delineations have used section 1.72 of title 14 of the California Code of Regulations, which provides the only definition of "stream" found anywhere in title 14:

> "[A] body of water that flows at least periodically or intermittently 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."

Recently, CDFW has been requesting that delineations of their jurisdictional waters be conducted according the publication *Methods to Describe and Delineate Episodic Stream Processes on Arid Landscapes for Permitting Utility-Scale Solar Power Plants: with the MESA field guide* (Brady and Vyverberg 2014). This includes identifying the watercourse indicators (fluvial transport, deposition, out-of-channel flow, and fluvial erosion), as well as upland indicators.

3.3 Feature Classification

3.3.1 Stream

A stream is defined by CDFW as a body of water that flows at least periodically or intermittently through a bed or channel, can be perennial, intermittent or ephemeral, and includes rivers, creeks, dry washes, sloughs, blue-line streams, and watercourses with subsurface flows. In addition, canals, aqueducts, irrigation ditches, and similar waterways may be considered streams if they support aquatic life, riparian vegetation, or stream-dependent terrestrial wildlife. CDFW and the RWQCBs typically assert jurisdiction over streams. CDFW jurisdiction extends from the stream bed to the bank or the outer edge of the associated riparian vegetation. RWQCB jurisdiction is similar to that of the USACE but does not require connection to a TNW or tributary thereof; a stream is jurisdictional for the USACE if it is considered a TNW or a tributary to a TNW up to the OHWM (USACE 2008).

3.3.2 Discontinuous Ephemeral Streams

Three channel forms are described within the discontinuous ephemeral stream type: erosional, depositional, and sheet-flood zone. Erosional reaches, or arroyos, are commonly entrenched to the point that there is little to no terrace, except for colluvial deposits being reworked only during extremely rare events. Arroyo streams are therefore more easily delineated, as most of the incised area is within the low-flow and active floodplain. Depositional and sheet-flood zones are more difficult to delineate, as the active part of the channel is more dynamic. Sheet-flood zones in particular are a challenge due to the unconfined nature of flood-flow, resulting in a wide mosaic of aquatic and upland features (USACE 2008).

3.3.3 Swale

Swales are generally shallow features in the landscape that may convey water across upland areas during and following storm events. Swales usually occur on nearly flat slopes and typically have grass or other low-lying vegetation throughout the swale. Swales are generally not waters of the U.S. because they are not tributaries or they do not have a significant nexus to TNWs (USACE 2007).

3.3.4 Erosional Features

Erosional features, including gullies, are generally not waters of the U.S. because they are not tributaries nor they do not have a significant nexus to TNWs.

4 RESULTS – EXISTING CONDITIONS

The purpose of this section is to summarize the findings of the survey and literature review. A photographic exhibit is found in Appendix A with representative photos of each feature identified in the literature review and field survey.

4.1 Topography and Hydrology

The Survey Area is generally flat and disturbed or developed high desert vegetation communities. The desktop review of the National Wetlands Inventory (NWI) Wetland Geodatabase data identified one previously mapped linear feature in the Survey Area and no mapped wetland features (USFWS 2017). Aerial imagery of the Survey Area from 1995 to 2017 reveals how the hydrology of Oro Grande Wash has been highly modified in the last 20 years; the construction of the Amethyst Basin and the Competitive Edge MX Park upstream of the Survey Area have disconnected the Oro Grande from its historic water sources (Google Earth 2017). Outside of the Oro Grande Wash, the Survey Area has flat upland slopes. South of Gabriel Road, Amethyst Road becomes Pegleg Road, which is an unmaintained road that appears to convey sheet flow from the surrounding area.

4.2 Vegetation

Vegetation within the Survey Area is a shrub canopy of primarily creosote bush (UPL), Nevada joint fir (UPL), annual ragweed (*Ambrosia acanthicarpa*; UPL), and Russian thistle (*Salsola tragus*; FACU). Joshua trees (*Yucca brevifolia*; UPL) and paperbag bush (*Scutellaria mexicana*; UPL) were substantially more common in and around the Oro Grande Wash. The herbaceous layer was dominated by non-native grasses such as red brome (*Bromus madritensis* ssp. *rubens*; UPL) and Mediterranean grass (*Schismus* sp.; UPL*)*.

4.3 Soils

Two soil series have been mapped in the Survey Area (Figure 5; USDA 1970). One element of these two series is hydric, meaning that they have either a major or a minor component that is at least in part hydric (NRCS 2017b). The hydric soils developed under conditions of saturation, flooding, or ponding long enough to develop anaerobic conditions in the upper part (USDA Soil Conservation Service 1994). However, the USACE notes: "To be identified as hydric, these soils should generally have one or more of the indicators. However, not all areas that have hydric soils will qualify as wetlands, if they no longer have wetland hydrology or support hydrophytic vegetation" (USACE 2008).

4.3.1 Cajon Series

Some elements of the Cajon series are listed as hydric soils; Cajon sand, 0 to 2 percent slopes, was mapped in the Survey Area and is included on the list of hydric soils (NRCS 2017b). The Cajon series consists of very deep, somewhat excessively drained soils that formed in sandy alluvium from dominantly granitic rocks. The soils are on alluvial fans, fan aprons, fan skirts, inset fans and river terraces, with slopes from 0 to 15 percent. Cajon soils are somewhat excessively drained, with negligible to low runoff and rapid permeability. The soils with sandy loam surface textures have moderately rapid over rapid permeability. Typical vegetation is mostly desert shrubs, including creosote, saltbush (*Atriplex* spp.), Mormon tea (*Ephedra* spp.), Joshua tree, Indian ricegrass (*Stipa hymenoides*; no WIS rating), annual grasses, and forbs (NRCS 2017a).

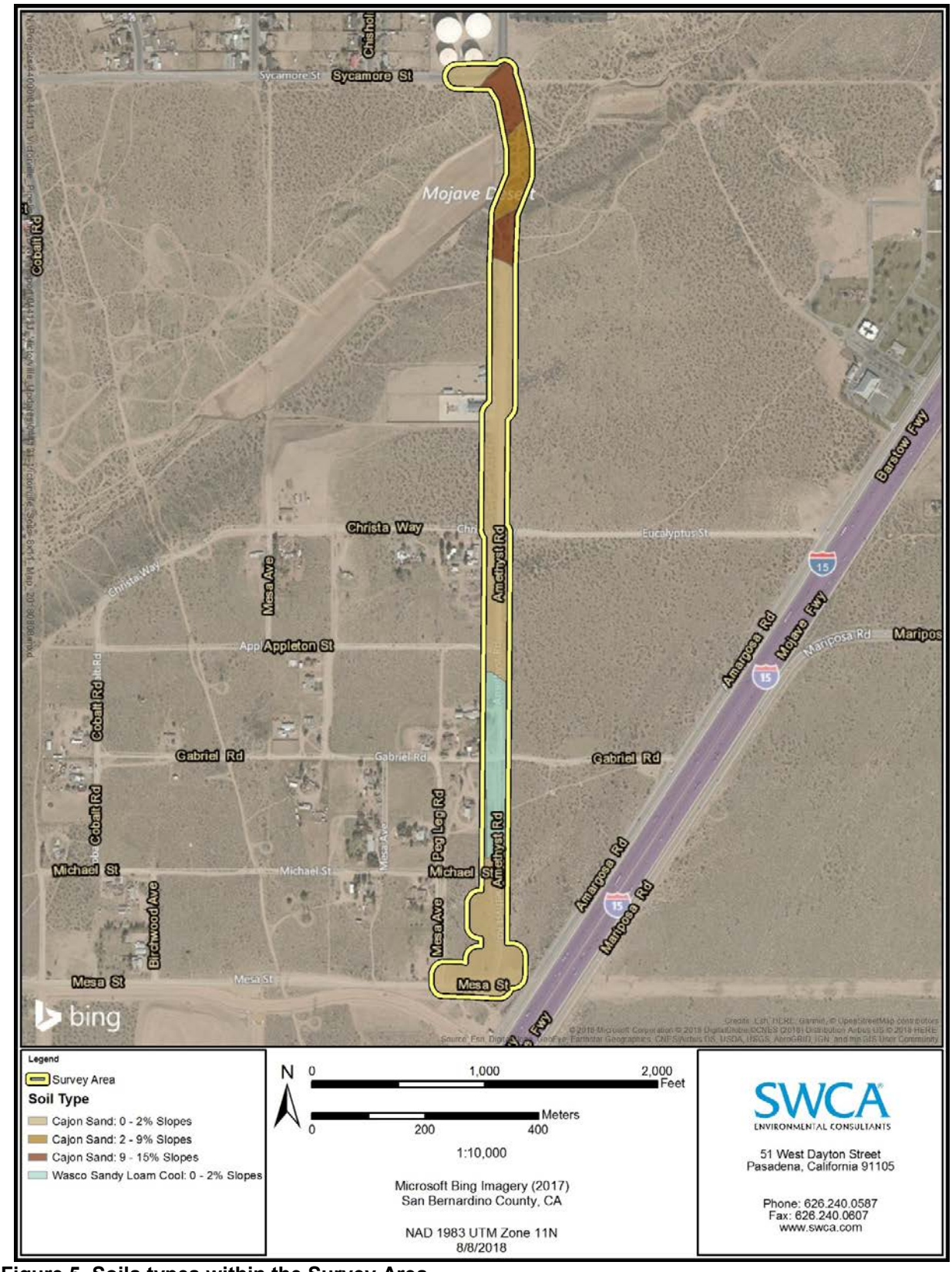

Figure 5. Soils types within the Survey Area.

4.3.2 Wasco Series

One element of the Wasco series is listed as a hydric soil; however, none of the elements mapped in the Survey Area are included on the list of hydric soils (NRCS 2017b). The Wasco series consists of very deep, well drained soils on recent alluvial fans and flood plains. These soils formed in mixed alluvium derived mainly from igneous and/or sedimentary rock sources. Slope is 0 to 5 percent slopes. The mean annual precipitation is about 6 inches and the mean annual temperature is about 64°F. Wasco soils are on recent alluvial fans and flood plains. Slope is 0 to 5 percent. These soils formed in mixed alluvium derived dominantly from igneous and/or sedimentary rock sources. Typical native vegetation is saltbush (*Atriplex* spp.), annual grasses and forbs (NRCS 2017a).

4.4 Potential Jurisdiction

Potential hydrological features were ground-truthed during the field survey to map them in detail and determine if they met the criteria of a regulated water feature. No potential jurisdictional wetlands (i.e. meeting all three criteria) were observed at the site; there is no evidence that saturation, flooding, or ponding occurs in a manner that supports hydrophytic vegetation. Water moves through much of the Survey Area via sheet flow and produces erosional features, such as bed, banks, and OHWMs. Many of the historical drainages in the Survey Area have been highly modified from water projects and ORVs, which have substantially altered the overall hydrology of the region.

Fourteen (14) features were identified in the Survey Area and are described in detail below (Figure 6). The Oro Grande Wash is tributary to the Mojave River, a USACE jurisdictional waterway, but several projects in the area, such as the Amethyst Basin, Competitive Edge MX Course, I-15, and the Victorville Municipal Golf Course have hydrologically disconnected the Oro Grande Wash from the Mojave River. Some erosional features are tributary to the Oro Grande Wash, while others terminate without a nexus to a larger feature. All features are isolated and ephemeral intrastate drainages with no connection to a TNW. No wetlands or non-wetland waters subject to USACE jurisdiction were observed within the Survey Area. Of the 14 features identified in the Survey Area, five (5) features (Features 2, 4a, 5, 7 and 8) are potentially jurisdictional under USACE, RWQCB, and/or CDFW.

4.4.1 Potentially Jurisdictional Features

4.4.1.1 FEATURE 2

Feature 2 is a man-made detention pond/groundwater recharge basin receiving flow conveyed by a large culvert (Figure 7). Large mud cracks and areas of saturation were present at the time of the survey. Restricted access precluded soil analysis. No hydrophytic vegetation was observed. Species observed included annual ragweed, Russian thistle, and red brome. Hydric soils are assumed to not be present since this feature was under construction in March 2013 (Google Earth 2017). Aside from the cracked soils, this feature showed no signs of a jurisdictional wetland. This feature may be subject to the jurisdiction of CDFW or RWQCB. Photographs of this feature are included as Appendix A, Photo 3. There are no proposed impacts to Feature 2.

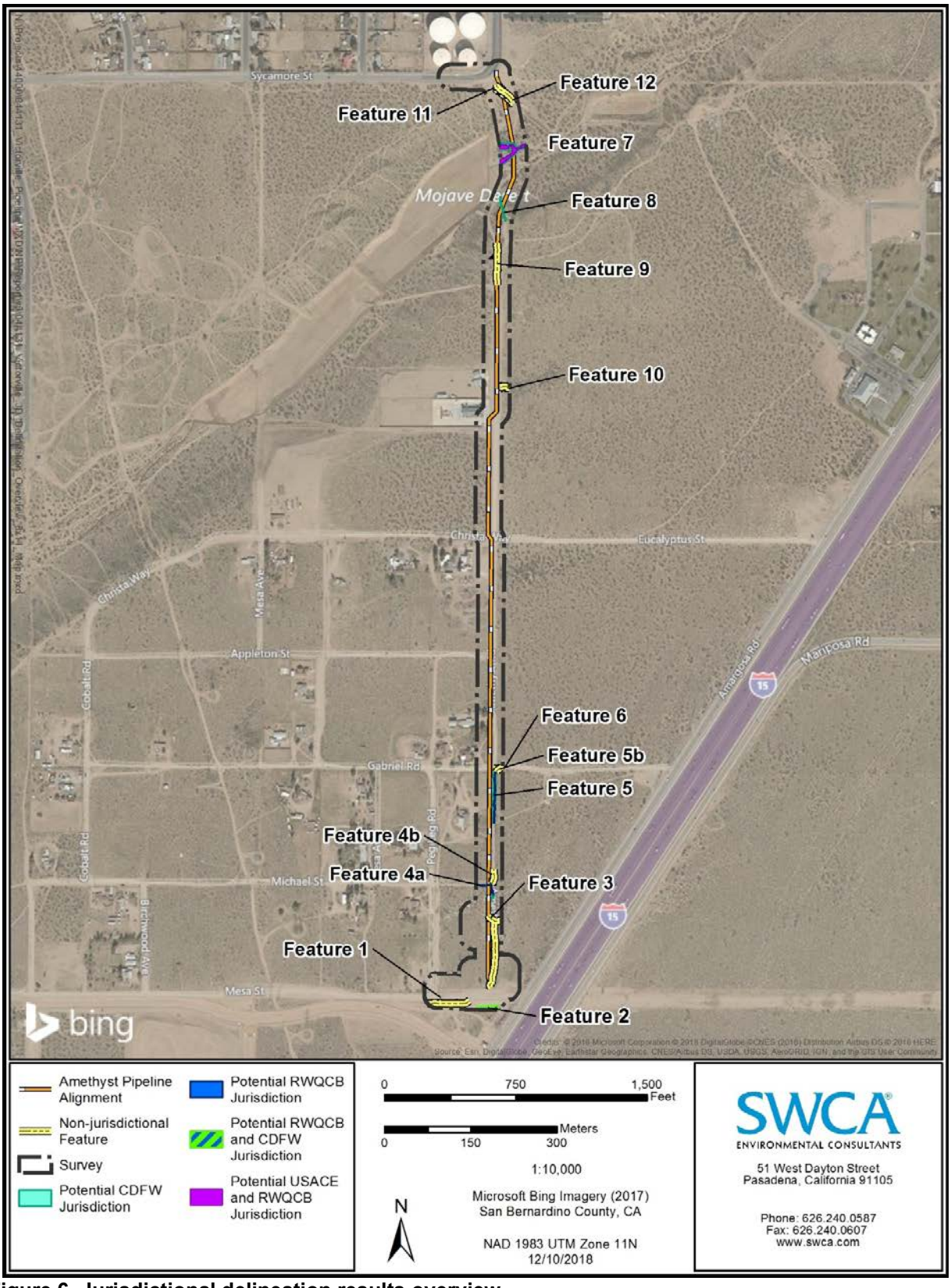

Figure 6. Jurisdictional delineation results overview.

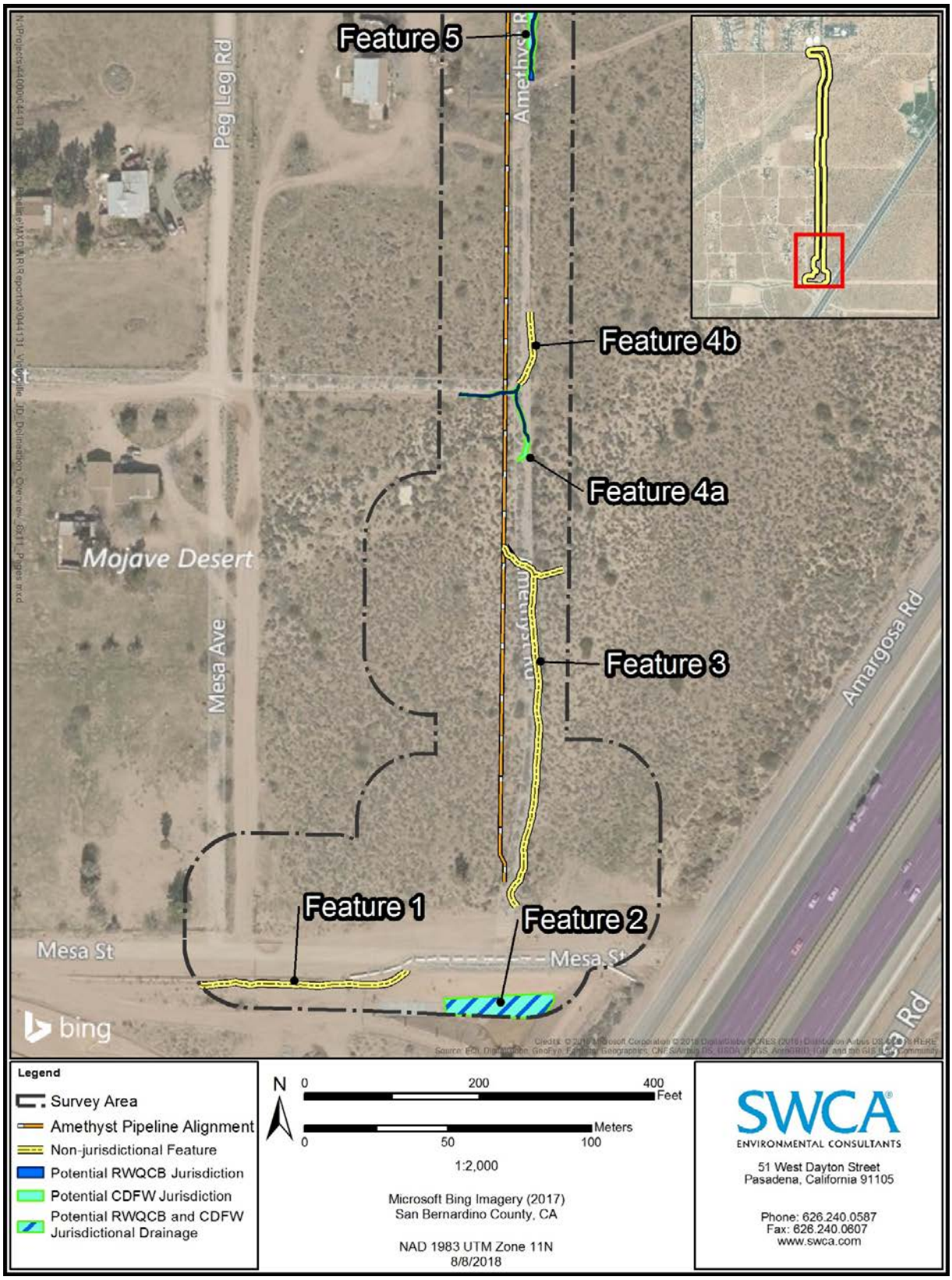

Figure 7. Jurisdictional delineation results map – Features 1, 3, 4a, and 4b.

4.4.1.2 FEATURE 4A

Feature 4a is a combination of two small erosional discontinuous ephemeral streams and their confluence (see Figure 7). Sheetflow from Feature 3 likely contributes to Feature 4a, but there was no visible evidence observed during the delineation. The drainages flow from west to east, and from south to north through a relatively natural vegetation community dominated by Nevada joint fir and rubber rabbitbrush (*Ericameria nauseosa*). Feature 4a has a defined bed and bank, with an apparent OHWM and sorted substrates. Their confluence is adjacent to Amethyst Road; shortly after, evidence of a defined bed and bank or OHWM disappears. Flow is then captured by Amethyst Road, which directs the flow northwards; at this point the drainage is referred to as Feature 4b. Due to the presence of visible hydrology and the presence of non-hydrophytic vegetation, this feature may be subject to the jurisdiction of the RWQCB and CDFW. The feature is not subject to USACE jurisdiction because there is no nexus to a TNW; Feature 4a flows into Feature 4b, which terminates mid road without a connection to any other hydrologic features in the area. The OHWM of Feature 4a is approximately 134 feet long and approximately 16 inches wide. Photographs of this feature are included as Appendix A, Photos 8-10.

4.4.1.3 FEATURE 5

Feature 5 is an erosional discontinuous ephemeral stream that appears to be hydrologically connected to Feature 4b when viewing the drainages from a map; however, the local topography hydrologically separates them (Figure 8). Similar to Features 1-4b, Feature 5 is the result of an unmaintained road that has been incised by water. Feature 5 flows from south to north along Pegleg Road (the name of Amethyst Road between Michael Street and Verano Street). Feature 5 appears to receive water as sheetflow from the nearby developed areas to the west and the natural Nevada Joint Fir Scrub and Creosote Bush Scrub (*Larrea tridentate* Alliance) to the east. The shrub canopy along the banks of Feature 5 is primarily creosote bush, rubber rabbitbrush, and annual ragweed. As the feature reaches Gabriel Road it is diverted to the east as an erosional feature (Feature 5b) and then disappears. Due to the presence of visible hydrology and non-hydrophytic vegetation, this feature may be subject to the jurisdiction of the RWQCB and CDFW. The feature is not subject to USACE jurisdiction because there is no nexus to a TNW; Feature 5 flows into Feature 5b, which terminates in the middle of Gabriel Road. The OHWM of Feature 5 is approximately 295 feet long and approximately 4-12 inches wide. Photographs of this feature are included as Appendix A, Photos 13-15.

4.4.1.4 FEATURE 7

Feature 7 is within the Oro Grande Wash and is mapped in the NWI (Figure 9). However, several projects upstream and downstream of the Survey Area have severely altered the hydrology of the Oro Grande Wash. A review of historical satellite imagery from 1995 and onward demonstrate that the Oro Grande Wash was once a braided ephemeral stream that is now reduced to a single-thread channel with a secondary channel in the floodplain. Repeated modifications along the wash, particularly the construction of the Amethyst Basin, have constrained and reduced the flow received by Feature 7. The bed and bank of Feature 7 are representative of historic conditions. However, due to the historic conditions and the currently visible evidence of active hydrology the feature may be subject to USACE, RWQCB, and CDFW jurisdiction.

The Oro Grande Wash is tributary to the jurisdictional Mojave River, which is subject to the jurisdiction of USACE. Informal consultations with the USACE Los Angeles District Regulatory Division and CDFW have indicated that both agencies have determined that the Oro Grande Wash is a jurisdictional feature. Photographs of this feature are included as Appendix A, Photos 17-21.

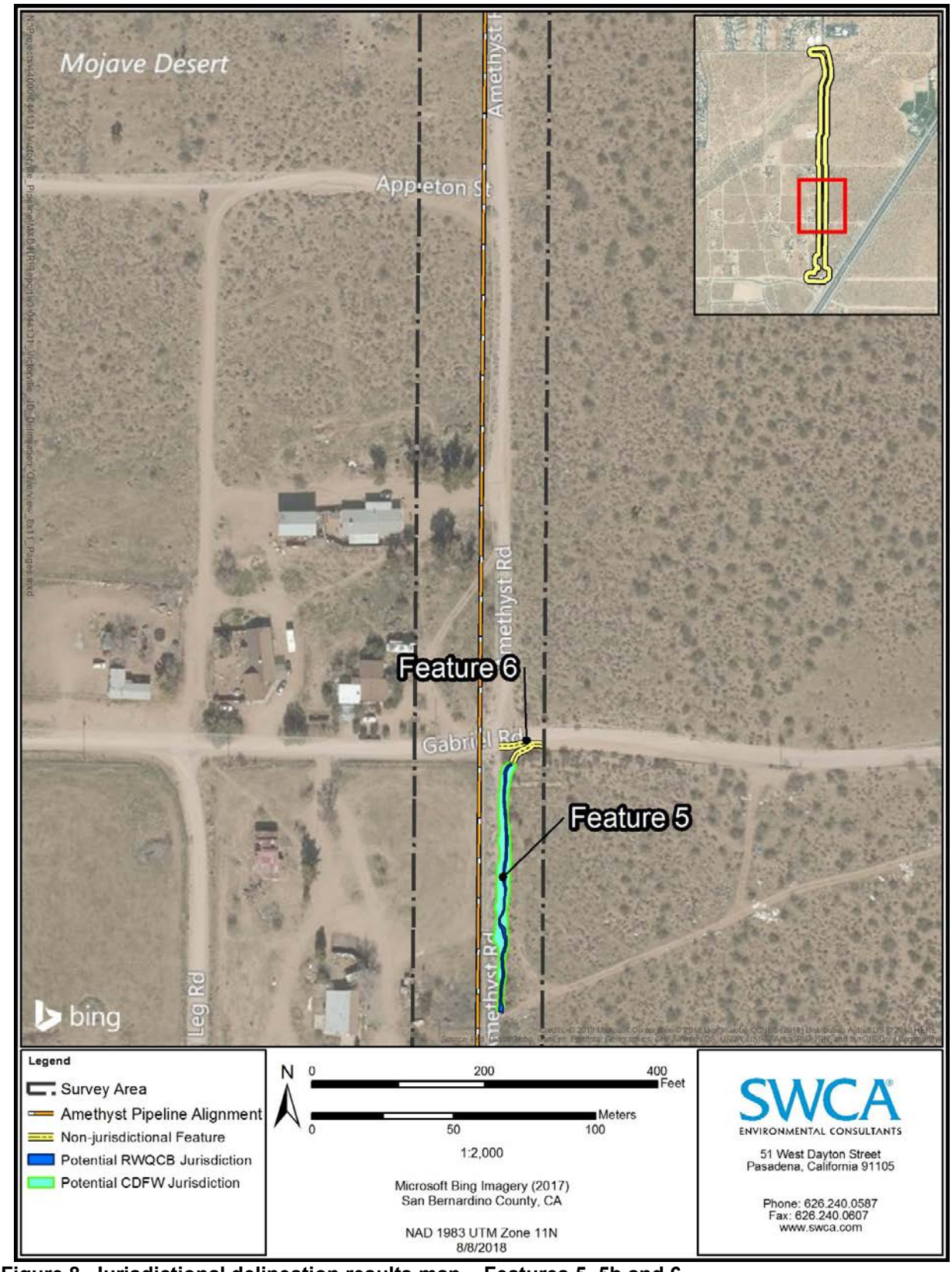

Figure 8. Jurisdictional delineation results map – Features 5, 5b and 6.

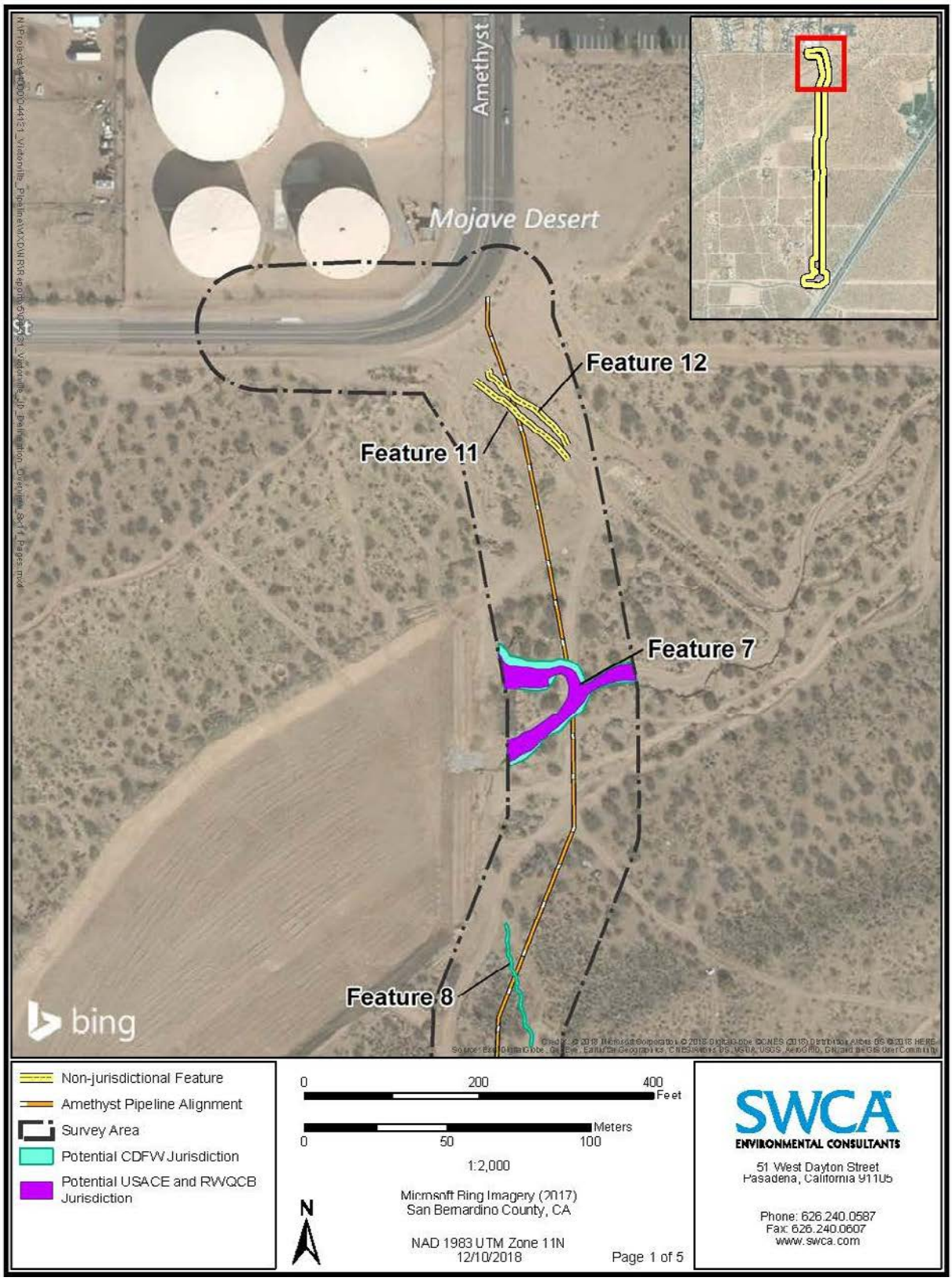

Figure 9. Jurisdictional delineation results map – Features 7, 8, 11, and 12.

4.4.1.5 FEATURE 8

Feature 8 is an erosional feature that flows from south to north and is the result of the abrupt end of Amethyst Road near a relatively steep slope; as the road ends the captured flow creates a rill (see Figure 9). The feature has no riparian vegetation. The slopes along the margins of the drainage are dominated by rubber rabbitbrush and California buckwheat (*Eriogonum fasciculatum*; no WIS rating). Feature 8 is tributary to the Oro Grande Wash. This feature is erosional in nature and does not display the characteristics typical of features subject to RWQCB or USACE jurisdiction. Based on informal consultation with CDFW, it is anticipated that Feature 8 will be considered jurisdictional under that agency. Photographs of this feature are included as Appendix A, Photos 22 and 23.

4.4.2 Non-jurisdictional Features

The following features were observed during the field delineation for the Project, and were considered unlikely to be jurisdictional under USACE, RWQCB, or CDFW. Descriptions of these non-jurisdictional features are provided below to demonstrate that all potentially jurisdictional waters within the Survey Area were fully considered during the field delineation.

4.4.2.1 FEATURE 1

Feature 1 is a small roadside swale located immediately south of Mesa Street, flowing from west to east towards Feature 2 (see Figure 7). Sheetflow accumulates from the land south and west of the feature; flow accumulates in Feature 1 due to a roadside berm that prevents flow from continuing northward. The primary evidence for any concentration of water within Feature 1 is due to the shape of the feature and the high density of vegetation compared to the surrounding area. The soils are heavily disturbed, appearing to have been graded in the past. Vegetation in the feature is dominated by plants that are associated with disturbed areas such as annual ragweed, Russian thistle, and red brome. Feature 1 does not resemble a jurisdictional feature; it has no hydrophytic vegetation, OHWM, sorted substrates, or visible soil cracking. This feature is not subject to the jurisdiction of CDFW, RWQCB or USACE. Photographs of this feature are included as Appendix A, Photos 1 and 2.

4.4.2.2 FEATURE 3

Feature 3 is a result of the intersection of Mesa Street and the unmaintained Amethyst Road (see Figure 7). Sheetflow from the landscape and Mesa Street are concentrated at the intersection; they scour the unmaintained road, creating an erosional feature. It is considered an erosional feature rather than a swale due to its lack of vegetation and its anthropogenic origin. As the water flows from south to north it is diverted from Amethyst Road when the flow meets an incline in the road; this causes the water to disperse into the adjacent Nevada Joint Fir Scrub (*Ephedra nevadensis* Shrubland Alliance) as the flow slows and the alluvium is deposited. Evidence of channelized flow dissipates as the feature shifts to a sheet flow once it is unbounded by Amethyst Road. This feature is not subject to the jurisdiction of CDFW, RWQCB or USACE. Photographs of this feature are included as Appendix A, Photos 4-7.

4.4.2.3 FEATURE 4B

Feature 4b flows from south to north along Amethyst Road and has no apparent OHWM or other indicators of jurisdictional features (see Figure 7). It then continues until it intersects Amethyst Road. Feature 4b is defined as an erosional feature rather than a discontinuous ephemeral stream or swale due to the lack of visible hydrologic indicators and lack of vegetation in or around the feature. As the water flows from south to north the feature becomes depositional in nature and terminates due to an incline in Amethyst Road. This feature is not subject to the jurisdiction of CDFW, RWQCB or USACE. Photographs of this feature are included as Appendix A, Photos 11 and 12.

4.4.2.4 FEATURES 5B AND 6

Feature 5b receives water from Feature 5, and it merges with Feature 6 at Gabriel Road (see Figure 8). Feature 6 is the result of accumulated water from the adjacent impervious roads and house plots. Both drainages are erosional in nature, being primarily characterized by their lack of vegetation and lack of depositional floodplains. These drainages terminate within Gabriel Road outside of the Survey Area as they flow from west to east towards I-15. Similar to Feature 3 and 4b, Feature 5b and 6 are not tributary to any potentially jurisdictional features as their flow remains captured along Gabriel Road until they terminate. These features are not subject to the jurisdiction of the RWQCB, CDFW, or USACE. Due to the lack of visible hydrology and the absence of vegetation (hydrophytic or not), these features are not subject to the jurisdiction of the USACE, RWQCB or CDFW. Photographs of this feature are included as Appendix A, Photo 16.

4.4.2.5 FEATURE 9

Feature 9 is an erosional feature that flows from south to north along the western edge of Amethyst Road (Figure 10). This roadside drainage conveys flow from the road towards the Amethyst Basin via the access roads. Feature 9 is tributary to the Oro Grande Wash. This feature is not subject to the jurisdiction of the RWQCB, CDFW or USACE. Photographs of this feature are included as Appendix A, Photos 24 and 25.

4.4.2.6 FEATURE 10

Feature 10 receives water from the adjacent Amethyst Road and nearby properties as a vegetated swale that conveys flow from west to east towards I-15 (see Figure 10). Vegetation within the drainage is dominated by annual ragweed and California buckwheat. Feature 10 has no defined bed and bank. The swale meanders through the dense vegetation, subsequently dissipating into the surrounding area. It is assumed that Feature 10 is tributary to the Oro Grande Wash through subsurface flow. This feature is not subject to the jurisdiction of the RWQCB, CDFW or USACE. Photographs of this feature are included as Appendix A, Photo 26.

4.4.2.7 FEATURES 11 AND 12

Features 11 and 12 are erosional features that run alongside a dirt road (see Figure 9). These features direct flow from the impervious surroundings as rills towards the Oro Grande Wash. Vegetation near these features is limited to disturbance associated species such as annual ragweed, rubber rabbitbrush, and red brome. Feature 11 and 12 are tributary to the Oro Grande Wash. These features are not subject to the jurisdiction of the RWQCB, CDFW or USACE. Photographs of this feature are included as Appendix A, Photos 27-29.

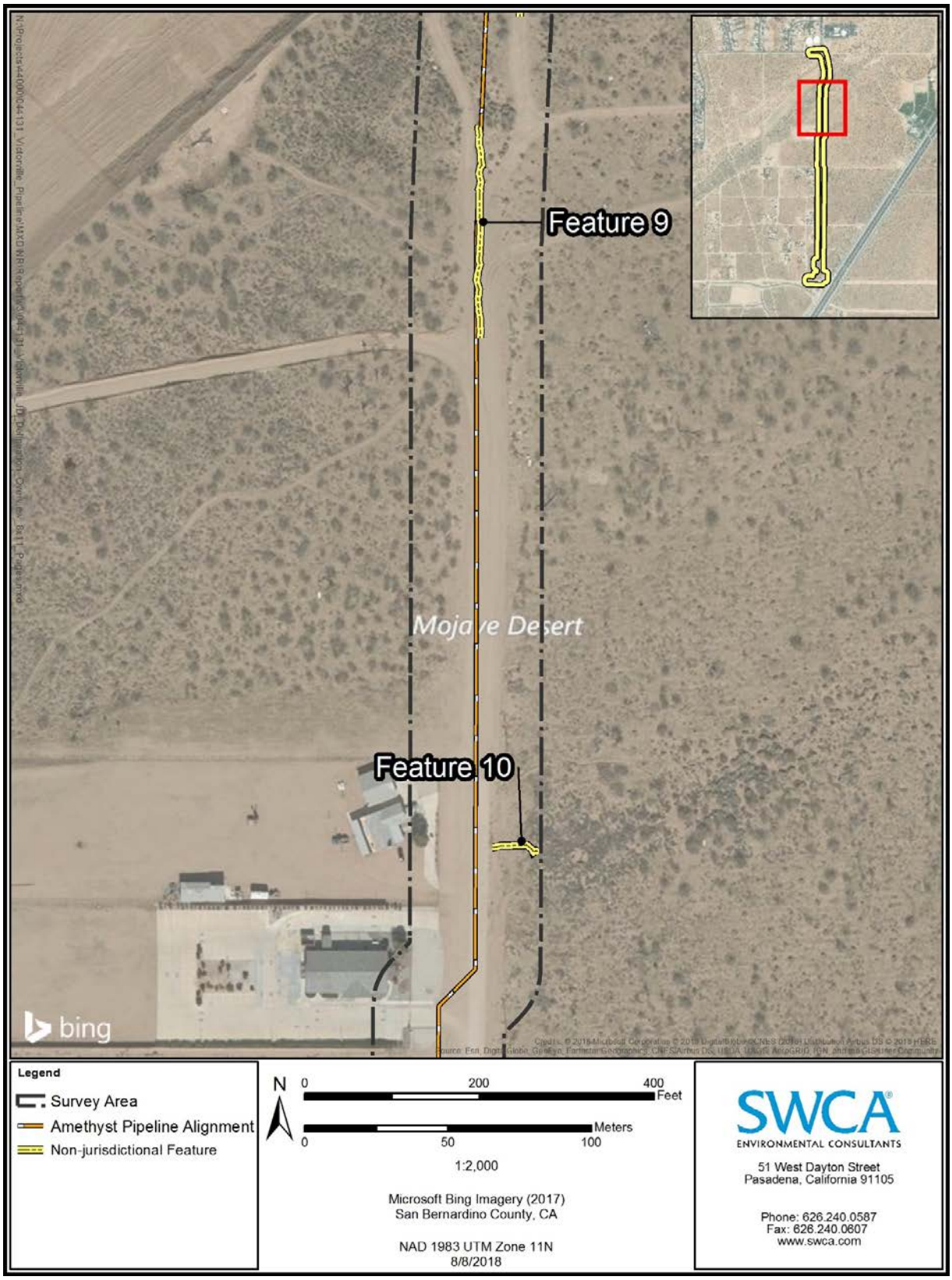

Figure 10. Jurisdictional delineation results map – Features 9 and 10.

5 JURISDICTIONAL DELINEATION FINDINGS

This report was prepared to delineate potential USACE, RWQCB, and CDFW jurisdictional authority over hydrological structures in the Survey Area. This report represents SWCA's best effort at determining the jurisdictional boundaries using the most current regulations and guidance from the regulatory agencies. However, the final determination of jurisdictional boundaries within a project site is by the regulatory agencies' discretion.

No areas that meet the federal or state definition of jurisdictional wetlands were identified. Of the potentially jurisdictional features identified in the Survey Area, five (5) had characteristics of RWQCB, CDFW, and/or USACE regulated jurisdictional water features (Table 1). Features 2, 4a, 5, 7 and 8 are potentially subject to CDFW, RWQCB, and/or USACE jurisdiction. No features had vegetation associated with riparian habitat. Proposed impacts will affect Feature 4a, Feature 5, 7, and 8 (Table 2, Figure 11, Figure 12). All impacts would be from construction of the pipeline; no impacts to jurisdictional drainages are anticipated from construction of the turnout or metering station.

Table 1. Jurisdictional Hydrological Features Delineated within the Survey Area

Location	Feature No.	Type	OHWM		USACE (acres)	CDFW (acres)	RWQCB (acres)
			Width (feet)	Length (feet)			
Mesa Street and Amethyst Road	2	Manmade Pond	110-124	25	N/A	0.06	0.06
Amethyst Road	4a	Discontinuous Ephemeral Stream	1	134	N/A	0.01	< 0.01
Amethyst Road	5	Discontinuous Ephemeral Stream	<1-1	295	N/A	0.08	0.01
Oro Grande Wash	7	Ephemeral Stream	7-38	285	0.10	0.15	0.10
Oro Grande Wash	8	Discontinuous Ephemeral Stream	3	153	N/A	0.01	N/A
Total				***892***	***0.10***	***0.31***	***0.18***

Note: Units are rounded to the nearest whole number for lengths, or to two decimal places for widths and acreages for presentation. The totals are calculated from un-rounded linear feet and acreages, which may differ slightly from the sum of linear feet and acres shown in the table.

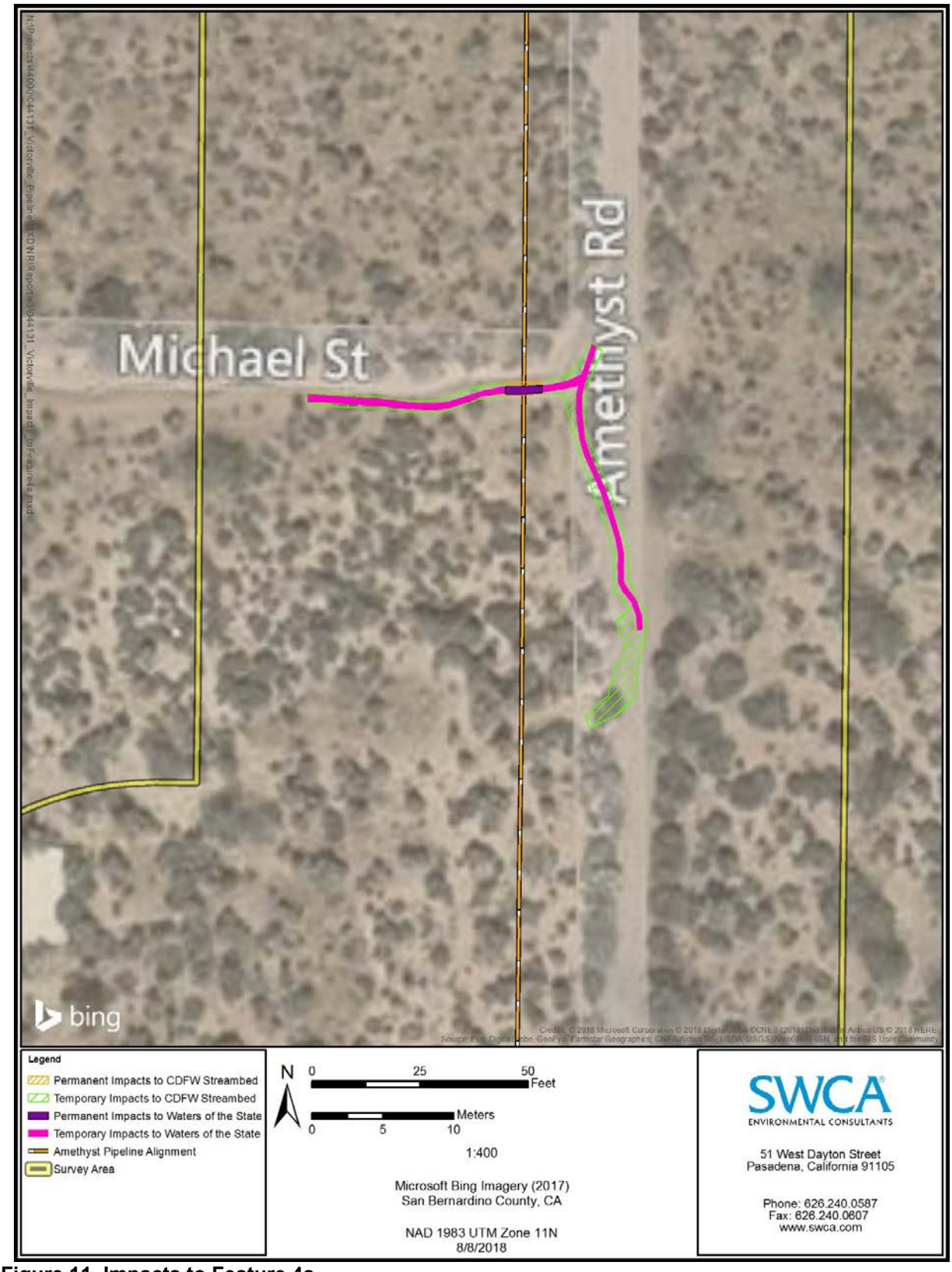

Figure 11. Impacts to Feature 4a.

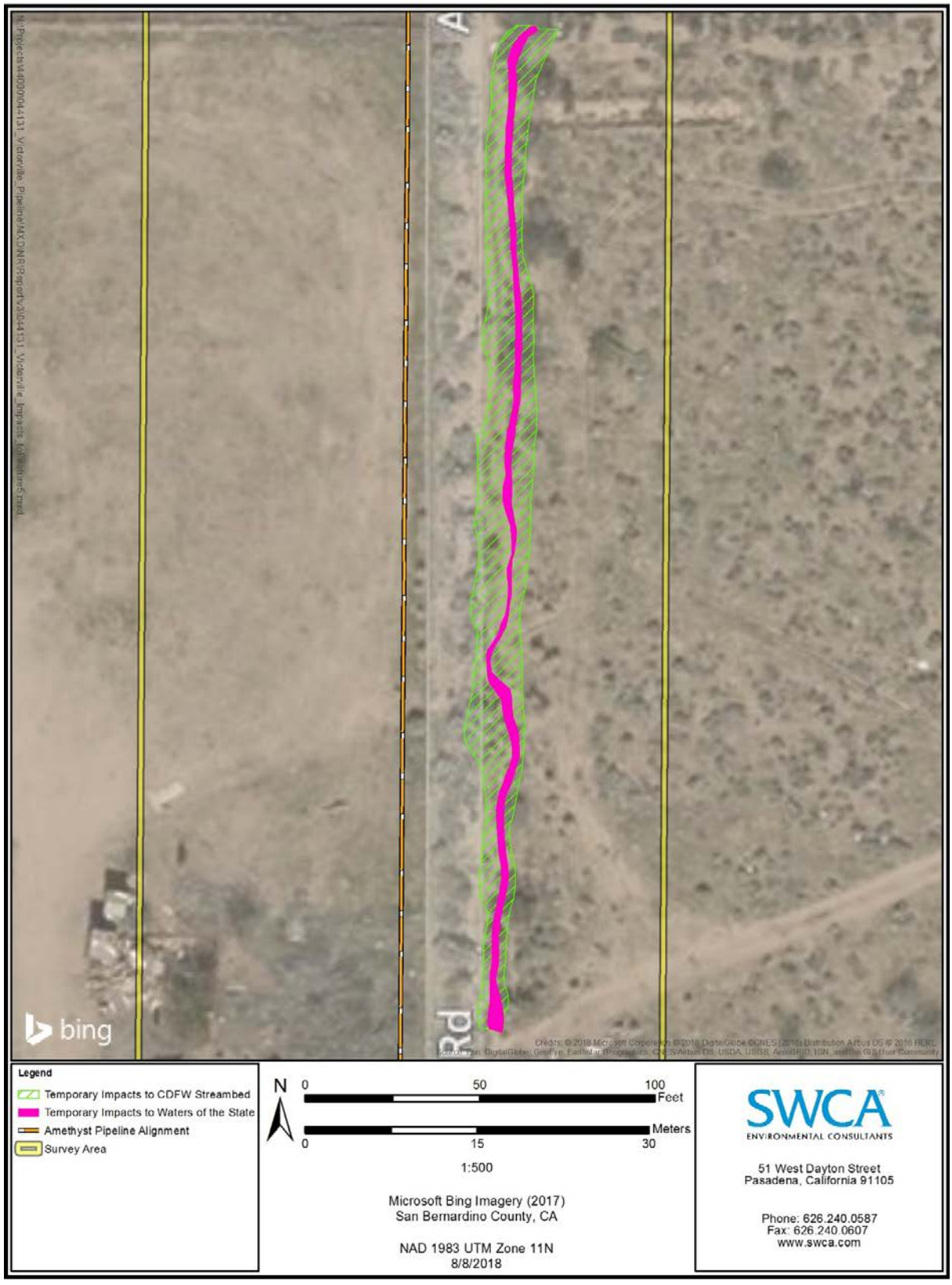

Figure 12. Impacts to Feature 5.

Table 2. Temporary and Permanent Impacts to Potentially Jurisdictional Features in Acres

Feature No.	USACE		RWQCB		CDFW	
	Temporary (acres / feet)	Permanent (acres / feet)	Temporary (acres / feet)	Permanent (acres / feet)	Temporary (acres / feet)	Permanent (acres / feet)
2 (no impacts)	N/A	N/A	0.00 / 0	0.00 / 0	0.00 / 0	0.00 / 0
4a	N/A	N/A	<0.01 / 126	<0.01 / 8	0.01 / 152	<0.01 / 8
5	N/A	N/A	0.01 / 295	0.00 / 0	0.08 / 295	0.00 / 0
7	0.05 / 179	0.01 / 23	0.05 / 179	0.01 / 23	0.08 / 179	0.01 / 23
8	N/A	N/A	N/A	N/A	0.01 / 140	<0.01 / 13
Total	**0.05 / 179**	**0.01 / 23**	**0.07 / 600**	**0.01 / 31**	**0.18 / 766**	**0.01 / 44**

Note: Units are rounded to the nearest whole number for lengths, or to two decimal places for acreages for presentation. The totals are calculated from un-rounded linear feet and acreages, which may differ slightly from the sum of linear feet and acres shown in the table.

5.1 U.S. Army Corps of Engineers Jurisdictional Areas

The USACE asserts jurisdiction over wetland and other waters of the United States; other waters of the United States include the area within the OHWM of each linear feature with a significant nexus to a TNW or interstate commerce. Feature 7 is the only feature potentially subject to USACE jurisdiction that is anticipated to be impacted by the Project. Temporary and permanent impacts are summarized above (see Table 2). The Project is anticipated to qualify for coverage under a Nationwide Permit for impacts to waters subject to USACE if impacts to these drainages are unavoidable.

5.2 California Porter-Cologne Water Quality Act: Waters of the State Determination

The RWQCB asserts jurisdiction over the waters of the State, defined by the area within the OHWM of each of the linear features delineated. RWQCB jurisdictional features in the Survey Area total approximately 0.18 acres. Avoiding impacts to all of these features is unlikely due to their proximity to the Project. Features 4a, 5, and 7 are the only features potentially subject to RWQCB jurisdiction that are anticipated to be impacted by the Project; temporary and permanent impacts are summarized above (see Table 2). A permit under Section 401 of the CWA from the Lahontan RWQCB for discharges of dredged or fill material to waters of the State will be required if impacts to these drainages are unavoidable.

5.3 California Fish and Game Code §§ 1600-1616 Determination

CDFW jurisdictional streambeds and banks in the Survey Area total approximately 0.31 acre (see Table 1). No riparian vegetation bordered these features that would have extended the jurisdictional limits beyond bank-top to bank-top. Avoiding impacts to these features is unlikely due to their proximity to the Project. Temporary and permanent impacts are summarized above (see Table 2). An LSAA from CDFW will be required if impacts to these drainages are unavoidable.

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Appendix A.
Photo Compendium

Photo 1. Feature 1, facing east (downstream) towards Feature 2.

Photo 2. Feature 1, facing west, roadside berm constraining the drainage.

Photo 3. Feature 2, facing east-southeast.

Photo 4. Feature 3, facing north.

Photo 5. Feature 3, facing south.

Photo 6. Feature 3, facing north. Photo is taken of the location where the drainage flows off Amethyst Road.

Photo 7. Feature 3, facing northeast, location where the visible fluvial erosion dissipates.

Photo 8. Feature 4a, facing west. Note the densely growing red brome and the OHWM.

Photo 9. Feature 4a, facing south.

Photo 10. Feature 4a, facing northeast, at the location where the drainage is impeded by a large shrub.

Photo 11. Feature 4b, facing northeast, evidence of OHWM dissipates.

Photo 12. Feature 4b, facing north, location where the drainage terminates due to the road incline.

Photo 13. Feature 5, facing north. Repeated vehicular disturbance may be altering hydrology.

Photo 14. Feature 5, facing north.

Photo 15. Feature 5, facing northwest.

Photo 16. The confluence of Feature 5b (on the right) and Feature 6, facing east.

Photo 17. Feature 7, facing west.

Photo 18. Feature 7, facing northwest. Road within the Amethyst Basin beheads the drainage.

Photo 19. Feature 7, facing south. Small rills are the only source of flow to the abandoned channel.

Photo 20. Feature 7, facing east. The small rills that flow into Feature 7 end as a dry pond.

Photo 21. Feature 7, facing south by southwest.

Photo 22. Feature 8, facing north by northwest.

Photo 23. Feature 8, facing north.

Photo 24. Feature 9 facing south.

Photo 25. Feature 9, facing north.

Photo 26. Feature 10, facing east.

Photo 27. Feature 11 (center) and Feature 12 (left), facing southeast.

Photo 28. Feature 11 (left) and Feature 12 (center), facing northwest.

Photo 29. Conditions of Oro Grande Wash, facing north.

APPENDIX C

Cultural Resources Report

Phase I Cultural Resource Assessment for the Victorville Water District Distribution System Project, City of Victorville, San Bernardino County, California

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Senior Project Manager
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August 2018

National Archaeological Database (NADB)
Type of Study: Literature Search, Intensive Pedestrian Survey
USGS 7.5' Quadrangle: Hesperia, California
Acreage: 14.25- acres
Level of Investigation: CEQA Phase I
Key Words: Victorville; San Bernardino County; CEQA; 14.25 acres surveyed

MANAGEMENT SUMMARY

The Victorville Water District (District) proposes the development of a water connection and pipeline that would transport imported water to seasonal storage via the groundwater aquifer in the City of Victorville, San Bernardino County, California. The Victorville Water District Distribution System Project (hereafter Project) involves construction of a pipeline within Amethyst Road, from the Mojave Water Agency's Turnout No. 5 on Mesa Road to the District's pumping station at Sycamore Street and Amethyst Road. Applied EarthWorks, Inc. (Æ) was retained by Meridian Consultants, LLC to conduct a cultural resource assessment of the Project area in accordance with the California Environmental Quality Act (CEQA). The City of Victorville is the lead CEQA agency for the Project.

This report summarizes the methods and results of the cultural resource investigation of the 14.25-acre Project area. This assessment included a records search and literature review, communication with Native American tribal representatives, and an intensive pedestrian survey. The purpose of the investigation was to determine the potential for the proposed Project to impact historical resources.

The literature and records search at the South Central Coastal Information Center (SCCIC) of the California Historical Resources Information System (CHRIS) indicated that 18 cultural resources have been documented within a 1-mile radius of the Project area. None of these previously identified cultural resources are located within the Project area.

As part of the cultural resource assessment, Æ also requested a search of the Sacred Lands File (SLF) from the Native American Heritage Commission (NAHC), which was completed with negative results. Native American individuals and organizations were contacted to elicit information on Native American resources within the Project area. Of the five groups and/or individuals contacted, responses have been received from the San Manuel Band of Mission Indians (SMBMI), the Twenty-Nine Palms Band of Mission Indians, and the Serrano Nation of Mission Indians.

Æ Archaeologist Ken Moslak performed an intensive pedestrian survey of the Project area on November 1, 2017, and June 26, 2017. One historic-period refuse scatter (CA-RIV-32469H) and one isolated prehistoric mano (36-032485) were identified within the Project area and documented as a result of the survey. These resources were evaluated against California Register of Historical Resources (CRHR) significance criteria and found ineligible for listing. The terrain throughout the entire Project area has been disturbed by previous road grading. Consequently, there is little to no potential for the Project area to contain intact buried cultural deposits. No further cultural resource management of the Project area is recommended.

Field notes documenting the current investigation are on file at Æ's Hemet office. A copy of the final report will be placed on file at the SCCIC.

CONTENTS

TABLES

1
INTRODUCTION

The Victorville Water District (District), a subsidiary district of the City of Victorville (City), proposes the development of a water connection and pipeline that would transport imported water to seasonal storage via the groundwater aquifer in the city of Victorville, San Bernardino County, California. Applied EarthWorks, Inc. (Æ) was retained by Meridian Consultants, LLC, to conduct a Phase I cultural resource investigation of the Victorville Water District Distribution System Project (hereafter Project) in accordance with the California Environmental Quality Act (CEQA). The City is the Lead Agency for the purposes of CEQA. Tiffany Clark, Ph.D., RPA, served as Æ's principal investigator, while Æ Associate Archaeologist Joan George, B.S., served as project manager. Field work was conducted by Æ Associate Archaeologist Ken Moslak.

1.1 PROJECT LOCATION AND DESCRIPTION

The Project area consists of approximately 14.25 acres of land immediately west of Interstate 15 (I-15) within the southern portion of the City (Figure 1-1). Specifically, the Project area is within Sections 1, 2, 11, and 12, Township 4 North, Range 5 West, San Bernardino Baseline and Meridian, as shown on the Hesperia, California 7.5' US Geological Survey (USGS) topographic quadrangle (Figure 1-2). Elevations within the Project area range from approximately 3,263 to 3,334 feet above mean sea level.

The District currently produces potable water through 36 active groundwater wells and relies solely on groundwater for the water source. The proposed water connection will provide Regional Recharge and Recovery (R3) water from the Mojave Water Agency to the City's domestic water network. Approximately 1 mile of 24-inch water pipeline will be installed within Amethyst Road from the Mojave Water Agency's Turnout No. 5 on Mesa Road to the District's pumping station at Sycamore Street and Amethyst Road. At the northern end of the Project, the pipeline extends into Assessor's Parcel Number 307225133 (a City owned property). The Project encompasses a 100-foot-wide corridor, centered along the proposed pipeline route, to account for the area needed to construct the pipeline. The Project includes 3 potential turnout locations at the southern end of the Project area. Construction staging areas will be located at the District's pumping station at Sycamore Street and Amethyst Road and adjacent to the metering station on Mesa Street. The metering station will cover 150 by 150 feet at the northeast corner of the intersection of Mesa Street and Mesa Avenue, within existing public right-of-way. The metering station will include a new masonry block building, electrical water controls including supervisory control and data acquisition (SCADA) communication, and mechanical piping and valves to allow control and measurement of the water flow. A new 120/240V single phase electric service will be included as part of the Project.

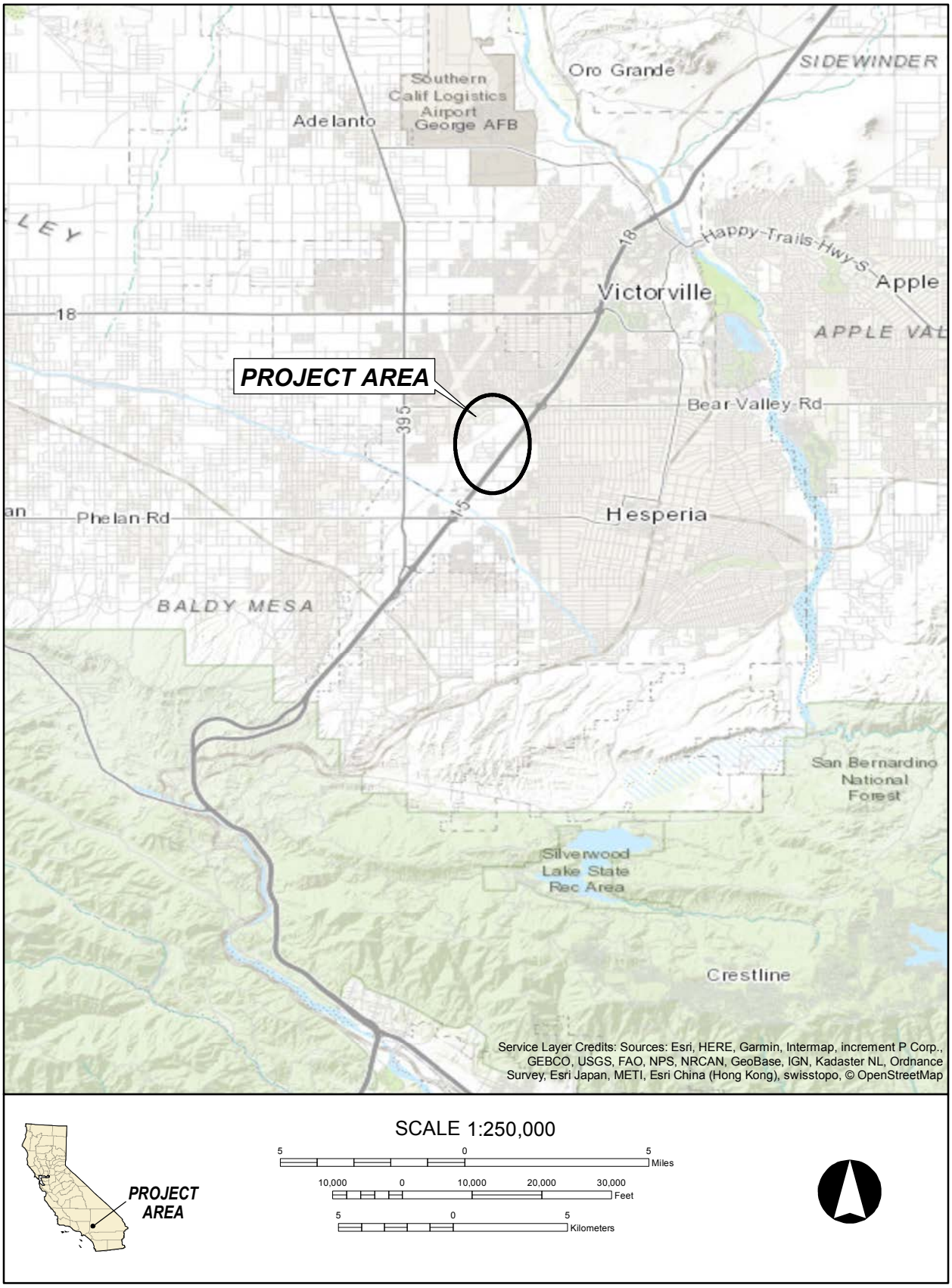


Figure 1-1 Project vicinity map.

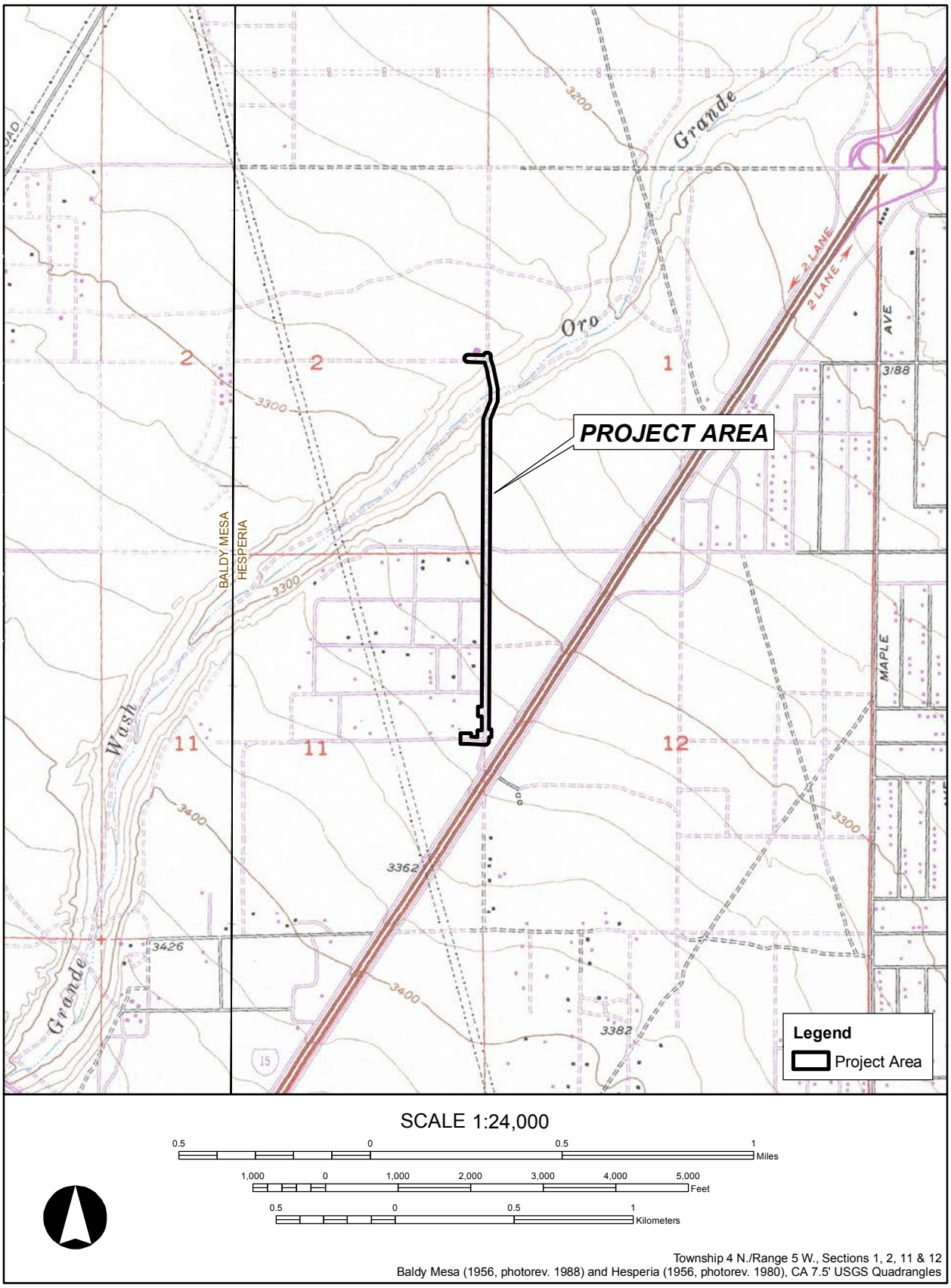


Figure 1-2 Project location map.

1.2 REGULATORY CONTEXT

The Project requires discretionary approval from the City and is therefore subject to the requirements of CEQA. The CEQA Statute and Guidelines direct lead agencies to determine whether a project will have a significant impact on significant historical resources. Generally, a cultural resource shall be considered "historically significant" if it meets the requirements for listing on the California Register of Historical Resources (CRHR) under any one of the following criteria (Title 14, California Code of Regulations [CCR], §15064.5):

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

In the context of projects such as the water infrastructure project, compliance with CEQA's cultural resource provisions typically involves several steps. Briefly, archival research and field surveys are conducted, and identified cultural resources are inventoried and evaluated in prescribed ways. Prehistoric and historical archaeological sites, as well as standing structures, buildings, and objects deemed historically significant must be considered in project planning and development. A project with an effect that may cause a substantial adverse change in the significance of a historical resource is a project that may have a significant effect on the environment (14 CCR § 15064.5[b]).

1.3 REPORT ORGANIZATION

This report documents the results of the cultural resource assessment of the proposed Project. Chapter 1 has described the Project and its location, defined the scope of cultural resource studies, and stated the regulatory context. Chapter 2 summarizes the natural and cultural setting of the Project and surrounding region. Chapter 3 presents the results of the archaeological literature and records search. Chapter 4 summarizes the Sacred Lands File (SLF) search with the Native American Heritage Commission (NAHC) and Native American communications. The field survey methods and results are discussed in Chapter 5. Resource evaluations are included in Chapter 6. Cultural resource management recommendations are provided in Chapter 7, and bibliographic references are cited in Chapter 8. Results of the SLF search and correspondence with Native American groups are included in Appendix A and the California Department of Parks and Recreation (DPR) 523 recording forms are included in Appendix B.

2
SETTING

This chapter describes the prehistoric, ethnographic, and historical cultural setting of the Project area to provide a context for understanding the nature and significance of cultural properties identified within the region. Prehistorically, ethnographically, and historically, the nature and distribution of human activities in the region have been affected by such factors as topography and the availability of water and natural resources. Therefore, prior to a discussion of the cultural setting, the environmental setting of the area is summarized below.

2.1 ENVIRONMENTAL SETTING

The Project area is on the west side of the Mojave River in the Victor Valley. For the most part, this part of the western Mojave Desert is hydrated by a playa system consisting of three primary lakebeds—Rosamond, Rogers, and Buckhorn—surrounded by a number of smaller playas. The three larger playas lie within Edwards Air Force Base. Today these lakebeds are usually dry, only occasionally covered in water following large winter storms. The principal drainage in Victor Valley, as well as the western Mojave Desert, is the Mojave River, which drains the San Bernardino Mountains and flows north and east to Soda Lake, near Baker, California. During the last glacial maximum in the late Pleistocene, the Mojave River flowed further north, merging with the Amargosa River and ultimately flowed into Death Valley and Lake Manly. At one time, this drainage system included Lake Manix and Lake Mojave. Lake Manix encompassed Afton, Troy, Coyote, Harper, and Cronese basins; Lake Mojave included the Soda Lake and Silver Lake basins (Parsons 2004:15).

The western Mojave Desert lies in the rain-shadow of the Sierra Nevada, Tehachapi Mountains, San Gabriel Mountains, and the San Bernardino Mountains. Its mid-latitude, desert climate features cool, slightly moist winters and dry, hot summers. Temperatures range from well below freezing in the winter to 100 to 110 degrees Fahrenheit in the summer. The rainfall in Victorville averages 5.48 inches annually, most of which occurs during the months of December through April, while some isolated thunderstorms may occur in July and August. Humidity is generally extremely low except during the brief period of thunderstorms during the summer months of July and August.

2.2 PREHISTORIC SETTING

The prehistoric cultural chronology for the general Project area is based primarily on the work of Claude N. Warren (1980, 1984; Warren and Crabtree 1986). Warren's framework for human history in the Mojave Desert divided prehistory into five distinct archaeological periods associated with changes in climate during the terminal Pleistocene and Holocene epochs: the Lake Mojave, Pinto, Gypsum, Saratoga Spring, and Shoshonean (or Late Prehistoric) periods. Claims have also been made for archaeological assemblages predating Lake Mojave, but as Warren and Crabtree (1986) note, all are controversial and, even if valid, have little or no relationship to later cultural developments in the region.

Sutton et al. (2007) recently expanded on Warren (1984) to include elements more closely aligned to prehistoric cultural complexes of the Central Mojave Desert. They employ the term "complex" to emphasize cultural rather than temporal association, deferring temporal association to the term "period," which they associate with geologic time. Subdivisions of the Mojave Desert cultural framework proposed by Sutton et al. (2007) include hypothetical Pre-Clovis and Paleo-Indian complexes, and the Lake Mojave, Pinto, Dead Man Lake, Gypsum, Rose Spring, and Late Prehistoric complexes. Both cultural sequences emphasize increasing population density over time, a gradual shift from foraging to collecting subsistence strategies accompanied by expanding dietary niches, settlement and land use systems that responded to sometimes extreme climatic shifts, and technological and social innovations that allowed more efficient acquisition and use of a wide range resources.

2.3 ETHNOGRAPHIC SETTING

The Project area is within traditional Serrano territory. Altschul et al. (1989) have provided a useful overview of Serrano land-use patterns, social organization, and early historical interactions. More detailed ethnographic information is supplied by Strong (1929), Gifford (1918), Kroeber (1925), and Bean and Smith (1978). The reader is referred to these documents for specific information on Native American cultures of the western Mojave Desert.

2.4 HISTORICAL SETTING

The historical background of the Upper Mojave River and adjacent San Bernardino Mountains is best presented by adhering to the familiar divisions of local history, which have become standardized in the area literature. Beginning with the Spanish (Mission) Period in 1771, the progression moves rapidly through the poorly documented Mexican (Rancho) Period into American (Anglo) times. In the following discussion, important historical events during these periods are summarized with a more detailed discussion of the historical developments in the immediate Project vicinity.

2.4.1 Spanish Exploration and Mission Period: 1771–1821

The earliest significant moment in the recorded history of the area was the arrival of Portola's former Lieutenant Pedro Fages who, as military governor, accompanied an expedition from San Diego in pursuit of deserters from the Presidio. Fages kept a journal which recorded that the party traveled along the west side of the San Jacinto Mountains to what is now Riverside, continued north into the San Bernardino Valley, and then crossed into the Mojave Desert by way of the Cajon Pass. The record of Fages' transit across the Mojave Desert in 1772 is the first written account of the area to have survived into modern times.

In the early 1800s, the Spanish increased their efforts to incorporate Native Americans into the mission system. As part of this endeavor, a series of explorations was undertaken into the Californian interior to identify possible locales for a chain of inland missions, which would run parallel to the coast chain (Berger 1941). One of these expeditions in 1806 was led by Father Zalvidea, who traveled through the Antelope Valley and recorded his visit to the Serrano villages of Amuscopiabit (Moscopiabit) and Guapiabit (Beattie and Beattie 1939:4).

2.4.2 Mexican (Rancho) Period: 1821–1848

During the period of Mexican rule (1821–1848), the Upper Mojave River region appears to have remained relatively outside the Hispanic frontier. The closest Hispanic settlement was the San Bernardino Asistencia mission outpost, which had been established at the Guachama Ranchería in 1819 in the adjacent San Bernardino Valley. During the 1820s and early 1830s, the San Bernardino Asistencia was active, functioning as rancho headquarters. In October 1834, the Paiutes attacked San Bernardino Asistencia, killing Christianized Indians and taking stored grain and altar vessels. They returned in December 1834, burned buildings, and took Father Esteneza hostage. This last attack, coupled with the decree of secularization, dealt the final blow to San Bernardino Asistencia; it was abandoned shortly thereafter.

Beginning in 1829, Mexican traders from New Mexico used Summit Valley and Crowder Canyon as a passageway to the Los Angeles basin and thus established what is now called the Old Spanish Trail. Anglo-American trappers and traders emanating from Taos, New Mexico (including Kit Carson), also used the route beginning in 1829. Spurred on by the demand for California mules, this trail served as a major pack train route until the end of the Mexican period with the 1846 war with Mexico (Speer 1980:5).

The unsettled political condition of California during the 1820s and 1830s was in part due to the turmoil in Mexico in the wake of the revolution. Most disturbing in California were the decrees issued by the Mexican authorities for the secularization of the mission system. The Indians were "liberated" by decree in 1826, followed by orders for the withdrawal of the Franciscans a few years later (Elliot 1883:27). On August 17, 1833, the Mexican Congress passed the Secularization Act, which placed all mission property into the hands of civil administrators. The former Mission Indians became the most vulnerable victims in the resulting shuffle and land grab, and their numbers were rapidly decimated by disease and culture shock.

2.4.3 American Period: 1848–1950s

Developments in the middle Mojave River Valley during the American period are closely tied to its location along a major travel corridor. As discussed above, this area was used as a trade route during both the prehistoric and early historic periods. After the Mormons colonized Utah in the mid-1800s, Salt Lake City gradually supplanted Santa Fe as a destination of commerce. The Old Spanish Trail became a favored route for Mormon settlers traveling from the Great Salt Lake to the San Bernardino area of Southern California, thus becoming known as the "Mormon Trail." In the early 1860s, a stagecoach station was established in the site; the station was subsequently burned by the Paiute Indians in 1863.

A great impetus to growth in the area was the arrival of the California Southern Railroad. A subsidiary of the Atchinson, Topeka, and Santa Fe (Santa Fe) Railway, the California Southern Railway Company began construction of a line from San Diego to Barstow in 1881. A rail station was established at Point of Rocks in 1885 to provide water for the steam engine locomotive moving trains across the Mojave Desert. In 1897, the name of the station was changed to Helen in honor of a daughter of a Santa Fe Railroad executive (Stickel and Weinman-Roberts 1980:163). The community was subsequently renamed Helendale in 1918.

During the late nineteenth century and early part of the twentieth century, the middle Mojave River Valley was also the scene of mining activity. From 1885 through 1900, the wetter and more southwesterly areas of the Mojave Desert experienced a cycle of boom and bust in pioneer settlement. Following the extension of rail transport to the desert in the 1870s and 1880s, attempts were made to establish agricultural communities in several desert regions. The most important of these were the Antelope Valley and the upper Mojave River Valley (Earle 1992, 1998:43–67; Thompson 1929:290–297, 381–384). In both of these regions, before the 1880s, stock grazing had been the principal agricultural activity.

As settlement activity increased in middle Mojave River Valley, lands that had once been used for cattle grazing were transformed for use as farms and orchards. Agrarian, mining, and commercial activities spurred the growth of Victorville and the neighboring communities of Apple Valley, Lucerne Valley, Hesperia, Adelanto, Oro Grande, and Helendale. The discovery of large deposits of limestone and granite in the 1910s and the construction of the Southwestern Portland Cement Company plant in 1917 solidified cement manufacturing as a major industry in Victor Valley.

A further impetus to growth in the middle Mojave River Valley was the paving of the National Trails Highway, which later became U.S. Route 66, in the late 1920s. The highway paralleled the Santa Fe Railway from Victorville to Barstow passing through both Oro Grande and Helendale. Access to the transcontinental highway strengthened the region's industrial and commercial base and brought increased settlement.

3
CULTURAL RESOURCE LITERATURE AND RECORDS SEARCH

On September 20, 2017, prior to the field survey of the Project area, Æ conducted an archaeological literature and records search at the South Central Coastal Information Center (SCCIC) of the California Historical Resource Information System (CHRIS), housed at the California State University, Fullerton. The objective of this records search was to determine whether any prehistoric or historical cultural resources had been recorded previously within a Study Area encompassing a 1-mile radius of the Project area. The records search indicated that no less than 33 cultural resource studies have been conducted between 1976 and 2016 within the Study Area (Table 3-1). Five of these studies specifically involved a portion of the Project area (Table 3-1). Approximately 70 percent of the Project area has been surveyed previously as a result of these studies.

Table 3-1
Previous Cultural Resource Studies in the Study Area

SCCIC Document #	Date	Author(s)	Title
SB-00372	1976	Harris, Ruth D.	Archaeological/Historical Resources Assessment of Approximately 52 Acres West of Interstate 15 and South of Bear Valley Cut-off, Sect. 1, T4N/R5W
SB-00602	1978	Hearn, Joseph E.	Archaeological/Historical Resources Assessment of the SE 1/4 of Sect. 3 and the SW 1/4 of Sect. 2, both in T4N/R5W, SBBM, Baldy Mesa Area
SB-00612	1978	San Bernardino County Museum Association	An Archaeological/Historical Assessment for the Proposed System Improvements for a Water System Master Plan for Victor Valley County Water District
SB-00623	1978	Smith, Gerald A. and La Verna A. Brown	An Archaeological/Historical Assessment for the Amendment to the General Plan for Land Use in the Hesperia-Baldy Mesa Area
SB-00986	1980	Reynolds, Robert E.	Baldy Mesa Water Lines, Cultural Resources Assessment
SB-01439	1984	Scientific Resource Surveys, Inc.	An Archaeological Survey of a Parcel of Land in the City of Victorville, San Bernardino County, California, to be Developed as "Bear Valley Mall"
SB-02202	1990	McKenna, Jeanette A.	A Phase I Archaeological Investigation of Proposed Water Pipeline Routs and Reservoir/Pumping Locations, in the Baldy Mesa/Phelan Area, San Bernardino County, California
SB-03165	1996	Jertberg, Patricia	L.A. Cellular Site 861.1
SB-03436	1998	Brechbiel, Brant	Cultural Resource Records Search and Survey Report for PBMS Telecommunications Facility: CM 393-01
SB-03438	2000	Love, Bruce	Lowe's Home Improvement Warehouse Project
SB-03958	2004	Kielusiak, Carol	Archaeological and Historical Resource Survey and Evaluation: City of Victorville's Bear Valley Road Improvement Project – Two Park and Ride Facility Site Options

Table 3-1 (continued)
Previous Cultural Resource Studies in the Study Area

SCCIC Document #	Date	Author(s)	Title
SB-03979	2003	Hogan, Michael	Archaeological/Paleontological Monitoring of Earth-Moving Activities, Amargosa Rd, Pads 6 and 7 for the Dunia Plaza Development Project, City of Victorville, San Bernardino County, CA
SB-04412	2004	Cerreto, Richard and Christy Malan	Cultural Resource Assessment for a 1.5 Acre Parcel in the City of Victorville, San Bernardino County, CA
SB-04575	2005	Austerman, Virginia and Kenneth M. Becker	Cultural Resources Survey of the Feole Property, APN: 0405-052-02, Hesperia, San Bernardino County, California
SB-04790	2006	Jacquemain, Terri, Hruby, Zachary X., and Josh Smallwood	Historical/Archaeological Resources Survey Report: Tentative Tract Map No. 17916, In The City of Hesperia, County of San Bernardino, California
SB-04791	2006	Jacquemain, Terri and Josh Smallwood	Historical/Archaeological Resources Survey Report: Tentative Tract Map No. 17915, in the City of Hesperia, San Bernardino County, California
SB-04975[a]	2005	Wetherbee, Matthew	Historical/Archaeological Resources Survey Report: Baldy Mesa Water District Arsenic Treatment Project, Cities of Victorville and Hesperia, San Bernardino County, California
SB-05217	2004	Malan, Christy and Richard Cerreto	Cultural Resources Assessment for APN 3093-141-01, City of Victorville, San Bernardino County, California
SB-05218	2005	White, Robert and Laura White	A Cultural Resources Assessment of TT 17243, a 30-Acre Parcel located Northeast of the Intersection of Topaz avenue and Mesa Street, City of Hesperia, San Bernardino County, California
SB-05219	2006	Tang, Bai, Michael Hogan, Josh Smallwood, and Laura Hensley Shaker	Historical/Archaeological Resources Survey Report, Baldy mesa Water District Well Sites and Pipeline Project, City of Victorville, San Bernardino County, California
SB-05244	2006	Budinger, Fred E.	An Archaeological Assessment of the Proposed Verizon Wireless Lockwood Unmanned Cellular Telecommunications Site, Victorville, San Bernardino County, California
SB-06859	2010	Tang, Bai "Tom", Terri Jacquemain, Daniel Ballester, and Harry Quinn	Identification and Evaluation of Historic Properties: Town of Apple Valley and City of Hesperia Wastewater Reclamation Plants and Related Facilities Project, Victor Valley Area, San Bernardino County, California.
SB-06957	2011	Perez, Don	Archaeological Sensitivity assessment, LA5613A, Victor Valley RV AT&T Colo, 11500 Mariposa Road, Hesperia, San Bernardino County
SB-07081 [a]	2010	Gust, Sherri	Cultural Resources Assessment for the Mojave Water Agency Oro Grande Wash Recharge (OGWR) Project, San Bernardino County, CA
SB-07118	2011	Said, Arabesque, Michael Dice, and Kenneth J. Lord	Phase I Cultural Resource Survey St. Mary Medical Center-Oasis Project, City of Victorville, San Bernardino County, California
SB-07156 [a]	2011	Tang, Bai "Tom", Daniel Ballester, and Nina Gallardo	Historical/Archaeological Resources Survey Report: Water Supply System Improvement Projects, Fiscal Years 2010/2011-2014/2015, Victorville Water District, San

Table 3-1 (continued)
Previous Cultural Resource Studies in the Study Area

SCCIC Document #	Date	Author(s)	Title
			Bernardino County, California
SB-07402	2012	Bonner, Wayne H. and Sarah A. Williams	Cultural Resource Records Search Results for Verizon Wireless Candidate "Mesa Street", Unaddressed Parcel, APN: 0405-331-22-0000, Victorville, San Bernardino County, California
SB-07481	2012	Hogan, Michael, Bai "Tom" Tang, Terri Jacquemain, Daniel Ballester, and Harry Quinn	Identification and Evaluation of Historic Properties: Town of Apple Valley Force Mains and Percolation Basins Project and City of Hesperia Recharge Basins and Lift Station Project, Victor Valley Area, San Bernardino County, California.
SB-07494	2013	Clark, Fatima V. and Dave Hanna	G.O. 131-D Victor-Aqueduct-Phelan 115kV Replacement Project
SB-07495 [a]	2011	Gust, Sherri and Molly Valasik	Cultural Resource Assessment for the Mojave Water Agency Groundwater Regional recharge and Recovery (R3) Project, San Bernardino County, California
SB-07496 [a]	2012	Gust, Sherri and Courtney Richards	Monitoring Compliance Report for Construction of the Mojave Water Agency Regional Recharge and Recovery (r3) Project, San Bernardino County, California
SB-07840	2014	Tang, Bai "Tom"	Addendum to Identification and Evaluation of Historic Properties: Town of Apple Valley Force Mains and Percolation Basins Project and City of Hesperia Recharge Basins and Lift Station Project, Victor Valley Area, San Bernardino County, California.
SB-08260	2016	McKenna, Jeanette A.	A Phase I Cultural Resources Investigation of the Proposed Pathways to College Charter School, City of Hesperia, San Bernardino County, California

a- Studies that involved portions of the Project area

These studies resulted in the identification and documentation of 18 cultural resources within the Study Area: 12 archaeological sites, 3 isolated artifacts, and 3 built-environment resources (Table 3-2). These include 12 historical archaeological resources (9 refuse scatters, 2 can scatters, and an abandoned single-family residence), 3 isolated artifacts (a prehistoric hammerstone; historical amethyst glass fragments and metal can; and a historical amethyst glass fragment), and 3 built-environment resources. Two of the built-environment resources (36-010315 and 36-010316) are electrical transmission lines and have been previously determined eligible for listing on the National Register of Historic Places (NRHP) and the CRHR. The third built-environment resource is a historic-period object, known as Hula Ville (36-015472). This resource has been designated a California Historic Landmark (No. 939) and as such is automatically listed on the CRHR. According to the site record, the resource was dismantled and relocated in 1996 to the California Route 66 Museum in Victorville (Arabesque 2011). None of the 18 previously documented cultural resources are located within the current Project area.

Other sources consulted during the archaeological literature and records search include the Office of Historic Preservation Archaeological Determinations of Eligibility and the Office of Historic Preservation Directory of Properties in the Historic Property Data File.

Table 3-2
Cultural Resources in the Study Area

Primary	Trinomial	Resource Type	Description
36-007742	CA-SBR-7742H	Site	Historical refuse scatter
36-007743	CA-SBR-7743H	Site	Historical refuse scatter
36-007744	CA-SBR-7744H	Site	Historical refuse scatter
36-010315	CA-SBR-10315H	Built Environment	Boulder Dam-San Bernardino 115 kV Transmission Line
36-010316	CA-SBR-10316H	Built Environment	Kramer-Victor 115 kV Transmission Line
36-015472	—	Object	Historic Hula Ville (California Historic Landmark No. 939); relocated in 1996
36-021285	—	Site	Historical can scatter
36-021286	—	Site	Historical refuse scatter
36-021287	—	Site	Historical refuse scatter
36-021288	—	Site	Historical refuse scatter
36-021299	—	Site	Historical can scatter
36-021300	—	Site	Historical refuse scatter
36-021381	CA-SBR-13733H	Site	Historical refuse scatter
36-024900	—	Site	Abandoned 1950s single-family residence
36-029912	CA-SBR-29912H	Site	Refuse associated with the William Seacord Homestead, circa1917
36-060831	—	Isolated Artifact	Prehistoric quartzite hammerstone
36-060846	—	Isolated Artifact	Amethyst glass fragments and hole-in-cap can
36-060847	—	Isolated Artifact	Amethyst glass fragment

Finally, Æ consulted a series of archival maps to assess historical land-use development in the Study Area. These maps include the 1902 Hesperia 1:62,500 USGS Quadrangle, the 1942 Hesperia 1:62,500 US Army Corps of Engineers War Department map, and the 1956, 1968, and 1980 Hesperia 1:24,000 USGS Quadrangles, and the 1953 and 1966 San Bernardino 1:250,000 USGS Quadrangles. In addition, historic aerial photographs (NETR Online 1952, 1968) were examined to identify the presence/absence of potential historical structures or buildings within the Project area. These maps depict the original alignment of the historical National Trails Highway, which later became U.S. Route 66, just west of the Project area. No structures or features of interest were noted within or near to the Project area on any of these historical maps.

4
NATIVE AMERICAN COMMUNICATION

Æ contacted the NAHC on September 15, 2017 for a review of the SLF to determine if any known Native American cultural properties (e.g., traditional use or gathering areas, places of religious or sacred activity) are present within or adjacent to the Project area. The NAHC responded on September 20, 2017, stating that no such properties are shown in the SLF. The NAHC requested that local Native American individuals and organizations be contacted to elicit information and/or concerns regarding cultural resource issues related to the proposed Project. A letter describing the Project and asking these individuals and organizations for their input was sent via United States Postal Service (USPS) and electronic mail on November 6, 2017. A copy of the letters sent, the list of contacts, and responses received are included in Appendix A. A second attempt at correspondence was made on November 20, 2017.

Individuals/organizations contacted at the request of the NAHC include:

- Denisa Torres, Cultural Resources Manager for the Morongo Band of Mission Indians
- John Valenzuela, Chairperson of the San Fernando Band of Mission Indians
- Jessica Mauck, Cultural Resources Analyst for the San Manuel Band of Mission Indians (SMBMI)
- Goldie Walker, Chairperson of the Serrano Nation of Mission Indians
- Anthony Madrigal, Tribal Historic Preservation Officer (THPO) for the Twenty-Nine Palms Band of Mission Indians

As of February 13, 2018, three responses have been received. The SMBMI noted that the proposed Project is located within Serrano ancestral territory and, as such, is of interest to the Tribe. SMBMI recommended testing adjacent to the Oro Grande Wash to rule out the presence of subsurface cultural material. However, after review of the geotechnical study for the project site, the SMBMI concluded that no further archeological field work is recommended. In addition, SMBMI requested a copy of the records search results and a copy of the cultural resource report.

The Twenty-Nine Palms Band of Mission Indians is not aware of any cultural resources or Tribal Cultural Resources within the Project area. The THPO will request a copy of the completed cultural resource report from the City and provide additional Project recommendations directly to the City. The Serrano Nation of Mission Indians requested to be notified if any cultural resources are identified during Project implementation. The Tribe also requested a copy of the completed cultural resource report. A table of responses summarizing consultation with Native American groups and/or individuals consulted is in Appendix A.

5
CULTURAL RESOURCE SURVEY METHODS AND RESULTS

5.1 SURVEY METHODS

Æ Staff Archaeologist Ken Moslak performed an intensive pedestrian archaeological survey of the Project area on November 1, 2017 and June 26, 2018. The area was inspected by walking a set of survey transects along the Project alignment. Survey transects ranged from 10 to 15 meters (33–50 feet) apart. The 3 potential turnout locations at the southern end of the Project area were surveyed at 5 to7 meter (17–23 feet) transect intervals.

The Project area is relatively level, sloping down slightly to the north. The area is dominated by Mojave creosote bush scrub vegetation that includes California buckwheat, creosote, ephedra, rabbit brush, bladderpod, mustard, beavertail cactus, fiddleneck, unidentified annual grasses, and sparse Joshua trees (Figure 5-1). Sediments consist of gravelly coarse sands that contain a low-to-moderate density (10–25 percent) of naturally occurring, poorly sorted angular to subrounded granitic and quartz gravels.

Figure 5-1 Project overview, facing south.

5.2 SURVEY RESULTS

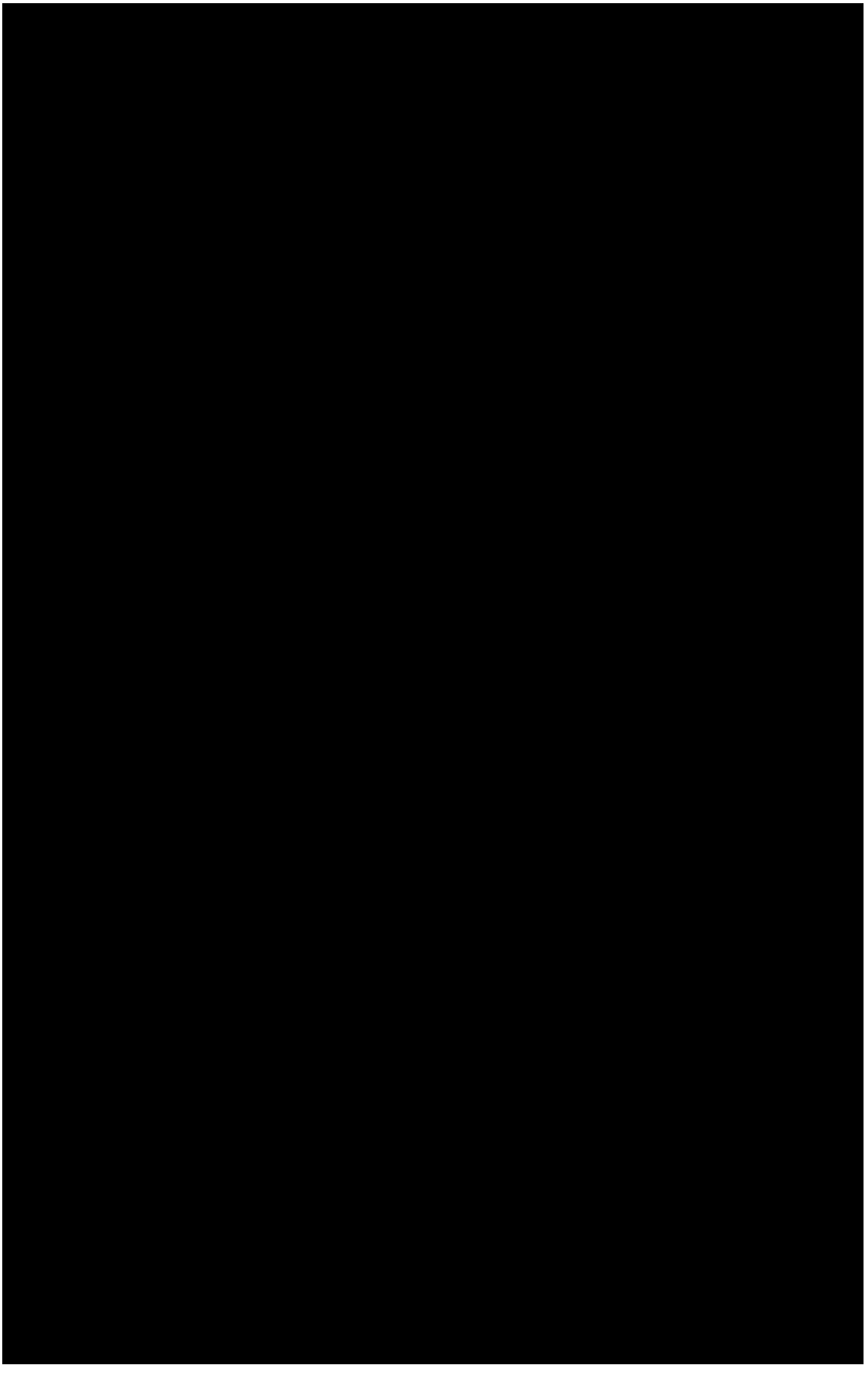
The Project is within an unpaved segment of Amethyst Road which, according to historical maps, was established between 1968 and 1980. Amethyst Road between Mesa Street and Gabriel Road was apparently abandoned shortly after it was established and is now covered in vegetative regrowth. Other disturbances noted during the survey include modern refuse. Although Amethyst Road partially obscured the ground surface in portions of the Project area, visibility was generally good (60 percent). It should be noted that the parcel at the northern end of the Project area was recently fenced in and bulldozed prior to the survey. The fence runs approximately 33 feet west of and parallel to the parcel's eastern boundary. The portion outside the fence appears to be impacted by vehicle and machinery traffic along the edge of the fence.

Two newly identified cultural resources, a mid-twentieth century refuse scatter CA-RIV-32469H (36-023469) and a prehistoric isolated mano (36-032485), were encountered within the Project area during the pedestrian survey (Figure 5-2). These resources are briefly described below.

5.2.1 Historic Refuse Scatter CA-RIV-32469H (36-023469)

A mid-twentieth century refuse scatter was encountered within the Project area during the pedestrian survey. [redacted] The area in and around the artifact concentration has been extensively impacted by mechanical grading activities and is in poor condition with nearly all cans crushed and all other items in a fragmentary condition. All material within the concentration was observed on the surface and examination of the scatter suggested there was no subsurface component. This discrete concentration appears to be the result of a single dumping event. Although the age of the site is not certain, date ranges on the temporally diagnostic items cover the early to mid-twentieth century. The following artifacts were documented at Æ-3763-1H:

- Nine crushed sanitary-seam food cans, rotary opened, approximately 3 by 4 inch (1904-P; Simonis 1997)
- Two 12-ounce church key-opened beverage cans (1935–1970s; Maxwell 1993)
- Two vent-hole milk cans, 2 15/16 by 3 15/16 inch (1930–1975; Simonis 1997)
- One sanitary-seam food can, rotary opened, 3 3/8 by 4 1/2 inch
- One sanitary-seam food can, rotary opened, 3 by 4 1/2 inch
- One rectangular hole-in-cap, key-opened meat can lid, 2 1/2 by 3 1/8 inch (1800–1920s; Simonis 1997)
- One 1-gallon paint can lid, 6 1/4-inch diameter, embossed "STIR THOROUGHLY/ONE GALLON"
- One 1-pound key-opened coffee can (1903-1960s; Lansford and Mills 2006)
- Eight unidentified sheet metal scraps, various sizes
- Two fragments of braided wire strips, function unknown
- Several nails and wire fragments
- Five 1/4-inch diameter carbon battery cores
- Three 3/16-inch diameter carbon battery cores



- One white earthenware tea/coffee cup fragment with rose decal on rim
- One fragmentary green glass serving dish with Hazel-Atlas maker's mark, square, 4 1/8 by 4 1/8 by 15/16 inch (1902–1964; Toulouse 1971:239)
- One fragment of aqua flat glass

This refuse deposit is on the side of Amethyst Road. Æ conducted archival research on the area and surrounding parcels to determine if the refuse scatter could be associated with a particular place or person (Assessor's Parcel Numbers 307225133, 307225134, and 307219112). All three adjacent parcels are privately owned and are currently vacant (County of San Bernardino Assessors Office 2017).

Township 5 N, Range 5 West, Section 1 was owned by the Southern Pacific Railroad beginning in 1866 (United States Congress 1866:5). The railroad owned the land for more than a century before the area was subdivided into public and private parcels in the 1960s. There are no records that indicate any infrastructure or land use for the parcels bounding the site. Historic USGS Quadrangles of the area and region further indicate that Amethyst Road was developed in the late 1970s and the surrounding properties and neighborhoods in the 1980s (USGS 1902, 1942, 1953, 1956, 1958, 1959, 1966, 1968, 1980, 1982).

5.2.2 Prehistoric Isolated Artifact (36-032485)

A single isolated artifact was also indentified within the Project area during the pedestrian survey. The artifact is a unifacial mano derived from an unshaped granitic stream-rounded cobble measuring 15.3 by 10.3 by 7.7 centimeters (Figure 5-4). The mano is complete and in good condition with moderate use wear on one relatively flat face. Large stream-worn granitic cobbles were not observed in the vicinity and it is likely that it was transported from some unknown distance.

6
SIGNIFICANCE EVALUATION

As part of this study, Æ evaluated the significance of site CA-RIV-32469H a historic-period archaeological site that may be impacted by the Project. This historical refuse scatter consists of a small concentration of artifacts that range in age from the early to mid-twentieth century. The site appears to be the result of a single dumping event. The isolated find (36-032485) lacks immediate cultural context and therefore lacks the data potential that would be required to be considered eligible for CRHR inclusion.

The archival research found no clear association between the refuse scatter and documented historical land-use practices. The railroad owned the land for more than a century before the area was subdivided into public and private parcels in the 1960s. There were no structures on the property prior to it passing into private ownership and there currently are no structures on the property. CA-RIV-32469H appears to be the result of a single isolated dumping episode of unknown origin. The refuse contained in this deposit dates to the early to mid-twentieth century and generally represents household refuse (e.g., beverage and food cans and bottles, household product bottles, a paint can, and other hardware). Therefore, the artifacts found within this scatter do not reveal any new information about the town of Victorville, its residents, or the larger region. With no direct association with important historical events or persons, the site is not significant under CRHR Criteria 1 or 2.

The site does not embody distinctive characteristics of a type, period, or method of construction; represent the work of a master; possess high artistic value; or represent a significant and distinguishable property. Refuse scatters of this type and vintage are frequently found along the sides of roads and highways in the rural and semi-rural desert areas of southern California, and there is nothing unique or unusual about this particular deposit. Thus, the site is not significant under CRHR Criterion 3.

Furthermore, this site is unlikely to yield information important to the study of local, state, or national history (CRHR Criterion 4). The scatter is limited to the surface and does not appear to have a subsurface component. In addition, the information gained from the field recording has obtained the limited data from this site. It is unlikely that further analysis of the historic-period refuse found at this site would yield any additional information that is likely to answer research questions regarding chronology, consumerism, and human behavior. As such, CA-RIV-32469H is not eligible for listing on the CRHR.

7
MANAGEMENT RECOMMENDATIONS

The cultural resource assessment identified one historical archaeological site CA-RIV-32469H and one prehistoric isolated mano (36-032485) within the Project area. Isolated artifacts, by definition, lack the data potential that would be required to be considered eligible for CRHR inclusion. An evaluation of the historical archaeological site suggests that the resource does not meet any criteria for listing on the CRHR; therefore no further management of CA-RIV-32469H is recommended at this time

Because the terrain throughout the entire Project area has been disturbed by previous road grading and other activities, it is unlikely that buried archaeological remains are present; therefore, no further cultural resource management of is recommended. It should be noted that the Serrano Nation of Mission Indians requested to be notified if any cultural resources are identified during Project implementation. In addition, the SMBMI recommended similar management recommendations as those described below.

In the event that potentially significant archaeological materials are encountered during construction, all work must be halted in the vicinity of the discovery until a qualified archaeologist can visit the site of discovery and assess the significance of the find. If significant archaeological remains are encountered, the impacts of the Project must be mitigated appropriately. Any such discoveries, and subsequent evaluation and treatment, should be documented in a cultural resource monitoring and treatment report, which should be submitted to the SCCIC for archival purposes. Additionally, Health and Safety Code Section 7050.5, CEQA Guidelines Section 15064.5(e), and Public Resources Code Section 5097.98 mandate the process to be followed in the unlikely event of an accidental discovery of human remains in a location other than a dedicated cemetery.

Finally, if the Project is expanded to include areas not covered by this survey or other recent cultural resource studies, additional cultural resource studies may be required.

8
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1959 San Bernardino, California (1:250,000).

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APPENDIX A

Native American Communication

LIST OF NATIVE AMERICAN CONTACTS AND RECORD OF RESPONSES

Name	Date & Time of Calls	Responses
Denisa Torres Cultural Resource Manager Morongo Band of Mission Indians	November 6, 2017 November 20, 2017	Scoping letter sent via email. E-mailed follow-up effort for correspondence. No response received.
John Valenzuela Chairperson San Fernando Band of Mission Indians	November 6, 2017 November 20, 2017	Scoping letter sent via email. E-mailed follow-up effort for correspondence. No response received.
Jessica Mauck Cultural Resources Analyst San Manuel Band of Mission Indians (SMBMI)	November 6, 2017 November 7, 2017 February 13, 2018	Scoping letter sent via email. Received immediate email response from Ms. Mauck. The Tribe noted that the proposed Project is within Serrano ancestral territory and, as such is of interest to the Tribe. SMBMI recommended testing adjacent to the Oro Grande Wash to rule out the presence of subsurface cultural material. In addition, SMBMI requested a copy of the records search results and a copy of the cultural resource report. A copy of the records search results was sent to Ms. Mauck and, once the report is complete, a copy will be sent to the SMBMI. After Review of the geotechnical study for the project site, the SMBMI concluded that no further archaeological fieldwork is recommended. SMBMI did request that language similar to that found in Section 7of the report Management Recommendations, be included as part of the project/permit/plan conditions.
Goldie Walker Chairperson Serrano Nation of Mission Indians	November 6, 2017 November 20, 2017	Scoping letter sent via United States Postal Service (USPS). Spoke to Ms. Walker and her son Mark Cochrane. They mentioned that the area is sensitive for cultural resources and requested to be notified if any cultural items are discovered during Project implementation. Ms. Walker also requested a copy of the final report.

Name	Date & Time of Calls	Responses
Anthony Madrigal Tribal Historic Preservation Officer (THPO) Twenty-Nine Palms Band of Mission Indians	November 6, 2017 November 8, 2017	Scoping letter sent via email. Received email response from Sarah Bliss, Tribal Cultural Specialist, for the THPO. The THPO is not aware of any additional cultural resources or Tribal Cultural Resources within the Project Area. The THPO will request a copy of the completed cultural resource report from the City of Victorville and provide additional Project recommendations directly to the City.

Sacred Lands File & Native American Contacts List Request

NATIVE AMERICAN HERITAGE COMMISSION
915 Capitol Mall, RM 364
Sacramento, CA 95814
(916) 653-4082
(916) 657-5390 – Fax
nahc@pacbell.net

Information Below is Required for a Sacred Lands File Search

Date: 9/15/2017

Project: Meridian – Victorville Water District Distribution System Project #3763

County: San Bernardino

USGS Quadrangle Name: Hesperia

Township 4N, Range 5W Sections 1, 2, 11, 12

Company/Firm/Agency: Applied EarthWorks, Inc.

Contact Person: Joan George

Street Address: 3550 E. Florida Avenue, Suite H

City: Hemet Zip: 92544

Phone: (951)766-2000

Fax: (951) 766-0020

Email: jgeorge@appliedearthworks.com

Project Description: Project consists of the installation of a one-mile long pipeline in the City of Victorville. The project will result in ground disturbance. Applied EarthWorks, Inc. has been contracted to conduct a cultural resource study of the Project area.

NATIVE AMERICAN HERITAGE COMMISSION
Environmental and Cultural Department
1550 Harbor Blvd., Suite 100
West Sacramento, CA 95691
(916) 373-3710

September 20, 2017

Joan George
Applied EarthWorks, Inc.

Sent by E-mail: jgeorge@appliedearthworks.com

RE: Proposed Meridian – Victorville Water District Distribution System (#3763) Project, City of Victorville; Hesperia Quadrangle, San Bernardino County, California

Dear Ms. George:

A record search of the Native American Heritage Commission (NAHC) *Sacred Lands File* was completed for the area of potential project effect (APE) referenced above with negative results. Please note that the absence of specific site information in the *Sacred Lands File* does not indicate the absence of Native American cultural resources in any APE.

Attached is a list of tribes culturally affiliated to the project area. I suggest you contact all of the listed Tribes. If they cannot supply information, they might recommend others with specific knowledge. The list should provide a starting place to locate areas of potential adverse impact within the APE. By contacting all those on the list, your organization will be better able to respond to claims of failure to consult. If a response has not been received within two weeks of notification, the NAHC requests that you follow-up with a telephone call to ensure that the project information has been received.

If you receive notification of change of addresses and phone numbers from any of these individuals or groups, please notify me. With your assistance we are able to assure that our lists contain current information. If you have any questions or need additional information, please contact via email: gayle.totton@nahc.ca.gov.

Sincerely,

Gayle Totton

Gayle Totton, M.A., PhD.
Associate Governmental Program Analyst
(916) 373-3714

Native American Heritage Commission
Native American Contact List
San Bernardino County
9/20/2017

Morongo Band of Mission Indians
Denisa Torres, Cultural Resources Manager
12700 Pumarra Rroad — Cahuilla
Banning, CA, 92220 — Serrano
Phone: (951) 849 - 8807
Fax: (951) 922-8146
dtorres@morongo-nsn.gov

Morongo Band of Mission Indians
Robert Martin, Chairperson
12700 Pumarra Rroad — Cahuilla
Banning, CA, 92220 — Serrano
Phone: (951) 849 - 8807
Fax: (951) 922-8146

San Fernando Band of Mission Indians
John Valenzuela, Chairperson
P.O. Box 221838 — Kitanemuk
Newhall, CA, 91322 — Serrano
Phone: (760) 885 - 0955 — Tataviam
tsen2u@hotmail.com

San Manuel Band of Mission Indians
Lee Clauss, Director of Cultural Resources
26569 Community Center Drive — Serrano
Highland, CA, 92346
Phone: (909) 864 - 8933
Fax: (909) 864-3370
lclauss@sanmanuel-nsn.gov

Serrano Nation of Mission Indians
Goldie Walker, Chairperson
P.O. Box 343 — Serrano
Patton, CA, 92369
Phone: (909) 528 - 9027

Twenty-Nine Palms Band of Mission Indians
Anthony Madrigal, Tribal Historic Preservation Officer
46-200 Harrison Place — Chemehuevi
Coachella, CA, 92236
Phone: (760) 775 - 3259
amadrigal@29palmsbomi-nsn.gov

Twenty-Nine Palms Band of Mission Indians
Darrell Mike, Chairperson
46-200 Harrison Place — Chemehuevi
Coachella, CA, 92236
Phone: (760) 863 - 2444
Fax: (760) 863-2449
29chairman@29palmsbomi-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 Meridian - Victorville Water District Distribution System Project, San Bernardino County.

Applied EARTHWORKS Inc.

3550 E. Florida Ave., Suite H
Hemet, CA 92544-4937
O: (951) 766-2000 | F: (951) 766-0020

November 3, 2017

Anthony Madrigal
Tribal Historic Preservation Officer
Twenty-Nine Palms Band of Mission Indians
46-200 Harrison Place
Coachella, CA 92236

Re: Cultural Resource Investigation for the Victorville Water District Distribution System Project, City of Victorville, San Bernardino County, California

Dear Mr. Madrigal:

On behalf of Meridian Consultants, Inc., Applied EarthWorks, Inc. (Æ) is conducting a cultural resource study of approximately one-mile of pipeline alignment (Project) in the City of Victorville. The Victorville Water District proposes a water connection that will extend north in Amethyst Road and then west in Sycamore Street to the intersection of Sycamore and Amethyst Road. The 24-inch pipeline would connect to the Turnout 5 metering station at Mesa Street and pump station at Sycamore Street. As indicated on the attached map, the Project is located on the Hesperia, CA 7.5' USGS quadrangle map within Township 4N/Range 5W, Sections 1, 2, 11, and 12, San Bernardino Baseline and Meridian (S.B.B.M.).

The archaeological literature and records search conducted at the South Central Coastal Information Center housed at California State University, Fullerton, indicates that 33 cultural resources studies have been conducted within a one-mile radius of the Project area. Five of these studies involved the property. Eighteen cultural resource properties have been recorded within a one-mile radius of the Project area. None of these resources are within the Project area.

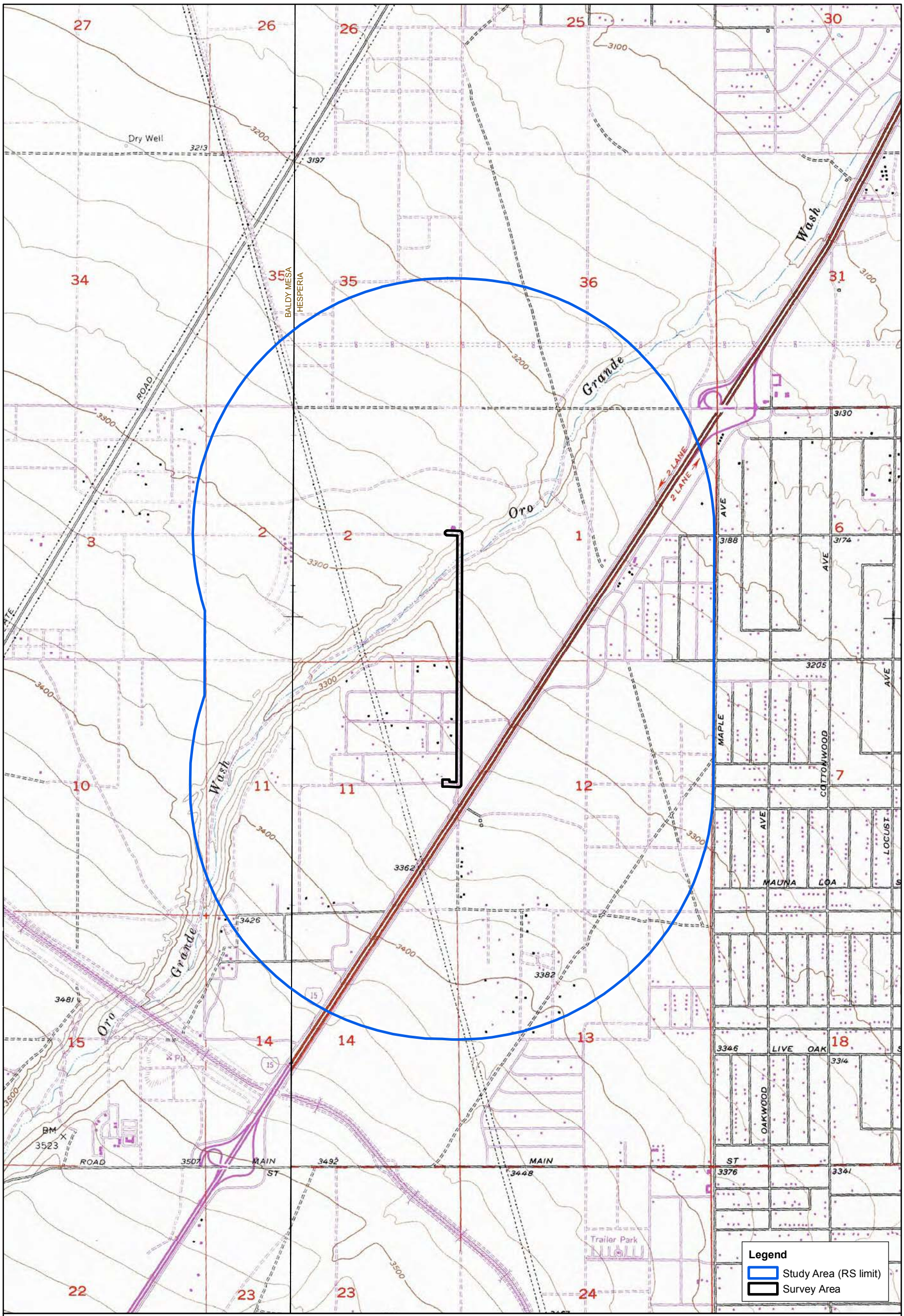
Æ was contracted to perform an intensive archaeological survey of the Project area. The survey was completed on November 1, 2017 and transect spacing ranged from 10 to 20 meters. A small historic refuse scatter was documented during the survey. No prehistoric cultural resources were identified during the survey.

As part of the cultural resource assessment of the Project area, Æ requested a search of the *Sacred Lands File* by the Native American Heritage Commission (NAHC) on September 15, 2017. The NAHC responded by letter on September 20, 2107 stating that the search was completed with negative results. Should your records show that cultural properties exist within or near the property shown on the enclosed map, or if you have any concerns regarding Native American issues related to the overall project, please contact me at (951) 766-2000 or via letter expressing your concerns. You may also e-mail me at jgeorge@appliedearthworks.com. If I do not hear from you within in the next two weeks, I will contact you with a follow-up phone call or email.

Please be aware that your comments and concerns are very important to us, as well as to the successful completion of this project. I look forward to hearing from you in the near future. Thank you, in advance, for taking the time to review this request.

Respectfully yours,

Joan George
Associate Archaeologist
Applied EarthWorks, Inc.



T4N/R4W, Sect. 7; T4N/R5W, Sects. 1, 2, 3, 10, 11, 12, 13, and 14; T5N/R5W, Sects. 35 and 36; SBB&M
Baldy Mesa (1956, photorevised 1988) and Hesperia (1956, photorevised 1980), CA 7.5' USGS Quadrangles

Location map for the *Meridian - Victorville-CLWA Phase 2D Project - AE#3763*.

Applied EARTHWORKS Inc.

3550 E. Florida Ave., Suite H
Hemet, CA 92544-4937
O: (951) 766-2000 | F: (951) 766-0020

November 3, 2017

Jessica Mauck
Cultural Resources Analyst
San Manuel Band of Mission Indians
26569 Community Center Drive
Highland, CA 92346

Re: Cultural Resource Investigation for the Victorville Water District Distribution System Project, City of Victorville, San Bernardino County, California

Dear Ms. Mauck:

On behalf of Meridian Consultants, Inc., Applied EarthWorks, Inc. (Æ) is conducting a cultural resource study of approximately one-mile of pipeline alignment (Project) in the City of Victorville. The Victorville Water District proposes a water connection that will extend north in Amethyst Road and then west in Sycamore Street to the intersection of Sycamore and Amethyst Road. The 24-inch pipeline would connect to the Turnout 5 metering station at Mesa Street and pump station at Sycamore Street. As indicated on the attached map, the Project is located on the Hesperia, CA 7.5' USGS quadrangle map within Township 4N/Range 5W, Sections 1, 2, 11, and 12, San Bernardino Baseline and Meridian (S.B.B.M.).

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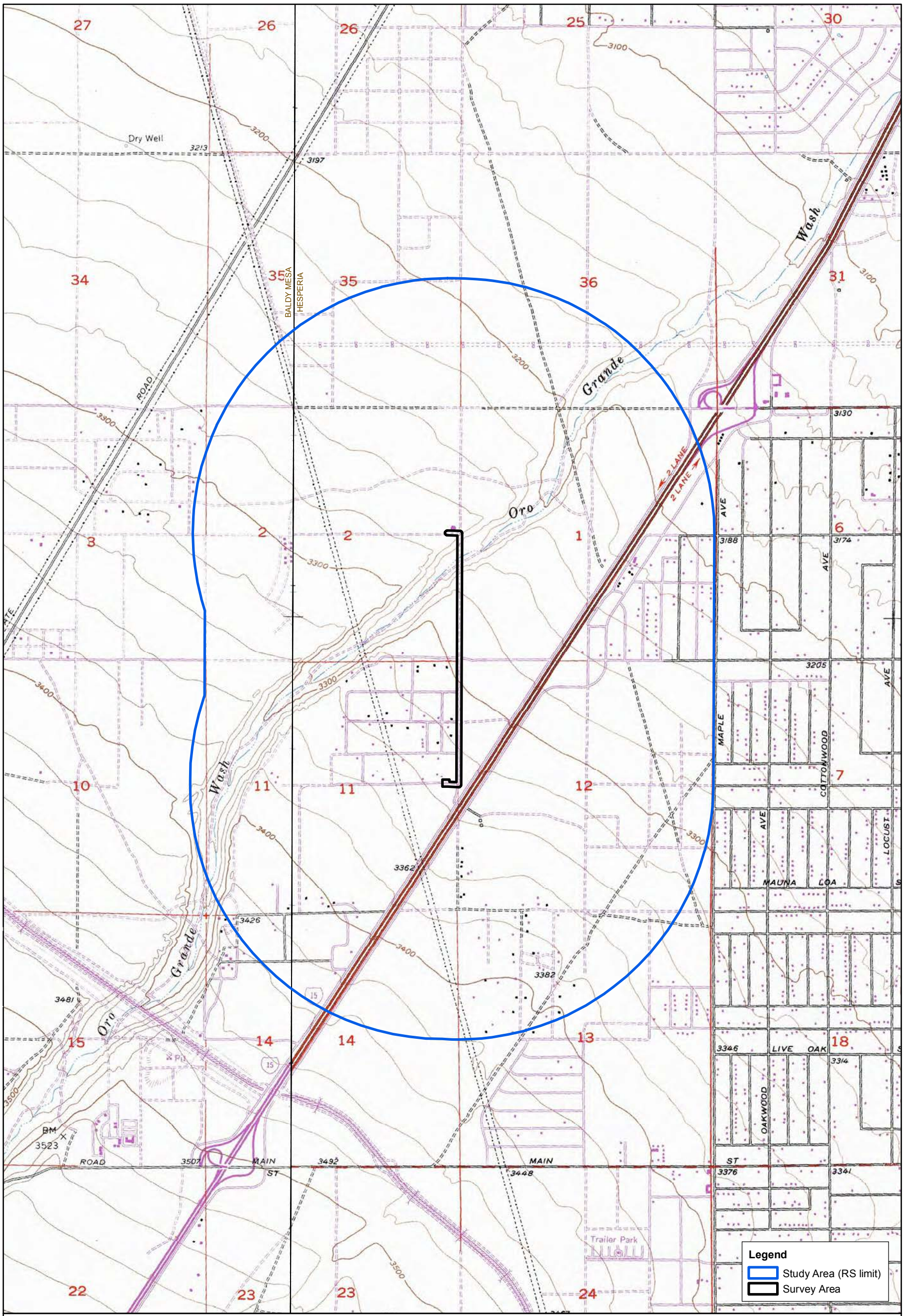

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O: (951) 766-2000 | F: (951) 766-0020

November 3, 2017

Denisa Torres
Cultural Resources Manager
Morongo Band of Mission Indians
12700 Pumarra Road
Banning, CA 92220

Re: Cultural Resource Investigation for the Victorville Water District Distribution System Project, City of Victorville, San Bernardino County, California

Dear Ms. Torres:

On behalf of Meridian Consultants, Inc., Applied EarthWorks, Inc. (*Æ*) is conducting a cultural resource study of approximately one-mile of pipeline alignment (Project) in the City of Victorville. The Victorville Water District proposes a water connection that will extend north in Amethyst Road and then west in Sycamore Street to the intersection of Sycamore and Amethyst Road. The 24-inch pipeline would connect to the Turnout 5 metering station at Mesa Street and pump station at Sycamore Street. As indicated on the attached map, the Project is located on the Hesperia, CA 7.5' USGS quadrangle map within Township 4N/Range 5W, Sections 1, 2, 11, and 12, San Bernardino Baseline and Meridian (S.B.B.M.).

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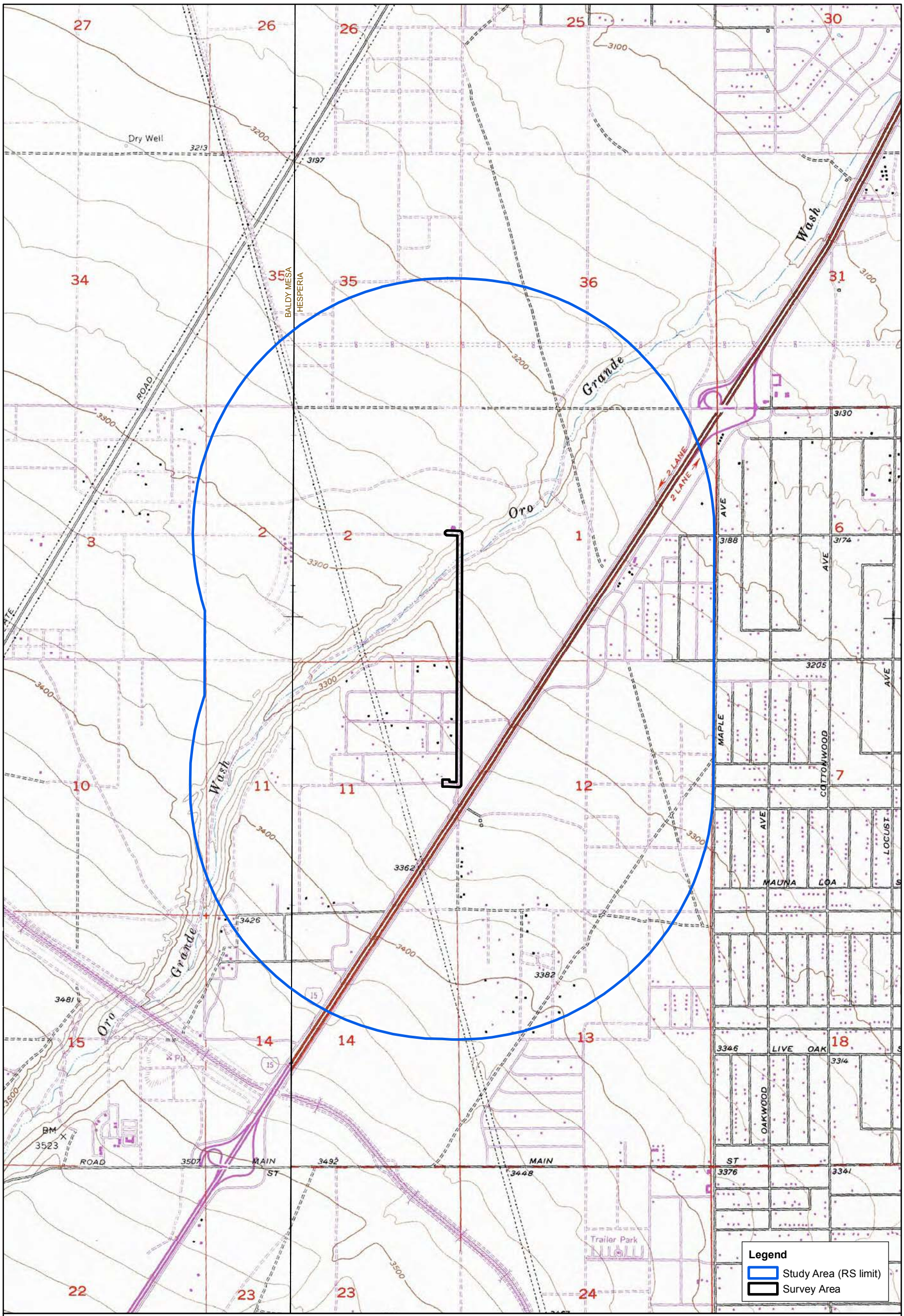

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November 3, 2017

John Valenzuela
Chairperson
San Fernando Band of Mission Indians
P.O. Box 221838
Newhall, CA 91322

Re: Cultural Resource Investigation for the Victorville Water District Distribution System Project, City of Victorville, San Bernardino County, California

Dear Mr. Valenzuela:

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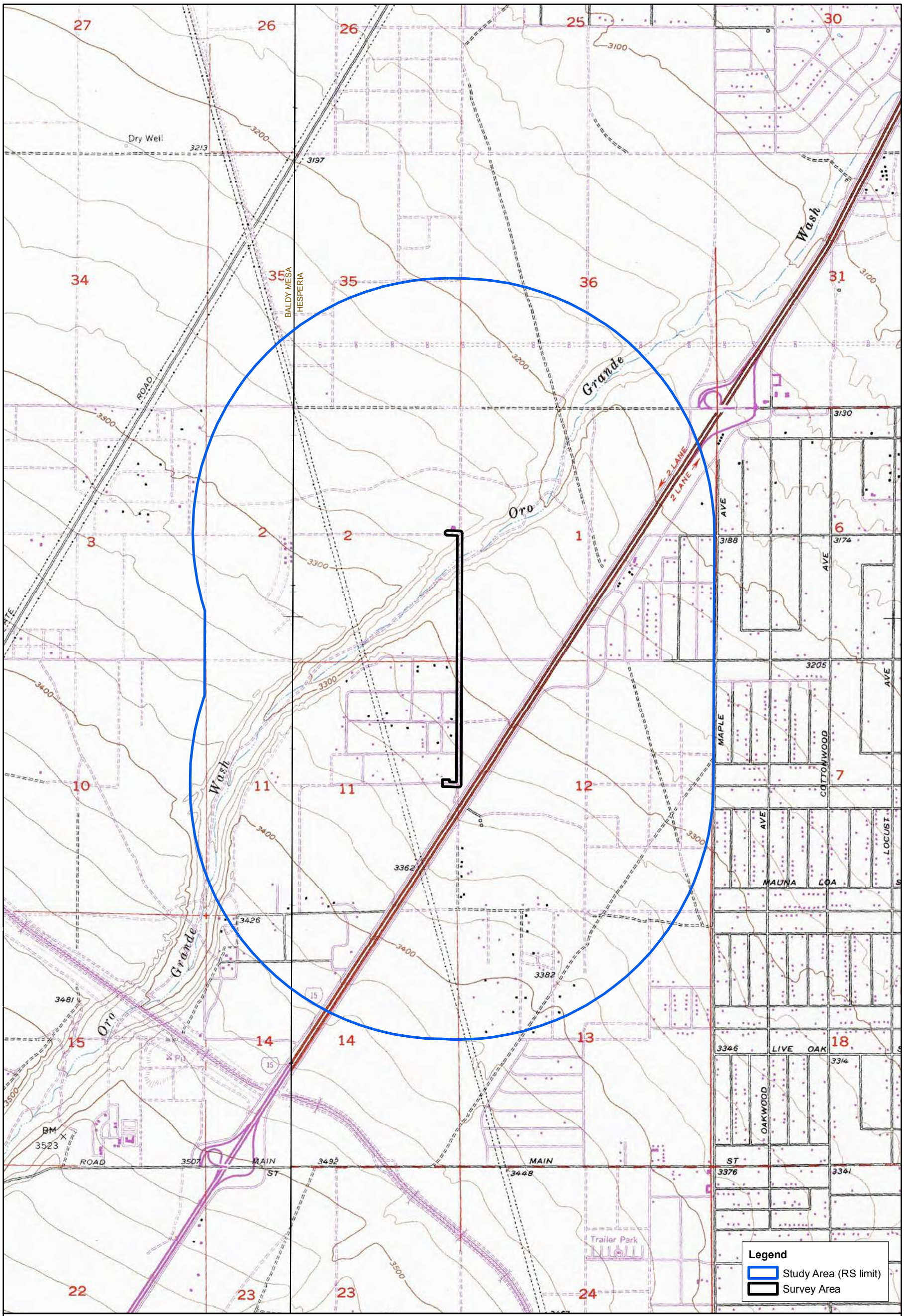
Applied EarthWorks, Inc.



T4N/R4W, Sect. 7; T4N/R5W, Sects. 1, 2, 3, 10, 11, 12, 13, and 14; T5N/R5W, Sects. 35 and 36; SBB&M
Baldy Mesa (1956, photorevised 1988) and Hesperia (1956, photorevised 1980), CA 7.5' USGS Quadrangles

Location map for the *Meridian - Victorville-CLWA Phase 2D Project - AE#3763*.

Applied EARTHWORKS Inc.

3550 E. Florida Ave., Suite H
Hemet, CA 92544-4937
O: (951) 766-2000 | F: (951) 766-0020

November 3, 2017

Goldie Walker
Chairwoman
Serrano Nation of Mission Indians
P.O. Box 343
Patton, CA 92369

Re: Cultural Resource Investigation for the Victorville Water District Distribution System Project, City of Victorville, San Bernardino County, California

Dear Ms. Walker:

On behalf of Meridian Consultants, Inc., Applied EarthWorks, Inc. (Æ) is conducting a cultural resource study of approximately one-mile of pipeline alignment (Project) in the City of Victorville. The Victorville Water District proposes a water connection that will extend north in Amethyst Road and then west in Sycamore Street to the intersection of Sycamore and Amethyst Road. The 24-inch pipeline would connect to the Turnout 5 metering station at Mesa Street and pump station at Sycamore Street. As indicated on the attached map, the Project is located on the Hesperia, CA 7.5' USGS quadrangle map within Township 4N/Range 5W, Sections 1, 2, 11, and 12, San Bernardino Baseline and Meridian (S.B.B.M.).

The archaeological literature and records search conducted at the South Central Coastal Information Center housed at California State University, Fullerton, indicates that 33 cultural resources studies have been conducted within a one-mile radius of the Project area. Five of these studies involved the property. Eighteen cultural resource properties have been recorded within a one-mile radius of the Project area. None of these resources are within the Project area.

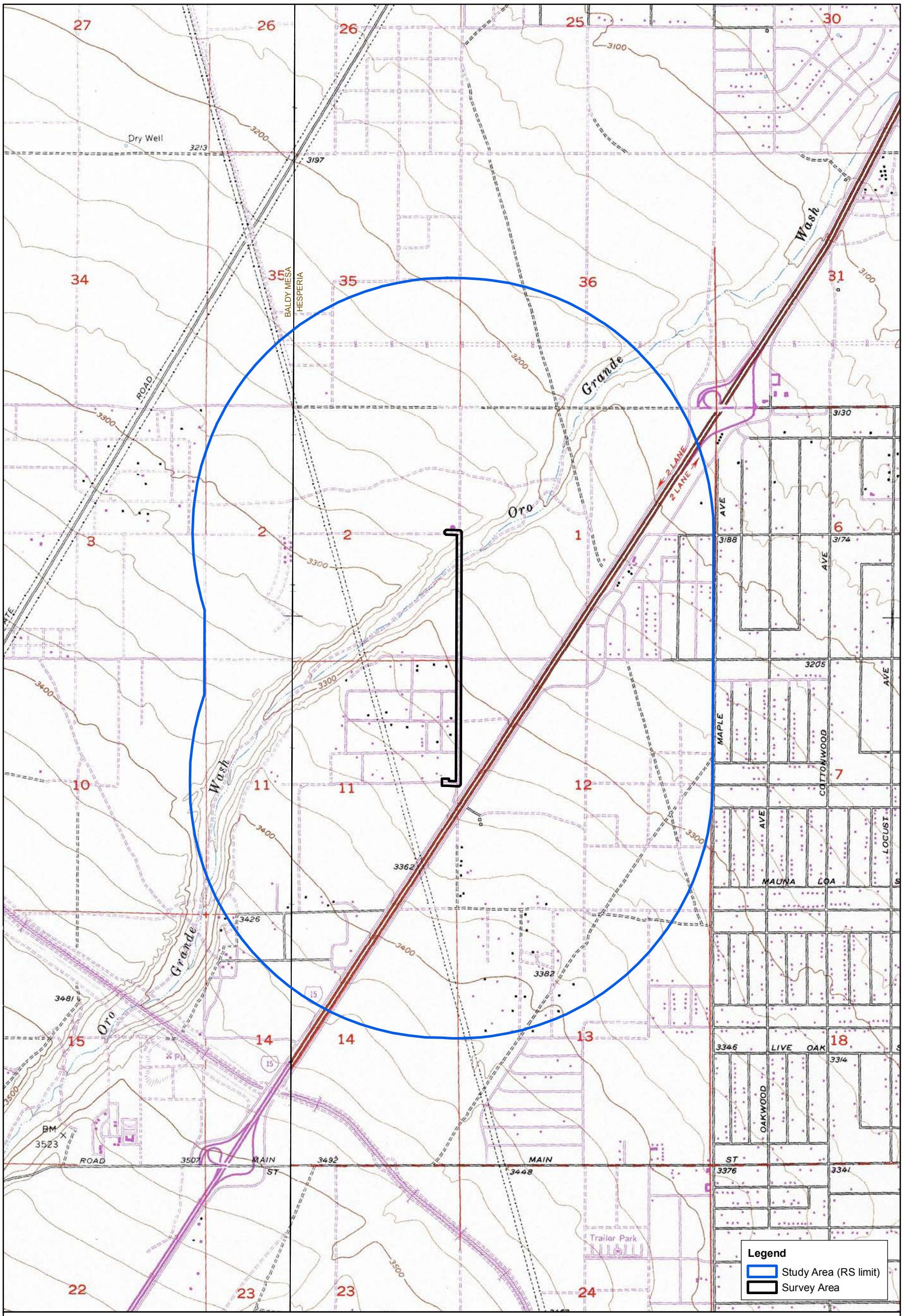
Æ was contracted to perform an intensive archaeological survey of the Project area. The survey was completed on November 1, 2017 and transect spacing ranged from 10 to 20 meters. A small historic refuse scatter was documented during the survey. No prehistoric cultural resources were identified during the survey.

As part of the cultural resource assessment of the Project area, Æ requested a search of the *Sacred Lands File* by the Native American Heritage Commission (NAHC) on September 15, 2017. The NAHC responded by letter on September 20, 2107 stating that the search was completed with negative results. Should your records show that cultural properties exist within or near the property shown on the enclosed map, or if you have any concerns regarding Native American issues related to the overall project, please contact me at (951) 766-2000 or via letter expressing your concerns. You may also e-mail me at jgeorge@appliedearthworks.com. If I do not hear from you within in the next two weeks, I will contact you with a follow-up phone call or email.

Please be aware that your comments and concerns are very important to us, as well as to the successful completion of this project. I look forward to hearing from you in the near future. Thank you, in advance, for taking the time to review this request.

Respectfully yours,

Joan George
Associate Archaeologist
Applied EarthWorks, Inc.



T4N/R4W, Sect. 7; T4N/R5W, Sects. 1, 2, 3, 10, 11, 12, 13, and 14; T5N/R5W, Sects. 35 and 36; SBB&M
Baldy Mesa (1956, photorevised 1988) and Hesperia (1956, photorevised 1980), CA 7.5' USGS Quadrangles

Location map for the *Meridian - Victorville-CLWA Phase 2D Project - AE#3763*.

From: Jessica Mauck
To: "Joan George"
Subject: RE: Cultural resource study for a pipeline project in the City of Victorville
Date: Monday, November 06, 2017 11:55:05 AM
Attachments: image65f5c9.PNG

Hi Joan,

Thank you for contacting the San Manuel Band of Mission Indians (SMBMI) regarding the above referenced project. SMBMI appreciates the opportunity to review the project documentation, which was received by our Cultural Resources Management Department on 6 November 2017. The proposed project area exists within Serrano ancestral territory and, therefore, is of interest to the Tribe. The northern portion of the proposed project runs through the Oro Grande Wash, which is considered a TCR to SMBMI, and is associated with a number of resources. As a result, testing is recommended adjacent to the fluvial deposits associated with the Wash to rule out the presence of subsurface cultural material. In addition, SMBMI respectfully requests a copy of the cultural resources report, complete with site records from the records search, as a well as any engineering/design plans for the proposed project to determine the extent of impacts. The provision of this information will assist San Manuel Band of Mission Indians in ascertaining whether or not the Tribe will assume consulting party status under CEQA with the lead agency. If you would prefer we contact the lead agency directly for the information above, though compiled by the consulting party, please let me know. This letter is merely intended to take part in information sharing to ensure efficiency of the process for SMBMI, the lead agency, and the consultants. All information shared with your firm within the body of this e-mail may be included within the cultural resources report, to be viewed only by your firm, your client, the lead agency, and tribes. If you should have any further questions with regard to this matter, please do not hesitate to contact me at your convenience, as I will be your Point of Contact (POC) for SMBMI with respect to this project.

Respectfully,

Jessica Mauck
CULTURAL RESOURCES ANALYST
O: (909) 864-8933 x3249
M: (909) 725-9054
26569 Community Center Drive, Highland California 92346
SAN MANUEL
BAND OF MISSION INDIANS

From: Joan George [mailto:jgeorge@appliedearthworks.com]

Sent: Monday, November 6, 2017 9:14 AM
To: Jessica Mauck
Subject: Cultural resource study for a pipeline project in the City of Victorville

Good morning,

Attached please find a scoping letter and map for a one-mile long pipeline project in the City of Victorville, San Bernardino County, California.

Thank you,
Joan

***Joan George* | Applied EarthWorks, Inc.**
Associate Archaeologist

3550 E. Florida Ave., Suite H
Hemet, CA. 92544-4937
951.766.2000 x-24 office
www.appliedearthworks.com

From:	Sarah Bliss
To:	"jgeorge@appliedearthworks.com"
Cc:	TNP Consultation
Subject:	Cultural Resource Investigation Victorville Water District Distribution System Project
Date:	Wednesday, November 08, 2017 2:24:08 PM
Attachments:	image001.png

Hello Joan,

In regards to the Victorville Water District Distribution System Project, the Tribal Historic Preservation Office (THPO) is not aware of any additional cultural resources or any Tribal Cultural Resources, as defined California Public Resources Code § 21074 (a) (1) (A)-(B), within the project area. The THPO will request the completed Cultural Report from the lead agency and provide additional recommendations when it is completed.

Thank you,

Sarah Bliss

Twenty-Nine Palms Band of Mission Indians

Tribal Cultural Specialist

46-200 Harrison Place, Coachella, CA 92236

Ofc: (760) 863-2489

E-mail: sbliss@29palmsbomi-nsn.gov

APPENDIX D

Geotechnical Exploration

GEOTECHNICAL EXPLORATION
CITY OF VICTORVILLE
AMETHYST ROAD PRESSURIZED WATER PIPELINE
AMETHYST ("PEGLEG") ROAD
VICTORVILLE, CALIFORNIA
CIVILTEC PROJECT NO. 2017143.00

Prepared For:

CIVILTEC ENGINEERING, INC
118 West Lime Avenue, Second Floor
Monrovia, California 91016-2841

Project No. 11770.002

February 7, 2018

Leighton Consulting, Inc.
A LEIGHTON GROUP COMPANY

Leighton Consulting, Inc.
A LEIGHTON GROUP COMPANY

Wednesday, February 7, 2018

Project No. 11770.002

Civiltec Engineering, Inc.
118 West Lime Avenue, Second Floor
Monrovia, California 91016-2841

Attention: Mr. Bed P. Dawadi, PE
Project Manager

Subject: Geotechnical Exploration
City of Victorville
Amethyst Road Pressurized Water Pipeline
Amethyst ("Pegleg") Road
Victorville, California
Civiltec Project No. 2017143.00

In accordance with our February 17, 2017 proposal authorized on August 31, 2017 (notice-to-proceed received December 5, 2017), Leighton Consulting, Inc. is pleased to present results of our geotechnical exploration to support design of the new Amethyst Road pressurized water pipeline, to be installed within the unpaved Amethyst Road right-of-way between Mesa Street to the south and Sycamore Street to the north (5,225-foot-long alignment), within southeastern Victorville, California.

This pipeline alignment is **not** located within a currently designated Alquist-Priolo Earthquake Fault Zone. However, strong seismic ground shaking has and will occur at this site. Groundwater was not encountered in our seven borings drilled on January 11, 2018 to a maximum depth of 21½ feet and groundwater in this area is much-deeper-than (>>) 50 feet below the surface. Encountered site soils were also dense clayey sands overlying dense gravelly sands and gravel to the depths explored. Therefore, potential for liquefaction occurring along this alignment is extremely low due to the lack of shallow groundwater and high density of encountered alluvium.

For the most part, this 24-inch-diameter pressurized, ductile-iron water pipeline will have 4-feet of soil cover, with an invert depth of 6-feet below existing and finish grade.

However, this alignment does cross the Oro Grade Wash at the northerly segment just south of Sycamore Street. San Bernardino County Flood Control District will be improving the Amethyst Flood Control Basin within the Oro Grande Wash. At the downstream end of their basin, an existing dam at the Amethyst Road alignment will be improved, including construction of a new weir. This pipeline will be installed within the Amethyst Road embankment (dam) extending under the new concrete weir, with the lowest invert elevation at 3,216.88 feet; protected from scour by a new reinforced concrete apron.

Conventional cut-and-cover construction is expected for this shallow pressurized pipeline. However, depending on timing, construction through the Oro Grande Wash will likely have to be coordinated with San Bernardino County Flood Control District's work, and (depending on their construction progress) may require bore-and-jack pipeline installation within their embankment and under their weir. There is an existing 6-inch-diameter water pipeline in Amethyst Road that the San Bernardino County Flood Control District's plans show as being protected in place during their proposed grading for basin improvements. This new 24-inch-diameter pipeline will be roughly parallel to the existing 6-inch-diameter pipeline.

We appreciate the opportunity to be of additional service to Civiltec Engineering, Inc. If you have any questions about this report, or if we can be of further service, please contact the undersigned at either (909) 484-2205 or **(866) *LEIGHTON***, directly at the phone extension and/or e-mail address listed below.

Respectfully submitted,

LEIGHTON CONSULTING, INC.

Thomas C. Benson, Jr, GE 2091
President and CEO
Extension 8771, tbenson@leightonconsulting.com

TCB:tcb

Distribution: (1) addressee (via e-mail PDF)
(3) City of Victorville, Public Works department, Engineering Division (City Hall)
Attn.: Mr. Shah Nawaz, PE

Leighton

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1.0 INTRODUCTION

1.1 Alignment Location and Description

As depicted on Figure 1, *Alignment Map*, a new Amethyst Road pressurized water pipeline is to be installed within the unpaved Amethyst Road right-of-way between Mesa Street to the south and Sycamore Street to the north (5,225-foot-long alignment), within southeastern Victorville, California. A southerly segment of Amethyst Road is also locally known as "Pegleg" Road). Figure 2, *Regional Topographic Map*, shows that this site is located on an alluvial fan sloping gently down to the northeast towards the Mojave River and central Victorville. Northern portion of this alignment crosses the Oro Grande Wash, eroded down into this alluvial fan.

1.2 Proposed Pipeline

We understand that the City of Victorville proposes to install a new pressurized 24-inch-diameter water pipeline within Amethyst Road to service the proposed new metering station addressed in our separate report (as requested by the City). Approximately 5,225-lineal-feet of new 24-inch-diameter ductile iron pipe is proposed, extending from the proposed MWA Turnout 5 on Mesa Road north to the Victorville Water District's existing pumping station at Sycamore Street. We also understand that this project will provide Mojave Water Agency (MWA) water to the City's domestic water network. A total project budget of $2,517,000 was estimated by the City.

For the most part, this 24-inch-diameter pressurized, ductile-iron water pipeline will have 4-feet of soil cover, with an invert depth of 6-feet below existing and finish grade. However, this alignment does cross the Oro Grade Wash at the northerly segment just south of Sycamore Street. San Bernardino County Flood Control District will be improving the Amethyst Flood Control Basin within the Oro Grande Wash. At the downstream end of their basin, an existing dam at the Amethyst Road alignment will be improved, including construction of a new weir. This pipeline will be installed within the Amethyst Road embankment (dam) extending under the new concrete weir, with the lowest invert elevation at 3,216.88 feet; protected from scour by a new reinforced concrete apron.

1.3 Purpose and Scope of Evaluation

Our scope of work was performed in accordance with our February 17, 2017 proposal authorized on August 31, 2017 (notice-to-proceed received December 5, 2017) by Civiltec Engineering, Inc. This geotechnical exploration has included the following tasks:

- **Research:** We reviewed available in-house geotechnical reports, literature and maps relevant to this alignment to look for potential geotechnical issues that may impact this proposed pipeline. Key documents reviewed are referenced at the end of this report.

- **Subsurface Exploration (7 Borings):** Prior to excavation, we marked proposed boring locations for Underground Service Alert (USA), so they would mark known public underground utilities to avoid at our proposed boring locations. Seven hollow-stem-auger borings were drilled along this alignment to depths of 16½ feet to 21 ½ feet below existing grade, at locations depicted on Plate 1, *Boring Location Map* (in pocket). Our borings were logged by a member of our technical staff during drilling. Driven ring-lined and bulk soil samples were obtained from these borings at selected depth intervals and transported to our in-house geotechnical laboratory for testing. Our borings were then backfilled with excavated soil the same day. A description of field procedures and boring logs are presented in Appendix A, *Field Exploration*.

- **Geotechnical Laboratory Tests:** Geotechnical laboratory tests were performed at our in-house laboratory on recovered driven ring-lined and bulk soil samples obtained from our field exploration. This laboratory-testing program was designed to classify and measure physical/engineering characteristics of sampled soils. As-received moisture and density data is plotted on boring logs in Appendix A. Test procedures and results are presented in Appendix B, *Geotechnical Laboratory Testing*.

- **Geotechnical Analyses:** Data from our background review, borings and geotechnical laboratory testing was evaluated and analyzed to develop geotechnical conclusions and provide geotechnical recommendations for the proposed pipeline.

- **Report Preparation:** Results of this evaluation have been summarized in this report, presenting our findings, conclusions and geotechnical recommendations for this proposed pipeline.

This report does **not** address the potential for hazardous materials in soil and/or groundwater.

2.0 FINDINGS

2.1 Regional Geotechnical Setting

This alignment is located within the Hesperia Quadrangle, and there are **not** any currently (early February 2018) designated Alquist-Priolo Fault Zones within the Hesperia Quadrangle. Closest major fault is the San Andreas Fault located to the southwest in the Cajon Pass, trending from northwest to southeast. Southern majority of this alignment is within a large alluvial fan sloping gently and uniformly down to the northeast towards the Mojave River. As regionally mapped on Figure 2, the northern portion of this alignment crosses the Oro Grande Wash; cutting into this fan.

Closest Caltrans structure along I-15, relative to this site, is the California Aqueduct double-box-culvert, 1.4 miles to the south to the south (I-15 Postmile 34.34). Prior to box culvert construction, three borings were reportedly drilled in late January 1967 to depths of roughly 50 feet below elevations on average at 3,472 feet above mean sea level (NGVD 29). Predominantly dense to very-dense gravelly sands were reportedly encountered; and no groundwater was encountered to the depths explored in January 1967.

GEI Consultants, Inc. prepared a March 2017 *Geotechnical Data Report* for San Bernardino County Flood Control District's Amethyst Basin project. Most of their borings were drilled within the basin to the west of Amethyst Road, with their Borings B101 and B105 closest to this alignment (approximate reported locations of these two borings are plotted on Plate 1, in pocket). An "existing" Groundwater Well OGW-2 was also reportedly located just east of Amethyst Road within the wash. Their findings were roughly consistent with ours, with older and dense alluvium existing in the region as this alluvial fan ("Victorville Fan"), and some young alluvium within the wash. GEI reported that shallowest groundwater was 390 feet below existing grade in February 2015, measured in deep wells. They did not encounter groundwater in their May 2015 borings, reportedly drilled to a maximum depth of 57 feet.

2.2 Subsurface Soil Conditions

There were not any pavements along this alignment except for Sycamore Street and Amethyst Road north of Sycamore Street as one paved road with a 90-degree curve in the paved alignment. Fill soils were not encountered in our borings, but some roadway grading fill of modest thickness is expected under

and adjacent to Amethyst Road. There is an existing dam as undocumented fill west of Amethyst Road, aligned across the Oro Grande Wash. Dibblee (DF382, April 2008) regionally maps this entire Section (Section 11, except the Oro Grade Wash) as old alluvium (Qoa). Predominantly encountered in our seven borings was sandy silt over clayey sand to a depth of approximately 10-feet. Tested clayey sand had low plasticity, and was dense as indicated by high sampling blow counts. Below the clayey sand to the depths explored in our southerly borings (16½ feet) was dense sand with sub-rounded gravel. Within the Oro Grande Wash, we encountered silt at depths ranging from 10- to 15-feet over gravel at 15- to 21½-feet (depths explored) in our two northerly borings. Sampled soils were slightly moist, with moisture contents at 6-percent or less (most often at 2-percent).

More detailed descriptions of soil encountered are provided on our boring logs in Appendix A.

2.3 Groundwater

Groundwater was not encountered within our borings drilled on January 11, 2018 to a maximum depth of 21½-feet. Groundwater at this high-desert site is expected to be several-hundreds-of-feet deep, see:

https://www.mojavewater.org/files/ofr20161105.pdf

GEI reported (March 2017) that shallowest groundwater was 390 feet below existing grade in February 2015, measured in deep wells. They did not encounter groundwater in their May 2015 borings, reportedly drilled to a maximum depth of 57 feet.

Although seasonal fluctuations are expected, groundwater is not expected to be encountered within 50-feet of the surface along this alignment, except possibly during a short time immediately after a heavy local downpour and/or if Amethyst Basin is full of floodwater, particularly in the wash.

2.4 Seismicity

Most important seismic hazard that has and will impact this alignment is ground shaking resulting from an earthquake occurring along several major active or potentially active faults within southern California. Following ASCE 7-10 procedures, site-specific Peak Horizontal Ground Acceleration (PGA) is 0.5g, and the PGA_M is also 0.5g (F_{PGA}=1 for Site Class D). The 2016 California

Building Code (CBC) site-specific seismic coefficients are presented in Table 1, later in this report.

2.5 Secondary Seismic Hazards

In general, secondary seismic hazards for sites in this region could include soil liquefaction, earthquake-induced settlement, lateral displacement, landsliding and earthquake-induced flooding. The potential for secondary seismic hazards at this alignment is discussed below.

2.5.1 Liquefaction Potential: Liquefaction is the loss of soil shear strength due to a buildup of pore-water pressure during severe and sustained ground shaking. Liquefaction is associated primarily with loose (low density), saturated, fine-to-medium grained, cohesionless soils. As shaking action of an earthquake progresses, soil grains are rearranged and densify within a short period of time. Rapid densification of soil results in a buildup of pore-water pressure within saturated soils. When the pore-water pressure approaches the total overburden pressure, then soil shear strength reduces greatly and this soil temporarily behaves similarly to a fluid. Effects of liquefaction can include sand boils, settlement and bearing capacity failures below structural foundations.

Groundwater was not encountered in our January 11, 2018 borings drilled to a maximum depth of 21½ feet and groundwater in this area is much-deeper-than (>>) 50 feet below the surface. Encountered site soils were also dense clayey sands. Therefore, potential for liquefaction occurring along this alignment is low due to the lack of shallow groundwater and high density of encountered alluvium. A possible exception might be within the Oro Grande Wash when the flood control basin is full of floodwater. But that should be a short duration event, with a low probability of a simultaneous strong earthquake. In that case, only young/loose alluvium in the wash could be potentially liquefiable.

2.5.2 Seismically Induced Settlement: During a strong seismic event, seismically induced settlement can occur within loose to moderately dense, dry or saturated granular soil. Settlement caused by ground shaking is often non-uniformly distributed, which can result in differential settlement.

The potential total settlement resulting from seismic shaking associated with a peak ground acceleration of 0.5g is estimated to be negligible based on the dense gravelly nature and consistency of soils underlying this alignment.

2.5.3 Seismically Induced Landslides: This alignment is generally level without slopes. Therefore, this alignment is **not** considered susceptible to either

static or seismically-induced slope instability, except at the Oro Grande Wash. At the wash, presumably the San Bernardino County Flood Control District will engineer and regrade slopes to be no-steeper-than 2:1 (horizontal:vertical), for enhanced stability along the northern portion of this alignment.

2.5.4 Earthquake-Induced Seiches and Tsunamis: Seiches are large waves generated in enclosed bodies of water in response to ground shaking. Tsunamis are predominately ocean waves generated by undersea large magnitude fault displacement or major ground movement.

Based on separation of this alignment from any body of water, seiche impact at this site is highly unlikely. Also, due to the inland location of this alignment and elevation at 3,333 feet above mean sea level, relative to the Pacific Ocean (see California Geological Survey, 2009) tsunami risks at this site is **nil**.

3.0 CONCLUSIONS AND RECOMMENDATIONS

3.1 Conclusions

This pipeline alignment is **not** located within (cross) a currently designated Alquist-Priolo Earthquake Fault Zone. However, strong seismic ground shaking has and will occur at this site. Groundwater was not encountered in our seven borings drilled on January 11, 2018 to a maximum depth of 21½ feet and groundwater in this area is much-deeper-than (>>) 50 feet below the surface. Encountered site soils were also dense clayey sands overlying dense gravelly sands and gravel to the depths explored. Therefore, potential for liquefaction occurring along this alignment is low due to the lack of shallow groundwater and high density of encountered alluvium. A possible exception might be within the Oro Grande Wash when the flood control basin is full of floodwater. But that should be a short duration event, with a low probability of a simultaneous strong earthquake. In that case, only young/loose alluvium in the wash could be potentially liquefiable.

3.2 Recommendations Summary

For the most part, this 24-inch-diameter pressurized, ductile-iron water pipeline will have 4-feet of soil cover, with an invert depth of 6-feet below existing and finish grade. However, this alignment does cross the Oro Grade Wash at the northerly segment just south of Sycamore Street. San Bernardino County Flood Control District will be improving the Amethyst Flood Control Basin within the Oro

Grande Wash. At the downstream end of their basin, an existing dam at the Amethyst Road alignment will be improved, including construction of a new weir. This pipeline will be installed within the Amethyst Road embankment (dam) extending under the new concrete weir, with the lowest invert elevation at 3,216.88 feet; protected from scour by a new reinforced concrete apron.

Conventional cut-and-cover construction is expected for this shallow pressurized pipeline. However, depending on timing, construction through the Oro Grande Wash will likely have to be coordinated with San Bernardino County Flood Control District's work, and (depending on their construction progress) may require bore-and-jack pipeline installation within their embankment and under their weir. There is an existing 6-inch-diameter water pipeline in Amethyst Road that the San Bernardino County Flood Control District's plans show as being protected in place during their proposed grading for basin improvements. This new 24-inch-diameter pipeline will be roughly parallel to the existing 6-inch-diameter pipeline.

Specific design recommendations are provided in the following subsections, followed by a discussion of construction considerations later in this report.

3.3 Earthwork

Earthwork for this project will be limited solely to pressurized water pipeline trench backfill along an unpaved alignment. We expect that the pipe invert will be buried on the order of 6-feet-deep. Project-specific earthwork recommendations are provided in the following subsections.

3.3.1 Backfill Placement and Compaction: Onsite soils **free of** organics, debris and oversized material greater-than (>) 6 inches in largest dimension, are suitable for use as compacted structural fill; but should be carefully blended to a uniform gradation. Soil to be placed as fill, whether onsite or import material, should be reviewed by Leighton Consulting, Inc., and tested if and as necessary. Any imported soils must be non-expansive.

Relative compaction should be measured using the modified Proctor ASTM D1557 laboratory maximum density. Fill should be placed in thin, loose lifts, sufficiently and uniformly moisture-conditioned at or slightly above optimum moisture, and compacted to a minimum of 90 percent of the ASTM D1557 laboratory maximum density where supporting the new vault.

3.3.2 Water Pipeline Trench Backfill: Water Pipeline trenches should be backfilled in accordance with Section 306-12.2 (for narrow trenches) or

Section 306-12.3 (for mechanically compacted backfill) of the *Standard Specifications for Public Works Construction* ("Greenbook"), 2015 Edition. 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:

(1) **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

(2) **CLSM:** Controlled Low Strength Material (CLSM) conforming to Section 201-6 of the *Standard Specifications for Public Works Construction*, ("Greenbook"), 2015 Edition.

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 (free of large cobbles and boulders) 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 D1557 modified Proctor laboratory maximum density.

3.4 Seismic Design Parameters

Seismic parameters presented in Table 1, below, are intended for site-specific structural design in accordance with the 2016 CBC:

Table 1. 2016 CBC Site Categorization/Coefficients

2016 CBC Categorization/Coefficient	Design Value
Site Longitude (decimal degrees)	-117.36482
Site Latitude (decimal degrees)	34.44887
Site Class Definition (ASCE 7 Table 20.3-1)	D
Mapped Spectral Response Acceleration at 0.2s Period, $\mathbf{S_s}$ (Figure 1613.3.1(1))	1.5g
Mapped Spectral Response Acceleration at 1s Period, $\mathbf{S_1}$ (Figure 1613.3.1(2))	0.6g
Short Period Site Coefficient at 0.2s Period, $\mathbf{F_a}$ (Table 1613.3.3(1))	1.0
Long Period Site Coefficient at 1s Period, $\mathbf{F_v}$ (Table 1613.3.3(2)	1.5
Adjusted Spectral Response Acceleration at 0.2s Period, $\mathbf{S_{MS}}$ (Eq. 16-37)	1.5g
Adjusted Spectral Response Acceleration at 1s Period, $\mathbf{S_{M1}}$ (Eq. 16-38)	0.9g
Design Spectral Response Acceleration at 0.2s Period, $\mathbf{S_{DS}}$ (Eq. 16-39)	1.0g
Design Spectral Response Acceleration at 1s Period, $\mathbf{S_{D1}}$ (Eq. 16-40)	0.6g
Long Period (T_L, seconds)	12
Seismic Design Category	**D**

3.5 Manholes and Vaults

Manhole or vault retaining wall recommendations presented in this section are based on a manhole or vault height (retained earth height) no-greater-than (≤) 15 feet. Retaining wall geotechnical design parameters are presented in the following subsections:

3.5.1 Design Static Lateral (Horizontal) Earth Pressures: For drained retaining walls with level backfill, the following parameters may be used for retaining wall design:

Table 2. Retaining Wall Design Earth Pressures

Retaining Wall Condition (Level Backfill)	Equivalent Fluid Pressure (pounds-per-cubic-foot)*
Active (cantilever)	30
At-Rest (braced)	45
Passive Resistance (compacted fill)	300**

*Only for level and drained properly compacted backfill.

**Allowable passive resistance should not exceed 3,000 psf in any event.

The project Structural Engineer should apply the applicable factors of safety and/or load factors during design, as specified by the California Building Code.

Cantilever walls that are designed to yield at least 0.001H, where H is equal to the wall height, may be designed using the active condition. Rigid walls and walls braced at the top should be designed using the at-rest condition. Passive pressure is used to compute soil resistance to lateral structural movement. In addition, for sliding resistance, a frictional resistance coefficient of 0.5 may be used for concrete cast directly on soil. Lateral passive resistance should be taken into account only where soil providing passive resistance, embedded against the foundation elements, will remain intact during the design life of the retaining wall.

3.5.2 Retaining Wall Surcharges: In addition to the above lateral forces due to retained earth, surcharge due to above grade loads on wall backfill, such as existing building foundations, should be considered in design of retaining walls. Vertical surcharge loads behind a retaining wall on or in 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.

In areas where autos and pickup trucks will drive, we suggest assuming a uniform vertical surcharge of 300 psf, which would result in active and at-rest horizontal surcharges of 100 psf and 150 psf, respectively. This should be doubled in areas of heavy construction traffic (such as concrete trucks, heavy equipment delivery-trucks, etc.). If crane outrigger loads or other point load sources are applied as wall surcharge, this will require additional analyses based on load magnitude and location relative to the wall.

3.5.3 Retaining Wall Incremental Seismic Loads: Seismic incremental loads need **not** be added to retaining walls with stem heights on the order of (≤) 6-feet or less, with adjacent level backfill. However, for taller walls, incremental seismic earth pressures of 15 pounds-per-cubic-foot (pcf) can be applied for design, at the discretion of the Structural Engineer, in addition to static earth and surcharge pressures presented above. This is based on traditional Mononobe-Okabe (1929) equations. Traditionally, this incremental seismic earth pressure has been applied as an inverted triangle (inverted equivalent fluid pressure), with largest dynamic earth pressure occurring at the top of the wall (upper ground surface). Resultant seismic earth pressure force has traditionally been applied at approximately 0.6H from the bottom of the wall, where H is the wall (stem) height (e.g. Seed and Whitman, 1970).

However, recent studies (Sitar, et. al., 2010, U.C. Berkeley) suggest a uniform pressure distribution is likely closer to actual lateral seismic loads, so a uniform pressure of 12H (psf) applied as a uniform/rectangular pressure distribution can also be considered (based on current research and observations), at the discretion of the Structural Engineer. It is important to consider that for level backfill and in areas without shallow groundwater, both case history reviews and centrifuge test results suggest all of these approaches above are conservative, particularly for retaining walls with modest heights such as we expect for this project. Seismic incremental loads need only be added to active earth pressures, rather than at-rest earth pressures.

3.5.4 Sliding and Overturning: Total depth of retained earth for design of walls and for uplift resistance, should be measured as the vertical height of the stem below the ground surface at the wall face for stem design, or measured at the heel of the footing for overturning and sliding. A soil total unit weight of 120 pounds-per-cubic-foot (pcf) may be assumed for calculating surcharge weight of backfill over the wall footing, if drained, or 60 pcf if submerged, for properly compacted backfill.

3.5.5 Drainage: Adequate drainage may be provided by a subdrain system positioned behind the walls. Typically, this system consists of a 4-inch minimum diameter perforated pipe placed near the base of the wall

(perforations placed downward). The pipe should be bedded and backfilled with pervious backfill material described in Section 300-3.5.2 of the *Standard Specifications for Public Works Construction* (Greenbook), 2015 Edition. This pervious backfill should extend at least 2 feet out from the wall and to within 2 feet of the outside finished grade. This pervious backfill and pipe should be wrapped in filter fabric, such as Mirafi 140N or equivalent, placed as described in Section 300-8.1 of the *Standard Specifications for Public Works Construction* (Green Book), 2015 Edition. The subdrain outlet should be connected to a free-draining outlet or sump.

Miradrain, Geotech Drainage Panels, or Enkadrain drainage geocomposites, or similar, may be used for wall drainage as an alternative to the Class 2 Permeable Material or drain rock backfill, particularly where horizontal space is limited adjacent to shoring (where walls are cast against shoring). These drainage panels should be connected to the perforated drainpipe at the base of the wall.

3.6 Sulfate Attack and Ferrous Corrosion Protection

3.6.1 Sulfate Exposure: Sulfate ions in the soil can lower the 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. A potentially high sulfate content could also cause corrosion of reinforcing steel in concrete. Section 1904A of the 2016 California Building Code (CBC) defers to the American Concrete Institute's (ACI's) ACI 318-14 for concrete durability requirements. Table 19.3.1.1 of ACI 318-14 lists "*Exposure categories and classes*," including sulfate exposure as follows:

Table 3. Sulfate Concentration and Exposure

Soluble Sulfate in Water (parts-per-million)	Water-Soluble Sulfate (SO_4) in soil (percentage by weight)	ACI 318-14 Sulfate Class
0-150	0.00 - 0.10	S0 (negligible)
150-1,500	0.10 - 0.20	S1 (moderate*)
1,500-10,000	0.20 - 2.00	S2 (severe)
>10,000	>2.00	S3 (very severe)

*or seawater

3.6.2 Ferrous Corrosivity: Many factors can modify 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 approximate relationship between soil resistivity and soil corrosiveness was developed as follows:

Table 4. 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. A pH between 5 and 8.5 is generally considered relatively passive from a corrosion standpoint. Chloride and sulfate ion concentrations, and pH appear to play secondary roles in modifying 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.

3.6.3 Corrosivity Test Results: To evaluate corrosion potential of soils sampled from this site, we tested a bulk soil sample for soluble sulfate content, soluble chloride content, pH and resistivity. Results of these tests are summarized below:

Table 5. Results of Corrosivity Testing

Boring Number	Sample Depth (feet)	Sulfate (mg/kg)	Chloride (mg/kg)	pH	Minimum Resistivity (ohm-cm)
LB-1	0 to 5	148	62	6.5	10,500
LB-7	0 to 5	21	41	6.7	14,800

Note: mg/kg = milligrams per kilogram, or parts-per-million (ppm)

These results are discussed as follows:

- **Sulfate Exposure**: Based on Table 19.3.1.1 of ACI 318-14, sulfate exposure should be considered **Exposure Class S0** for near-surface soils (upper 5 feet below existing grade) sampled along this alignment. Based on Table 19.3.2.1 of ACI 318-14, for this Exposure Category S0, requires

no cement type restrictions, and an f_c' (28-day compressive strength) of at least 2,500 pounds-per-square-inch (psi) is required at a minimum for structural concrete.

- **Ferrous Corrosivity**: As shown above, minimum soil resistivity of 10,500 ohm-centimeters was measured in our laboratory test. In our opinion, based on resistivity correlation presented in Table 4, it appears for site soils that corrosion potential to buried steel may be characterized as "**very mildly corrosive**" at the site. No special soils-induced-corrosion mitigations are required. However, ferrous pipe can be protected by polyethylene bags, tap or coatings, di-electric fittings or other means to separate the pipe from on-site earth materials.

4.0 CONSTRUCTION CONSIDERATIONS

4.1 Temporary Excavations

Based on our field observations, caving of cohesionless alluvial soils will likely be encountered in unshored excavations. To protect workers entering excavations, excavations should be performed in accordance with OSHA and Cal-OSHA requirements, and the current (2015) edition of the California Construction Safety Orders:

(http://www.dir.ca.gov/title8/sb4a6.html)

Contractors should be advised that fill and cohesionless alluvial soils should be considered Type C soils as defined in the California Construction Safety Orders. As indicated in Table B-1 of Article 6, Section 1541.1, Appendix B, of the California Construction Safety Orders, 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. This may be impractical near adjacent existing utilities and structures; so shoring may 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 Consulting, Inc. 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 presented in the retaining wall section (e.g. 30 pcf). 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 15 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 12 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 (interpolated and extrapolated) from seven exploratory borings. 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 Consulting, 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.

Geotechnical observation and testing should be conducted 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 initial findings and interpretations. Geotechnical observation and testing should be provided:

- During utility trench backfilling and compaction, and/or
- When any unusual geotechnical conditions are encountered.

5.0 LIMITATIONS

This report was based in part on data obtained from a limited number of observations, site visits, 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. Therefore, our findings, conclusions and recommendations presented in

this report are based on the assumption that Leighton Consulting, Inc. will provide geotechnical observation and testing during construction.

This report was prepared for the sole use of Civiltec Engineering, Inc. for application to the design of the proposed improvements in accordance with generally accepted geotechnical engineering practices at this time in southern California.

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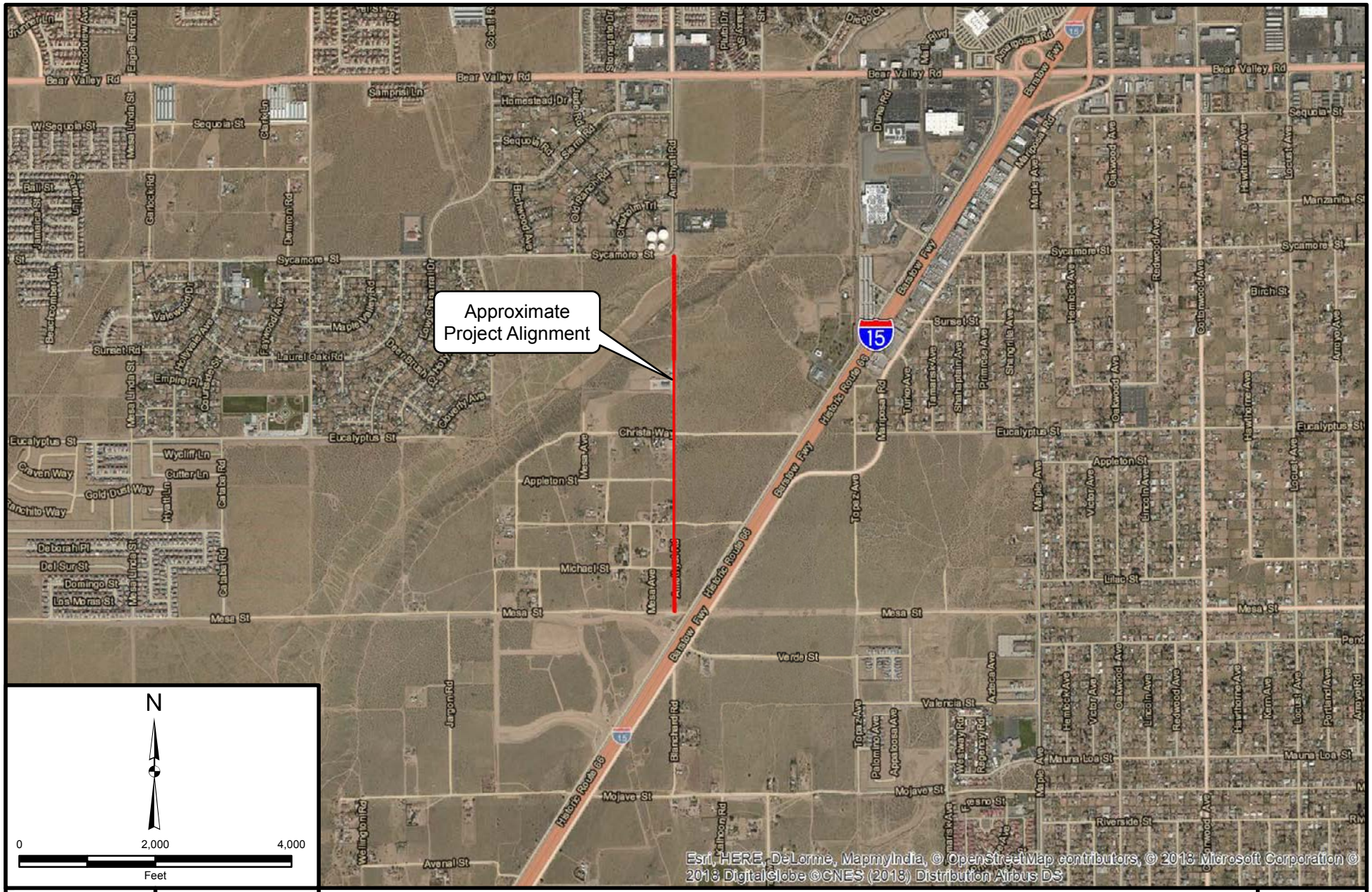

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Scale: 1 " = 2,000 '	Date: February 2018

Base Map: ESRI ArcGIS Online 2018
Thematic Information: Leighton
Author: Leighton Geomatics (btran)

ALIGNMENT MAP

City of Victorville
Amethyst Water Pipeline, Amethyst ("Pegleg") Road
Victorville, California

Figure 1

Leighton

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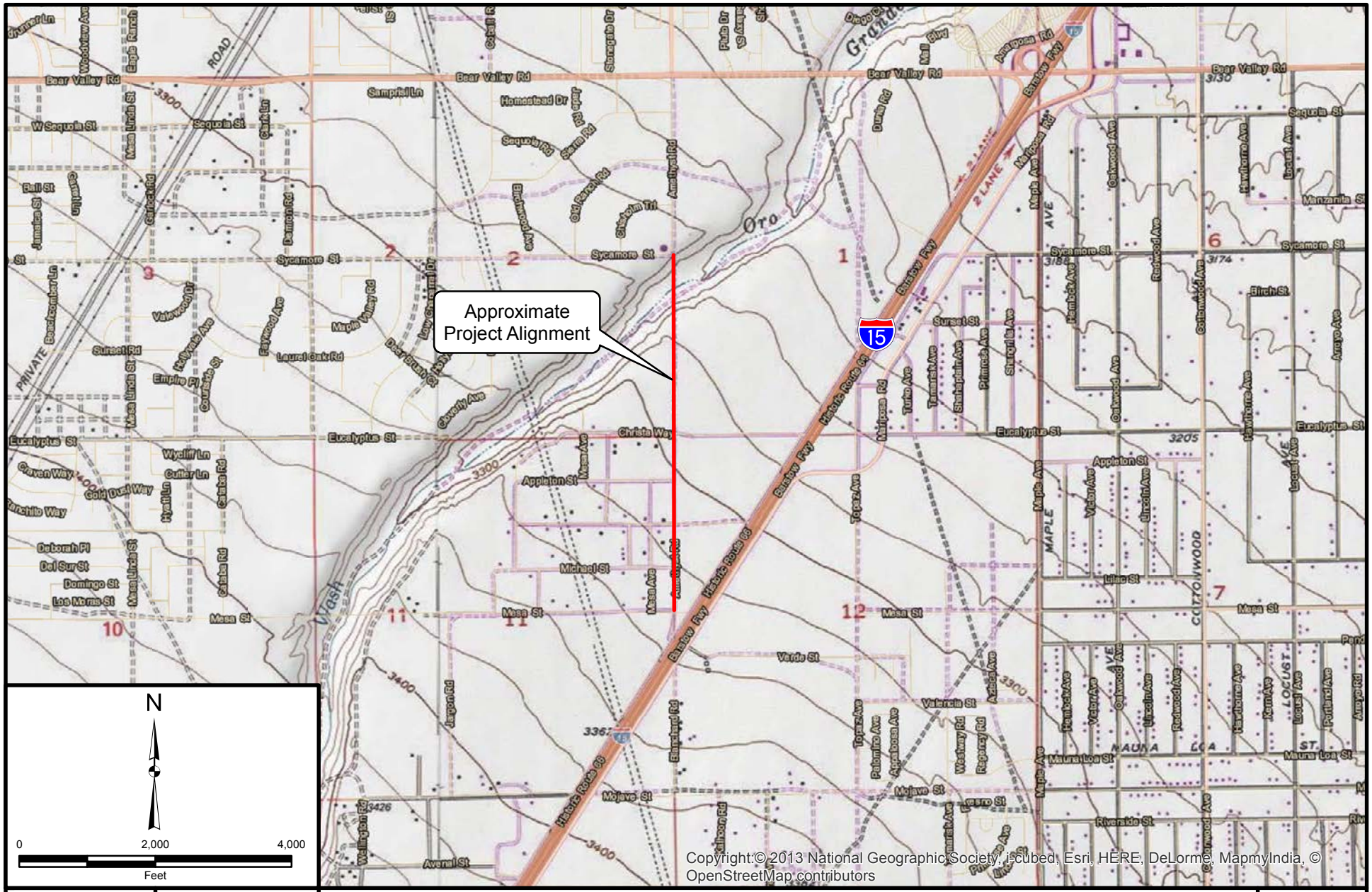


Project: 11770.002	Eng/Geol: TCB
Scale: 1 " = 2,000 '	Date: February 2018

Base Map: ESRI ArcGIS Online 2018
Thematic Information: Leighton
Author: Leighton Geomatics (btran)

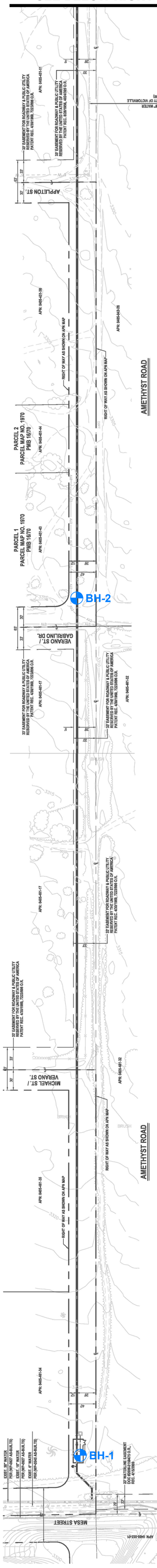
REGIONAL TOPOGRAPHIC MAP

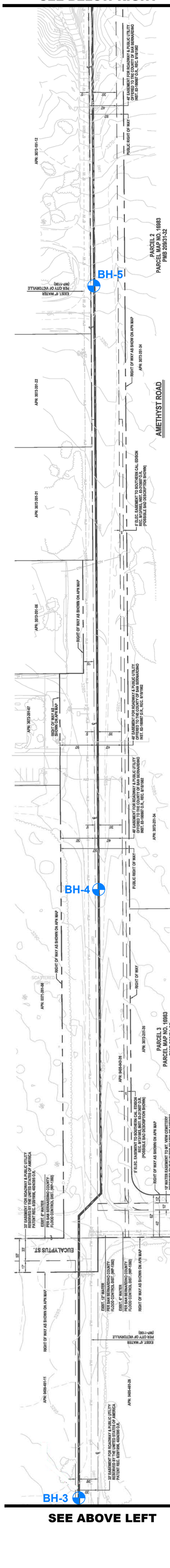
City of Victorville
Amethyst Water Pipeline, Amethyst ("Pegleg") Road
Victorville, California

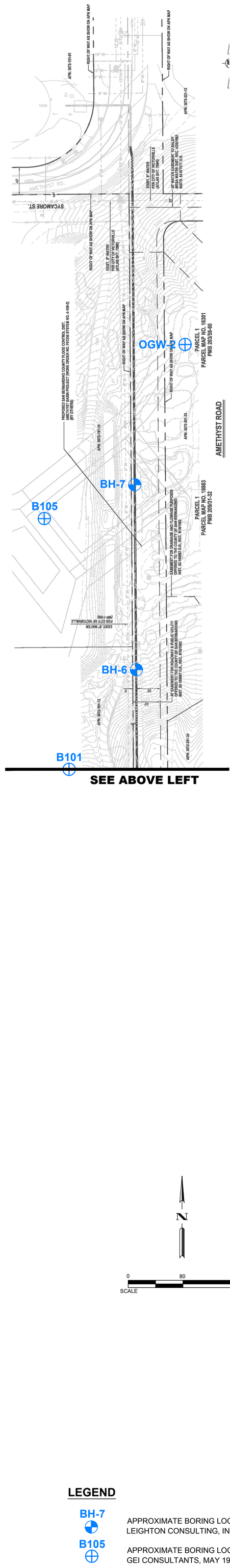
Figure 2

Leighton

Map Saved as V:\Drafting\11770\002\Maps\11770-002_F02_RTM_2018-02-08.mxd on 2/7/2018 1:11:32 PM







LEGEND

BH-7 — APPROXIMATE BORING LOCATION
LEIGHTON CONSULTING, INC., JANUARY 11, 2018

B105 — APPROXIMATE BORING LOCATION
GEI CONSULTANTS, MAY 19, 2015

BASE MAP IS FROM CIVILTEC ENGINEERING, INC.
PIPELINE PLAN AND PROFILE SHEETS 3-7 DATED: 12/15/2017

BORING LOCATION MAP

City of Victorville
Amethyst Water Pipeline, Amethyst ("Pegleg") Road
Victorville, California

Plate-1

Proj: 11770.002	Eng/Geol: TCB
Scale: 1"=80'	Date: February 2018

V:\DRAFTING\11770\002\2018-02-07\11770-002_P01_BLM_2018-02-08.DWG (02-08-18 8:26:39AM) Plotted by: btran

Leighton

APPENDIX A

FIELD EXPLORATION

Prior to drilling, we marked our proposed boring locations for use by Underground Service Alert (USA) and the City of Victorville to identify buried utilities at this location. On January 11, 2018, our field exploration consisted of drilling seven borings along this alignment with a truck-mounted hollow-stem-auger drill rig to depths of 16½- to 21½ - feet. Locations of these borings are depicted on Plate 1, *Boring Location Map* (in pocket). Our seven boring logs are included in this appendix.

Relatively undisturbed ring-lined barrel drive soil samples were obtained from these borings, at 5-foot-depth intervals, driven with a 140-pound hammer falling 30-inches each blow. Shallow auger-cutting bulk (disturbed) soil samples were also obtained from these borings. Encountered earth materials were logged during drilling by a Leighton Consulting, Inc. Staff Geologist, in accordance with the Unified Soil Classification System (ASTM D2488). After sampling and logging, our borings were immediately (same day) backfilled with soil cuttings. Soil samples from our borings were transported to our in-house geotechnical laboratory for evaluation and geotechnical testing.

Our attached subsurface exploration logs and related information depict subsurface conditions only at locations indicated and at the particular date designated on the logs. Subsurface conditions at other locations may differ from conditions occurring at these locations. The passage of time may result in altered subsurface conditions due to environmental changes; particularly changes in groundwater. In addition, any stratification lines on these logs represent an approximate boundary between soil types and these transitions may be gradual.

GEOTECHNICAL BORING LOG LB-1

Project No.	11770.002	**Date Drilled**	1-11-18
Project	Civiltec-Victorville - Amethyst Pipeline	**Logged By**	BPC
Drilling Co.	2R Drilling Inc	**Hole Diameter**	8"
Drilling Method	Hollow Stem Auger - 140lb - Autohammer - 30" Drop	**Ground Elevation**	3333'
Location	Plate 1, Boring Location Map	**Sampled By**	BPC

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
	0			B1				ML	*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.* **Young Alluvial Fan Deposits (Qyf3)** SANDY SILT, light brown, slightly moist, with some vegetation	
3330				R1	17 23 39			SC	CLAYEY SAND (SC), dense, brown, slightly moist, fine to coarse sand, no to low plasticity, , LL=18, PI=10	
	5			R2	13 40 50 for 4			SC	CLAYEY SAND (SC), dense, brown to reddish brown, slightly moist, fine to coarse sand, no to low plasticity, poorly cemeneted with blocky to platey breakage, LL=24, PI=13	
3325										
	10			R3	30 50 for 6			SP	SAND (SP), dense, light brown to grayish brown, slightly moist, fine to coarse sand, no to low plasticity, with trace subrounded gravel and very little fines	
3320										
	15			R4	36 30 24			SP	SAND (SP), dense, tan, slightly moist, fine to coarse sand, no to low plasticity, with trace subrounded gravel and little fines	
3315									**Total depth of 16½ feet** **No groundwater encountered** **Backfilled with soil cuttings to ground surface**	
	20								*** POOR RECOVERY, DISTURBED**	
3310										
	25									
3305										
	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

GEOTECHNICAL BORING LOG LB-2

Project No.	11770.002	**Date Drilled**	1-11-18
Project	Civiltec-Victorville - Amethyst Pipeline	**Logged By**	BPC
Drilling Co.	2R Drilling Inc	**Hole Diameter**	8"
Drilling Method	Hollow Stem Auger - 140lb - Autohammer - 30" Drop	**Ground Elevation**	3314'
Location	Plate 1, Boring Location Map	**Sampled By**	BPC

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
	0			B1				SM	**Young Alluvial Fan Deposits (Qyf3)** SILTY SAND, light brown, dry, hard with trace gravel and some vegetation	
				R1	11 23 34			ML	SILT with sand (ML), dense, brown, slightly moist, fine to coarse sand, no to low plasticity	
3310	5			R2	14 25 22			ML	SILT with sand (ML), dense, brown, slightly moist, fine to coarse sand, no to low plasticity	
3305										
	10			R3	50 for 6			SC	CLAYEY SAND (SC), dense, brown to reddish brown, slightly moist, fine to coarse sand, no to low plasticity, blocky breakage, poorly cemented	
3300										
	15			R4	16 40 30			SP	SAND with gravel (SP), dense, light brown to grayish brown, slightly moist, fine to coarse sand, no to low plasticity	
									Total depth of 16½ feet **No groundwater encountered** **Backfilled with soil cuttings to ground surface**	
3295										
	20									
3290										
	25									
3285										
	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		

GEOTECHNICAL BORING LOG LB-3

Project No.	11770.002	**Date Drilled**	1-11-18
Project	Civiltec-Victorville - Amethyst Pipeline	**Logged By**	BPC
Drilling Co.	2R Drilling Inc	**Hole Diameter**	8"
Drilling Method	Hollow Stem Auger - 140lb - Autohammer - 30" Drop	**Ground Elevation**	3301'
Location	Plate 1, Boring Location Map	**Sampled By**	BPC

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
									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.	
3300	0			B1				ML	**Young Alluvial Fan Deposits (Qyf3)** SANDY SILT, brown, moist, with some vegetation	
				R1	7 15 27			ML	SILT with sand (ML), very stiff, brown, slightly moist, fine to coarse sand, no to low plasticity	
3295	5			R2	20 21 15			SM	SILTY SAND (SM), very dense, brown, slightly moist, fine to coarse sand, no to low plasticity	
3290	10			R3	14 35 50 for 5			SM	SAND with silt and gravel (SP), very dense, brown, slightly moist, fine to coarse sand, no to low plasticity	
3285	15			R4	35 40 40			SP	SAND with gravel (SP), dense, light brown to grayish brown, slightly moist, fine to coarse sand, no to low plasticity	
									Total depth of 16½ feet **No groundwater encountered** **Backfilled with soil cuttings to ground surface**	
3280	20									
3275	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

GEOTECHNICAL BORING LOG LB-4

Project No.	11770.002	**Date Drilled**	1-11-18
Project	Civiltec-Victorville - Amethyst Pipeline	**Logged By**	BPC
Drilling Co.	2R Drilling Inc	**Hole Diameter**	8"
Drilling Method	Hollow Stem Auger - 140lb - Autohammer - 30" Drop	**Ground Elevation**	3293'
Location	Plate 1, Boring Location Map	**Sampled By**	BPC

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
	0			B1				ML	**Young Alluvial Fan Deposits (Qyf3)** SANDY SILT, brown to light brown, moist, with gravel and vegetation	
3290				R1	8 17 17			SM	SILTY SAND (SM), very dense, brown, slightly moist, fine to coarse sand, no to low plasticity	
	5			R2	6 9 13			SM	SILTY SAND (SM), very dense, brown, slightly moist, fine to coarse sand, no to low plasticity	
3285										
	10			R3	13 30 40			SM	SILTY SAND (SM), very dense, brown, slightly moist, fine to coarse sand, no to low plasticity	
3280										
	15			R4	34 50 for 6			SP	SAND (SP), very dense, brown, slightly moist, fine to coarse sand, no to low plasticity, with trace fine gravel	
3275									**Total depth of 16½ feet** **No groundwater encountered** **Backfilled with soil cuttings to ground surface**	
	20									
3270										
	25									
3265										
	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		

GEOTECHNICAL BORING LOG LB-5

Project No.	11770.002	**Date Drilled**	1-11-18
Project	Civiltec-Victorville - Amethyst Pipeline	**Logged By**	BPC
Drilling Co.	2R Drilling Inc	**Hole Diameter**	8"
Drilling Method	Hollow Stem Auger - 140lb - Autohammer - 30" Drop	**Ground Elevation**	3288'
Location	Plate 1, Boring Location Map	**Sampled By**	BPC

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
	0			B1				ML	**Young Alluvial Fan Deposits (Qyf3)** SANDY SILT, brown to light brown, moist, with gravel and vegetation	
3285				R1	16 28 27			SM	SILTY SAND (SM), dense, brown, slightly moist, fine to coarse sand, no to low plasticity	
	5			R2	4 16 24			SM	SILTY SAND (SM), dense, brown, slightly moist, fine to coarse sand, no to low plasticity	
3280										
	10			R3	11 16 19			SP	SAND with gravel (SP), med. dense, light brown to grayish brown, slightly moist, fine to coarse sand, no to low plasticity, with trace fine gravel	
3275										
	15			R4	14 20 21			SP	SAND (SP), med. dense, brown, slightly moist, fine to coarse sand, no to low plasticity, **NO RECOVERY**, loose sand and gravel in cuttings	
3270									**Total depth of 16½ feet** **No groundwater encountered** **Backfilled with soil cuttings to ground surface**	
	20									
3265										
	25									
3260										
	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		

GEOTECHNICAL BORING LOG LB-6

Project No.	11770.002	**Date Drilled**	1-11-18
Project	Civiltec-Victorville - Amethyst Pipeline	**Logged By**	BPC
Drilling Co.	2R Drilling Inc	**Hole Diameter**	8"
Drilling Method	Hollow Stem Auger - 140lb - Autohammer - 30" Drop	**Ground Elevation**	3233'
Location	Plate 1, Boring Location Map	**Sampled By**	BPC

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
	0			B1				SW	**Young Alluvial Fan Deposits (Qyf3)** GRAVELY SAND, with little silt and cobbles, light brown, moist, with trace gravel, and some vegetation	
3230				R1	7 10 22			SP	SAND with silt and gravel (SP), med. dense, brown, slightly moist, medium to coarse sand, no to low plasticity, with trace fine gravel	
	5			R2	15 18 22			SP	SAND with silt and gravel (SP), med. dense, brown, slightly moist, medium to coarse sand, no to low plasticity, with trace fine gravel	
3225										
	10			R3	12 18 20			SP	SILT with sand (ML), med. dense, brown, slightly moist, fine to coarse sand, no to low plasticity, with trace fine gravel	
3220										
	15			R4	7 10 16			SP	GRAVEL with sand (GP), med. dense, brown, slightly moist, fine to coarse sand, no to low plasticity, with trace fine gravel	
3215										
	20			R5	16 50 for 6			SP	GRAVEL with sand (GP), med. dense, dark brown, slightly moist, fine to coarse sand, no to low plasticity	
3210									**Total depth of 21½ feet** **No groundwater encountered** **Backfilled with soil cuttings to ground surface**	
	25									
3205										
	30									

Italic: 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.

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

GEOTECHNICAL BORING LOG LB-7

Project No.	11770.002	**Date Drilled**	1-11-18
Project	Civiltec-Victorville - Amethyst Pipeline	**Logged By**	BPC
Drilling Co.	2R Drilling Inc	**Hole Diameter**	8"
Drilling Method	Hollow Stem Auger - 140lb - Autohammer - 30" Drop	**Ground Elevation**	3237'
Location	Plate 1, Boring Location Map	**Sampled By**	BPC

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
									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.	
3235	0			B1				SP	**Young Alluvial Fan Deposits (Qyf3)** SILTY SAND, light brown, moist, with trace gravel and cobble, and some vegetation	
				R1	10 14 17			SP	SAND with silt and gravel (SP), med. dense, brown, slightly moist, fine to coarse sand, no to low plasticity, with trace fine gravel	
3230	5			R2	8 13 14			SP	SAND with silt and gravel (SP), med. dense, brown, slightly moist, fine to coarse sand, no to low plasticity	
3225	10			R3	14 24 30			ML	SILT with sand (ML), med. dense, brown, slightly moist, fine to coarse sand, no to low plasticity, with trace fine gravel	
3220	15			R4	11 12 16			SP	GRAVEL with sand (GP), med. dense, dark brown, slightly moist, fine to coarse sand, no to low plasticity	
	20			R5	8 11 16			SP	GRAVEL with sand (GP), med. dense, slightly moist, fine to coarse sand, no to low plasticity, **NO RECOVERY**	
3215									**Total depth of 21½ feet** **No groundwater encountered** **Backfilled with soil cuttings to ground surface**	
3210	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

APPENDIX B
GEOTECHNICAL LABORATORY TESTING

Our geotechnical laboratory-testing program was directed toward a quantitative and qualitative evaluation of physical and mechanical properties of sampled soils at this site, and to aid in verifying Unified Soil Classification System (USCS) soil classification.

Moisture Content: As sampled moisture-content was determined (ASTM D 2216) on soil samples from our borings. In addition, in-situ dry-density determinations (ASTM D 2937) were performed on relatively undisturbed soil samples from our borings to measure unit weight (dry density). Results of these tests are presented on our boring logs in Appendix A.

Grain Size (Sieve) Analyses: Bulk soil samples were subjected to mechanical grain-size analysis by sieving from U.S. Standard brass screens (sieves; ASTM Test Methods D6913 and D1140). Results were evaluated to establish tested soil Unified Soil Classification System (USCS) classifications. Grain-size distribution curves are presented in this appendix on the "*Particle-Size Distribution*" sheets, and percent fines (percent passing the No. 200 U.S. Standard Sieve) are listed on boring logs in Appendix A.

Atterberg Limits: Liquid Limit (LL), Plastic Limit (PL) and Plasticity Index (PI) were determined for soil samples suspected to contain clay, in accordance with ASTM D4318. Specimens were air-dried, passed through a No. 40 sieve and then wetted to different moisture contents. These liquid and plastic limit tests were performed on the soil fraction passing the No. 40 sieve. Results of these tests are presented on the "*Atterberg Limits*" sheets in this appendix.

Modified Proctor Compaction Curve: A laboratory compaction curve (ASTM D1557) was completed for bulk soil samples to determine the modified Proctor laboratory maximum dry density and optimum moisture content. Results of this test are presented on the "*Modified Proctor Compaction Test*" plot in this appendix.

Direct Shear: Direct shear tests were performed on a remolded specimen of fill soils at this site, passing the #4 U.S. Standard Sieve. These specimens were remolded to 85-percent of the ASTM D 1557 modified Proctor laboratory maximum density, then soaked prior to testing. Three specimens contained in brass sampler rings were placed, one at a time, directly into the test apparatus and subjected to a range of normal loads appropriate for the anticipated conditions. Each sample was then sheared at a constant strain rate of 0.05 inch/minute. Shear deformation was recorded until a maximum of about 0.3-inch shear displacement was achieved. Results of these direct shear tests are presented graphically in this appendix on the attached Direct Shear Test Results figures.

Soil Corrosivity: Two samples of soils along this alignment were tested for corrosivity. Test for water-soluble sulfate, water-soluble chloride, pH and minimum resistivity were performed in accordance with State of California Standard Methods CTM 417 Part II, CTM 422, and CTM 532/643, respectively. These test results are presented at the end of this appendix.

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ATTERBERG LIMITS

ASTM D 4318

Project Name:	Civiltec/Victorville - TO-5 and Amethyst Pipeline	Tested By:	S. Felter	Date:	01/18/18
Project No. :	11770.002	Input By:	J. Ward	Date:	01/25/18
Boring No.:	LB-1	Checked By:	J. Ward		
Sample No.:	R1	Depth (ft.)	2.5		
Soil Identification:	Yellowish brown clayey sand (SC)				

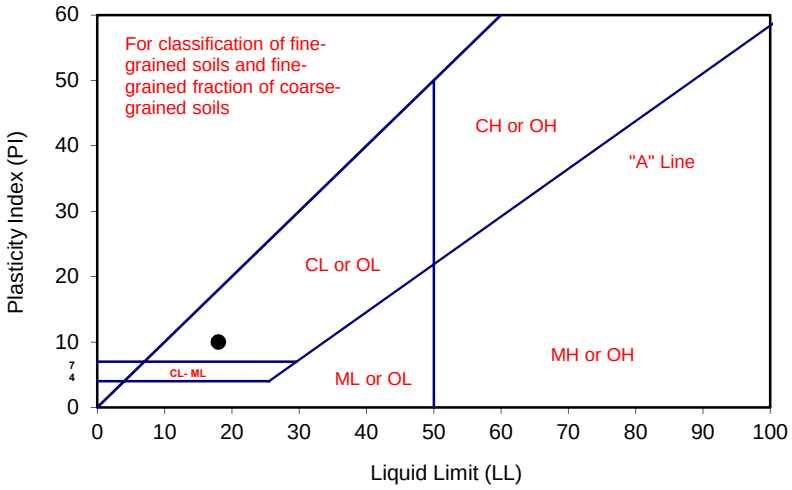
TEST	PLASTIC LIMIT		LIQUID LIMIT			
NO.	1	2	1	2	3	4
Number of Blows [N]			33	25	18	
Wet Wt. of Soil + Cont. (g)	23.74	23.79	36.09	38.26	38.50	
Dry Wt. of Soil + Cont. (g)	22.97	23.05	32.82	34.59	34.65	
Wt. of Container (g)	13.56	13.57	13.49	13.61	13.51	
Moisture Content (%) [Wn]	8.18	7.81	16.92	17.49	18.21	

Liquid Limit	**18**
Plastic Limit	**8**
Plasticity Index	**10**
Classification	**CL**

PI at "A" - Line = 0.73(LL-20) -1.46

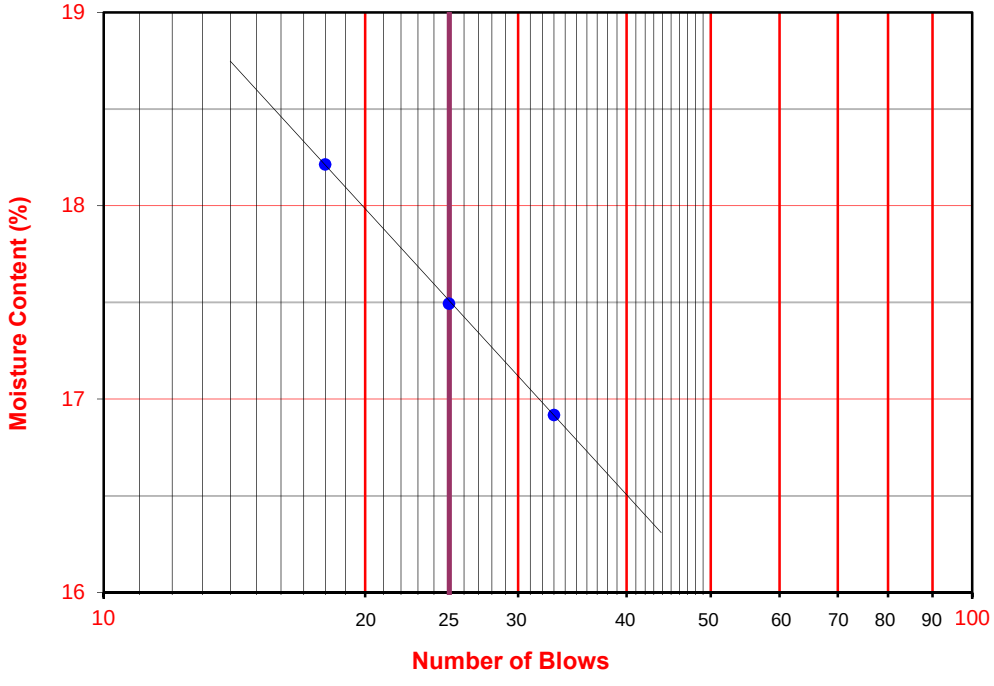
One - Point Liquid Limit Calculation

$LL = Wn(N/25)^{0.121}$



PROCEDURES USED

	Wet Preparation
	Multipoint - Wet
X	Dry Preparation
	Multipoint - Dry
X	Procedure A
	Multipoint Test
	Procedure B
	One-point Test



ATTERBERG LIMITS

ASTM D 4318

Project Name:	Civiltec/Victorville - TO-5 and Amethyst Pipeline	Tested By:	S. Felter	Date:	01/18/18
Project No. :	11770.002	Input By:	J. Ward	Date:	01/25/18
Boring No.:	LB-1	Checked By:	J. Ward		
Sample No.:	R2	Depth (ft.)	5.0		
Soil Identification:	Yellowish brown clayey sand (SC)				

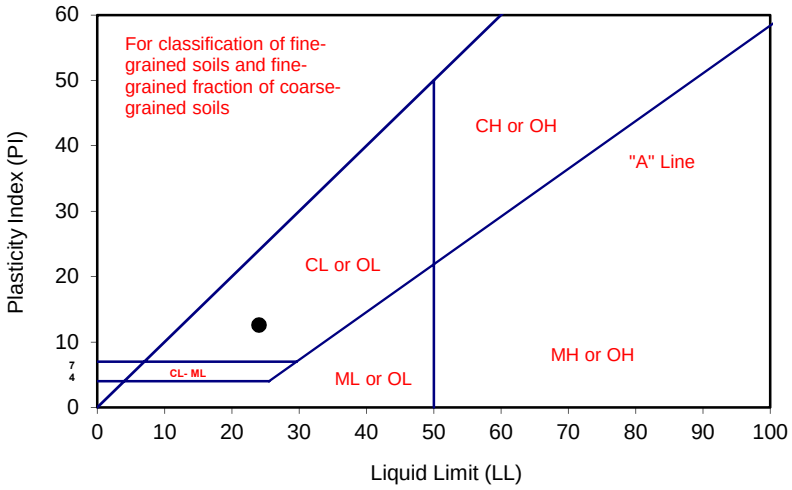
TEST	PLASTIC LIMIT		LIQUID LIMIT			
NO.	1	2	1	2	3	4
Number of Blows [N]			34	27	20	
Wet Wt. of Soil + Cont. (g)	23.74	23.74	37.37	35.91	37.45	
Dry Wt. of Soil + Cont. (g)	22.71	22.70	33.03	31.62	32.76	
Wt. of Container (g)	13.63	13.61	13.59	13.56	13.54	
Moisture Content (%) [Wn]	11.34	11.44	22.33	23.75	24.40	

Liquid Limit	**24**
Plastic Limit	**11**
Plasticity Index	**13**
Classification	**CL**

PI at "A" - Line = 0.73(LL-20) 2.92

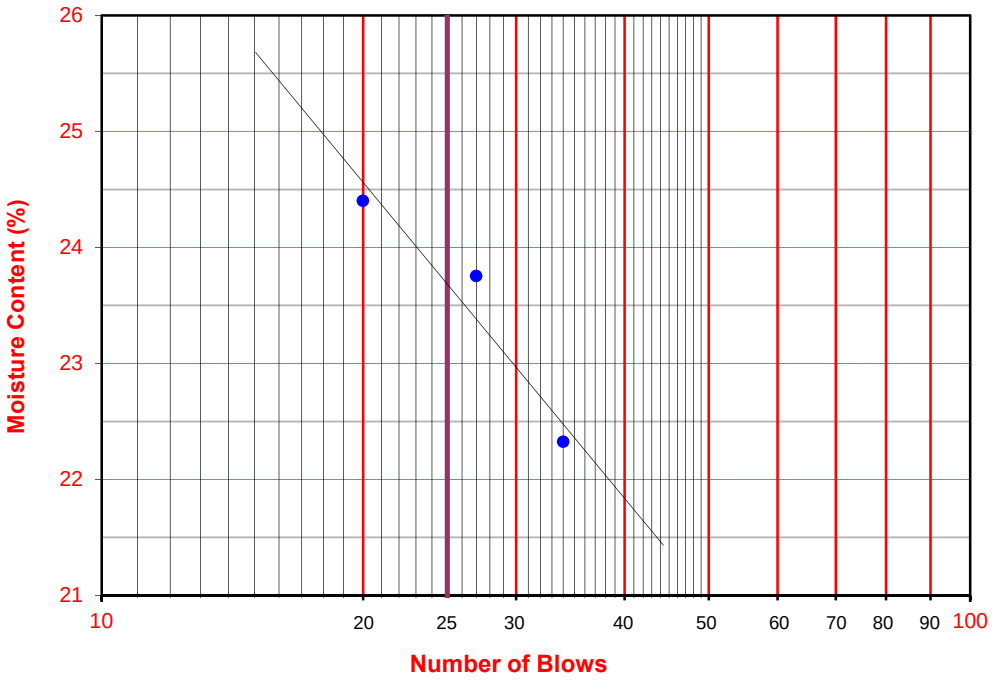
One - Point Liquid Limit Calculation

$LL = Wn(N/25)^{0.121}$



PROCEDURES USED

- [ ] Wet Preparation
  Multipoint - Wet
- [X] Dry Preparation
  Multipoint - Dry
- [X] Procedure A
  Multipoint Test
- [ ] Procedure B
  One-point Test

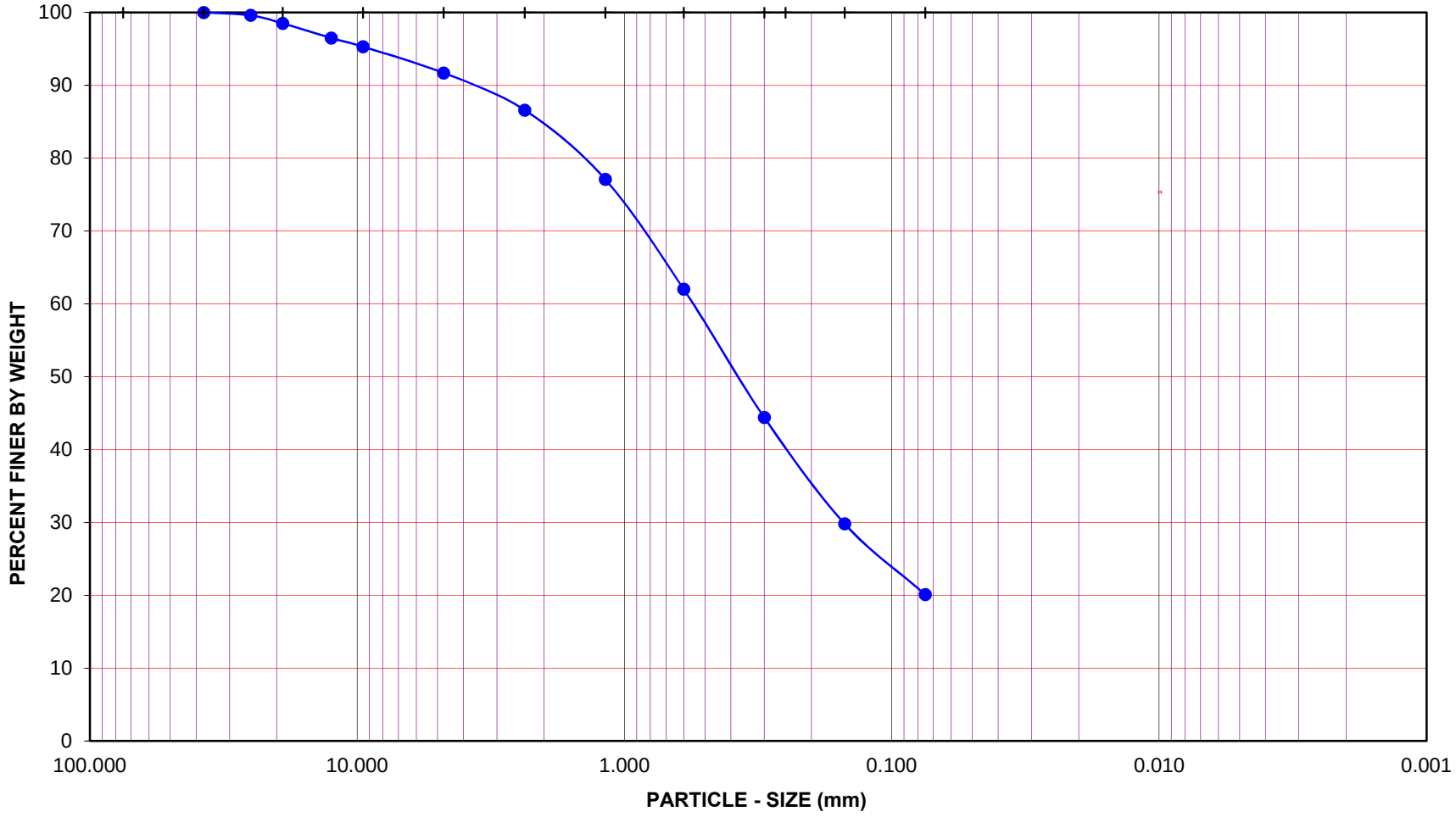


GRAVEL		SAND			FINES	
COARSE	FINE	COARSE	MEDIUM	FINE	SILT	CLAY

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: Civiltec/Victorville - TO-5 and Amethyst Pipeline

Project No.: 11770.002

Boring No.: LB-2 Sample No.: B1

Depth (feet): 0-5 Soil Type : SM

Soil Identification: Yellowish brown silty sand (SM)

GR:SA:FI : (%) 8 : 72 : 20

Leighton

PARTICLE - SIZE DISTRIBUTION ASTM D 6913

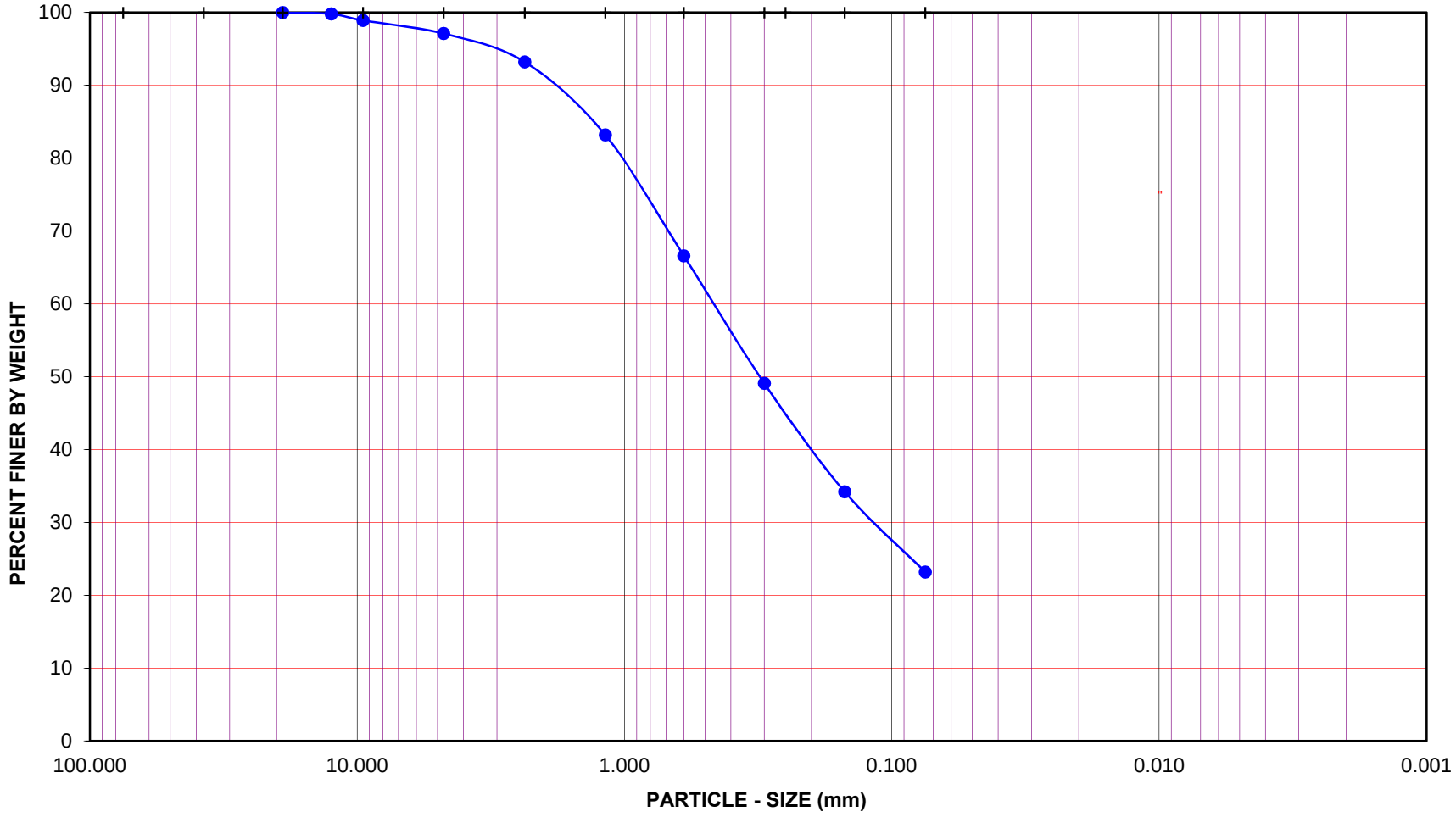
Jan-18

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: Civiltec/Victorville - TO-5 and Amethyst Pipeline

Project No.: 11770.002

Boring No.: LB-3 Sample No.: B1

Depth (feet): 0-5 Soil Type : SM

Soil Identification: Yellowish brown silty sand (SM)

GR:SA:FI : (%) 3 : 74 : 23

Leighton

PARTICLE - SIZE DISTRIBUTION ASTM D 6913

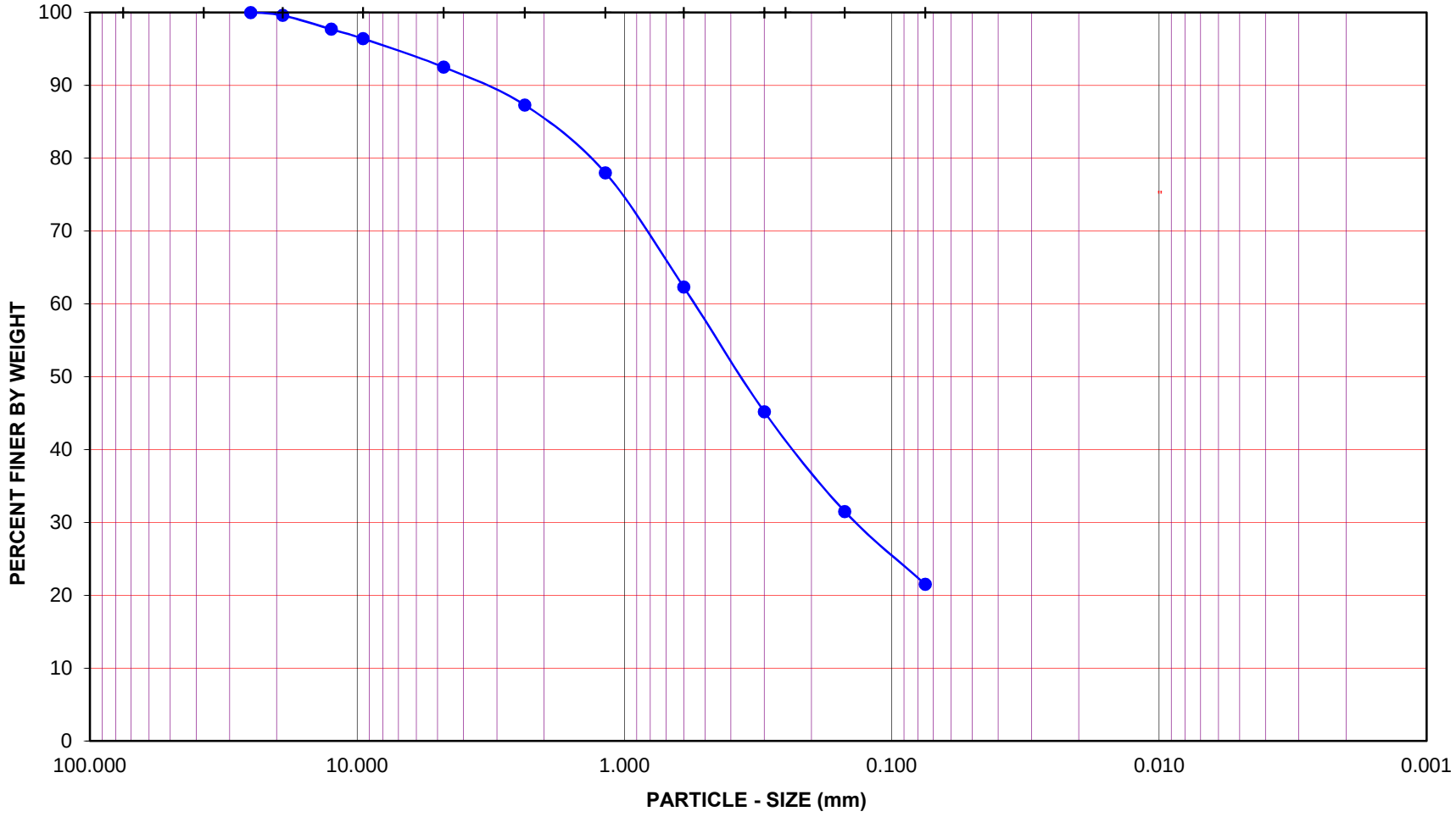
Jan-18

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: Civiltec/Victorville - TO-5 and Amethyst Pipeline

Project No.: 11770.002

Boring No.: LB-5 Sample No.: B1

Depth (feet): 0-5 Soil Type : SM

Soil Identification: Yellowish brown silty sand (SM)

GR:SA:FI : (%) 8 : 70 : 22

Leighton

PARTICLE - SIZE DISTRIBUTION ASTM D 6913

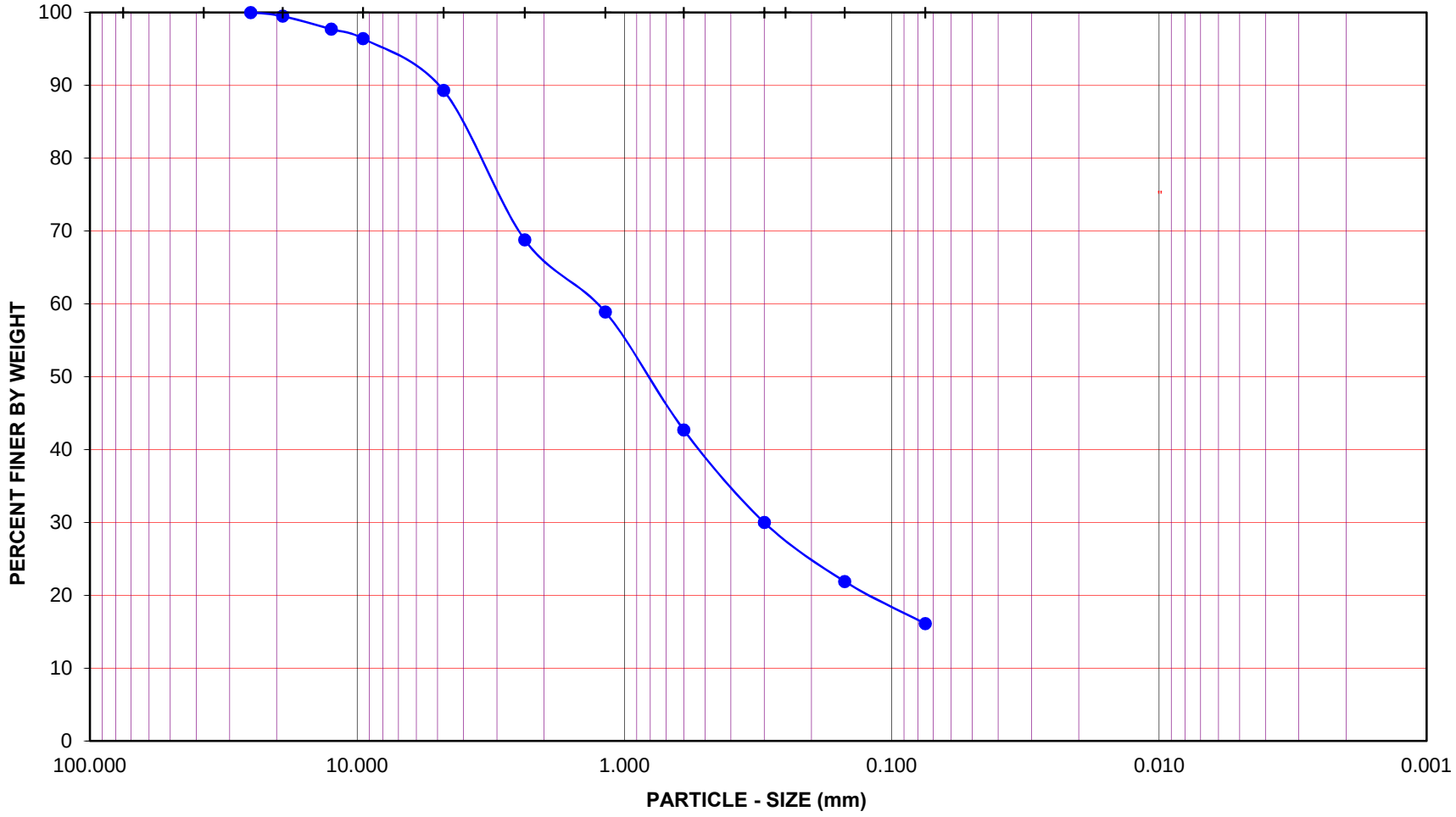
Jan-18

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: Civiltec/Victorville - TO-5 and Amethyst Pipeline

Project No.: 11770.002

Boring No.: LB-6 Sample No.: B1

Depth (feet): 0-5 Soil Type : SM

Soil Identification: Light brown silty sand (SM)

GR:SA:FI : (%) 11 : 73 : 16

Leighton

PARTICLE - SIZE DISTRIBUTION ASTM D 6913

Jan-18

MODIFIED PROCTOR COMPACTION TEST

ASTM D 1557

Leighton

Project Name:	Civiltec/Victorville - TO-5 and Amethyst Pipeline	Tested By:	R. Manning	Date:	01/12/18
Project No.:	11770.002	Input By:	J. Ward	Date:	01/15/18
Boring No.:	LB-4	Depth (ft.):	0-5		
Sample No.:	B1				
Soil Identification:	Dark yellowish brown silty sand (SM)				

Note: Corrected dry density calculation assumes specific gravity of 2.70 and moisture content of 1.0% for oversize particles

Preparation Method:	X	Moist
		Dry
Compaction Method	X	Mechanical Ram
		Manual Ram

Scalp Fraction (%)	
#3/4	
#3/8	
#4	6.6

Rammer Weight (lb.) = 10.0

Height of Drop (in.) = 18.0

Mold Volume (ft³) 0.03330

TEST NO.	1	2	3	4	5	6
Wt. Compacted Soil + Mold (g)	3859	3981	4025	3959		
Weight of Mold (g)	1852	1852	1852	1852		
Net Weight of Soil (g)	2007	2129	2173	2107		
Wet Weight of Soil + Cont. (g)	578.8	579.2	530.2	671.1		
Dry Weight of Soil + Cont. (g)	561.7	550.3	493.6	611.1		
Weight of Container (g)	39.3	39.9	39.2	39.3		
Moisture Content (%)	3.27	5.66	8.05	10.49		
Wet Density (pcf)	132.9	140.9	143.9	139.5		
Dry Density (pcf)	128.7	133.4	133.1	126.2		

Maximum Dry Density (pcf) 134.0

Corrected Dry Density (pcf) 136.0

Optimum Moisture Content (%) 7.0

Corrected Moisture Content (%) 6.5

[X] **Procedure A**
Soil Passing No. 4 (4.75 mm) Sieve
Mold : 4 in. (101.6 mm) diameter
Layers : 5 (Five)
Blows per layer : 25 (twenty-five)
May be used if +#4 is 20% or less

[ ] **Procedure B**
Soil Passing 3/8 in. (9.5 mm) Sieve
Mold : 4 in. (101.6 mm) diameter
Layers : 5 (Five)
Blows per layer : 25 (twenty-five)
Use if +#4 is >20% and +3/8 in. is 20% or less

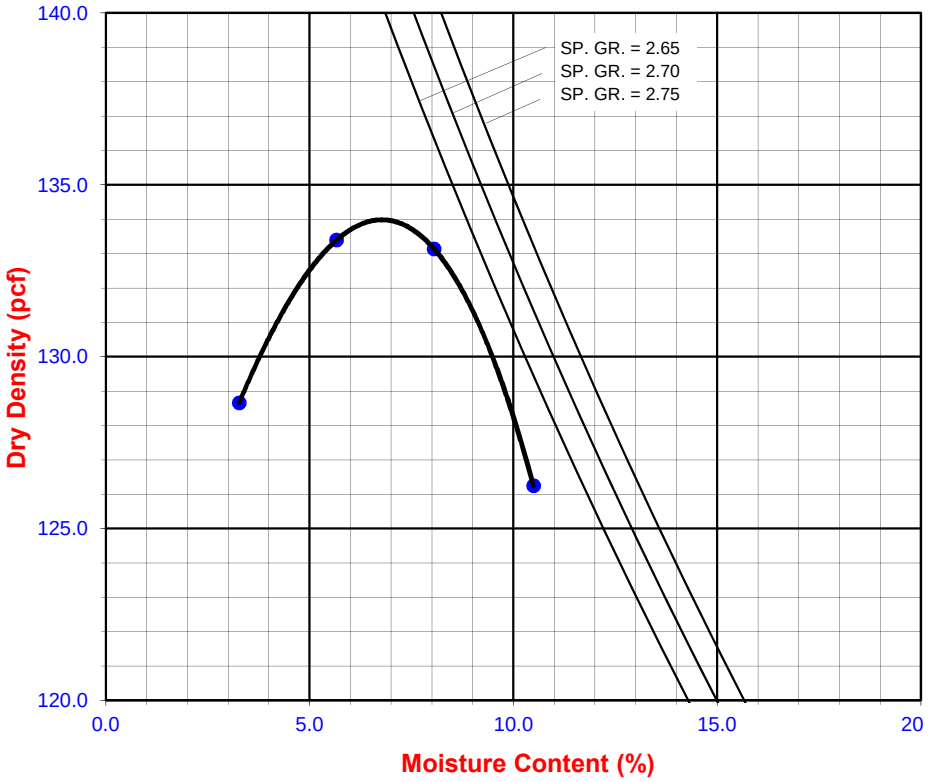
[ ] **Procedure C**
Soil Passing 3/4 in. (19.0 mm) Sieve
Mold : 6 in. (152.4 mm) diameter
Layers : 5 (Five)
Blows per layer : 56 (fifty-six)
Use if +3/8 in. is >20% and +¾ in. is <30%

Particle-Size Distribution:

GR:SA:FI

Atterberg Limits:

LL,PL,PI



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DIRECT SHEAR TEST

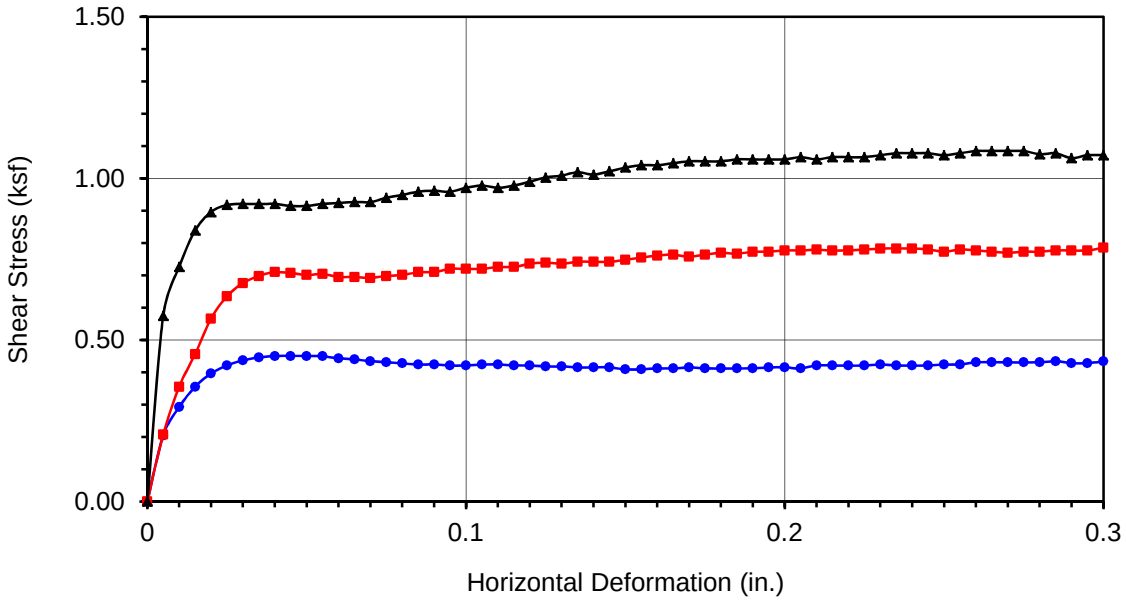
Consolidated Undrained

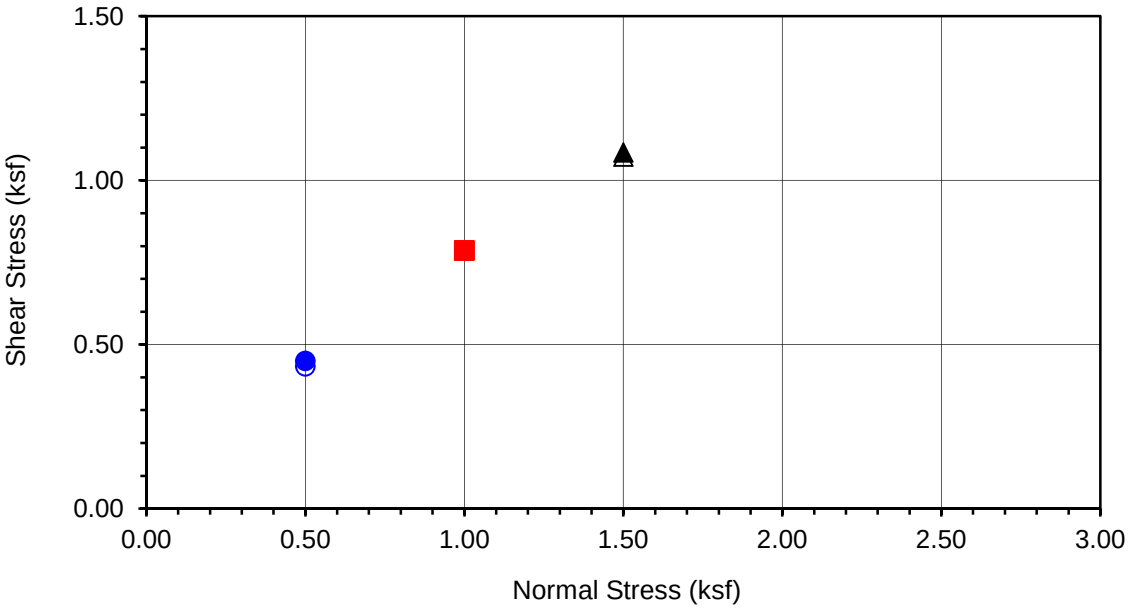
Civiltec/Victorville - TO-5 and Amethyst

Project Name:	Pipeline	Tested By:	G. Bathala	Date:	01/16/18
Project No.:	11770.002	Checked By:	J. Ward	Date:	01/25/18
Boring No.:	LB-4	Sample Type:	85% Remold		
Sample No.:	B1	Depth (ft.):	0-5		

Soil Identification: Dark yellowish brown silty sand (SM)

Sample Diameter(in):	2.415	2.415	2.415
Sample Thickness(in.):	1.000	1.000	1.000
Weight of Sample + ring(gm):	191.18	193.28	193.40
Weight of Ring(gm):	43.49	45.62	46.35
Before Shearing			
Weight of Wet Sample+Cont.(gm):	153.54	153.54	153.54
Weight of Dry Sample+Cont.(gm):	147.33	147.33	147.33
Weight of Container(gm):	57.40	57.40	57.40
Vertical Rdg.(in): Initial	0.2427	0.2687	0.0000
Vertical Rdg.(in): Final	0.2478	0.2754	-0.0086
After Shearing			
Weight of Wet Sample+Cont.(gm):	190.81	217.32	208.59
Weight of Dry Sample+Cont.(gm):	175.57	202.26	193.20
Weight of Container(gm):	39.59	66.99	57.53
Specific Gravity (Assumed):	2.70	2.70	2.70
Water Density(pcf):	62.43	62.43	62.43





Boring No.	**LB-4**
Sample No.	**B1**
Depth (ft)	**0-5**
Sample Type: 85% Remold	
Soil Identification: Dark yellowish brown silty sand (SM)	

Normal Stress (kip/ft²)	0.500	1.000	1.500
Peak Shear Stress (kip/ft²)	● 0.450	■ 0.786	▲ 1.085
Shear Stress @ End of Test (ksf)	○ 0.434	□ 0.786	△ 1.072
Deformation Rate (in./min.)	0.0500	0.0500	0.0500
Initial Sample Height (in.)	1.000	1.000	1.000
Diameter (in.)	2.415	2.415	2.415
Initial Moisture Content (%)	6.91	6.91	6.91
Dry Density (pcf)	114.9	114.9	114.4
Saturation (%)	39.9	39.9	39.4
Soil Height Before Shearing (in.)	0.9949	0.9933	0.9914
Final Moisture Content (%)	11.2	11.1	11.3

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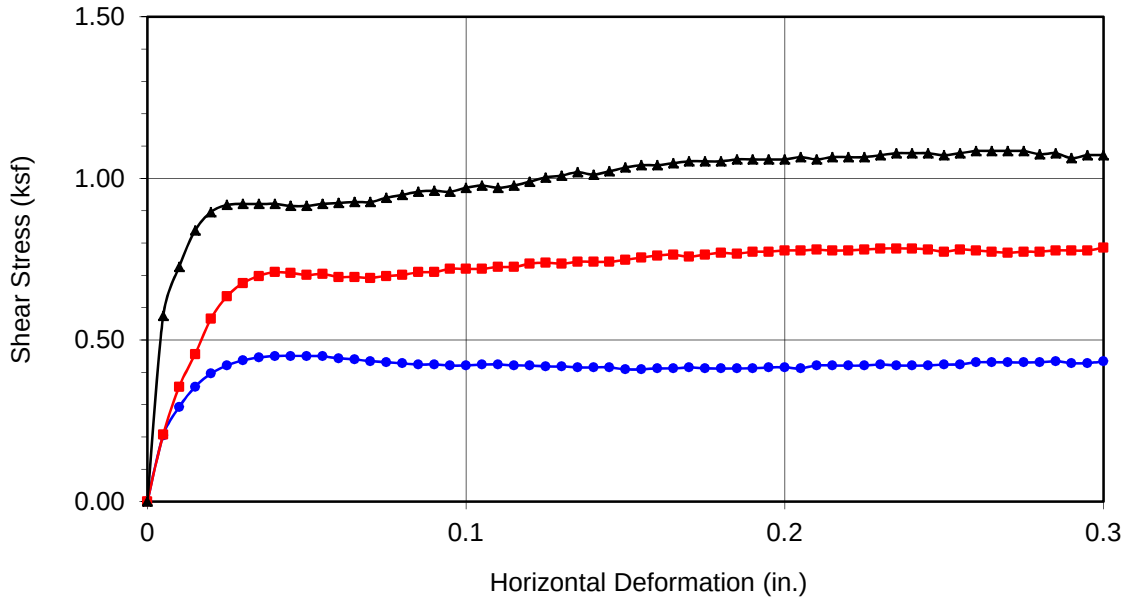
DIRECT SHEAR TEST RESULTS

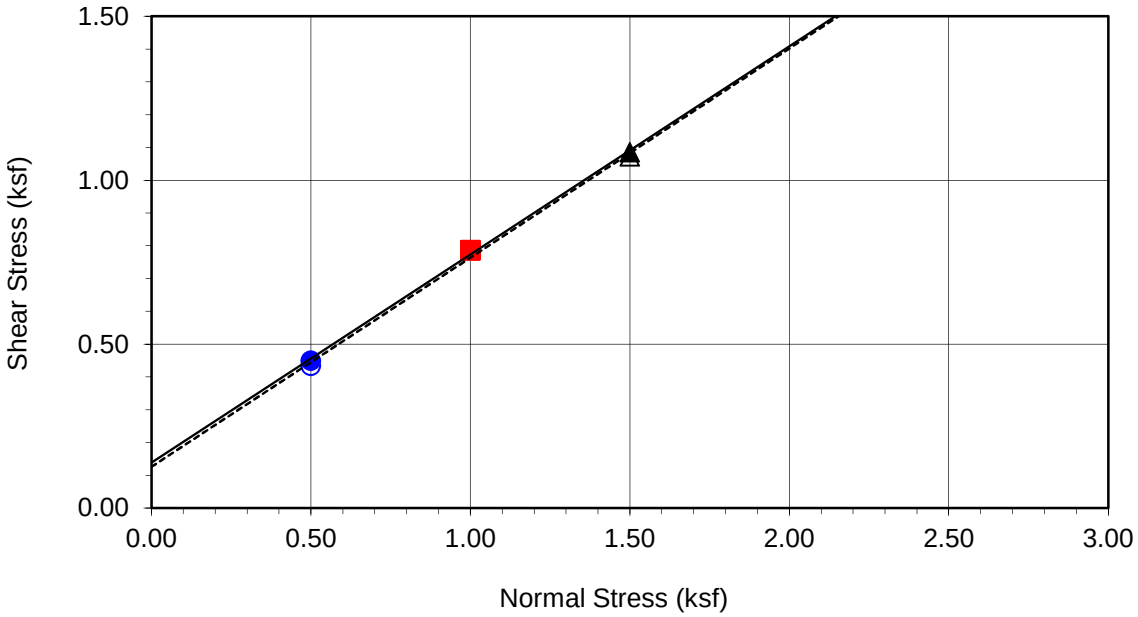
Consolidated Undrained

Project No.: 11770.002

Civiltec/Victorville - TO-5 and Amethyst Pipeline

01-18





Boring No.	**LB-4**
Sample No.	**B1**
Depth (ft)	**0-5**
Sample Type:	85% Remold
Soil Identification:	Dark yellowish brown silty sand (SM)

Strength Parameters

	C (psf)	ϕ (^{o})
Peak	139	32
Ultimate	126	33

Normal Stress (kip/ft²)	0.500	1.000	1.500
Peak Shear Stress (kip/ft²)	● 0.450	■ 0.786	▲ 1.085
Shear Stress @ End of Test (ksf)	○ 0.434	□ 0.786	△ 1.072
Deformation Rate (in./min.)	0.0500	0.0500	0.0500
Initial Sample Height (in.)	1.000	1.000	1.000
Diameter (in.)	2.415	2.415	2.415
Initial Moisture Content (%)	6.91	6.91	6.91
Dry Density (pcf)	114.9	114.9	114.4
Saturation (%)	39.9	39.9	39.4
Soil Height Before Shearing (in.)	0.9949	0.9933	0.9914
Final Moisture Content (%)	11.2	11.1	11.3

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DIRECT SHEAR TEST RESULTS

Consolidated Undrained

Project No.: 11770.002

Civiltec/Victorville - TO-5 and Amethyst Pipeline

01-18

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TESTS for SULFATE CONTENT
CHLORIDE CONTENT and pH of SOILS

Project Name: Civiltec/Victorville - TO-5 and Amethyst Pipeline Tested By : G. Berdy Date: 01/12/18

Project No. : 11770.002 Data Input By: J. Ward Date: 01/25/18

Boring No.	LB-1	LB-7		
Sample No.	B1	B1		
Sample Depth (ft)	0-5	0-5		
Soil Identification:	Yellowish brown SC	Yellowish brown SM		
Wet Weight of Soil + Container (g)	193.91	219.99		
Dry Weight of Soil + Container (g)	190.65	216.78		
Weight of Container (g)	59.02	52.58		
Moisture Content (%)	2.48	1.95		
Weight of Soaked Soil (g)	100.67	100.09		

SULFATE CONTENT, DOT California Test 417, Part II

Beaker No.	15	15		
Crucible No.	14	8		
Furnace Temperature (°C)	860	860		
Time In / Time Out	8:15/9:00	8:15/9:00		
Duration of Combustion (min)	45	45		
Wt. of Crucible + Residue (g)	23.7553	20.3868		
Wt. of Crucible (g)	23.7518	20.3863		
Wt. of Residue (g) (A)	0.0035	0.0005		
PPM of Sulfate (A) x 41150	144.02	20.58		
PPM of Sulfate, Dry Weight Basis	**148**	**21**		

CHLORIDE CONTENT, DOT California Test 422

ml of Extract For Titration (B)	15	15		
ml of AgNO3 Soln. Used in Titration (C)	0.5	0.4		
PPM of Chloride (C -0.2) * 100 * 30 / B	60	40		
PPM of Chloride, Dry Wt. Basis	**62**	**41**		

pH TEST, DOT California Test 643

pH Value	**6.46**	**6.68**		
Temperature °C	21.1	21.1		

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SOIL RESISTIVITY TEST

DOT CA TEST 643

Project Name:	Civiltec/Victorville - TO-5 and Amethyst Pipeline	Tested By :	G. Berdy	Date:	01/15/18
Project No. :	11770.002	Data Input By:	J. Ward	Date:	01/25/18
Boring No.:	LB-1	Depth (ft.) :	0-5		
Sample No. :	B1				

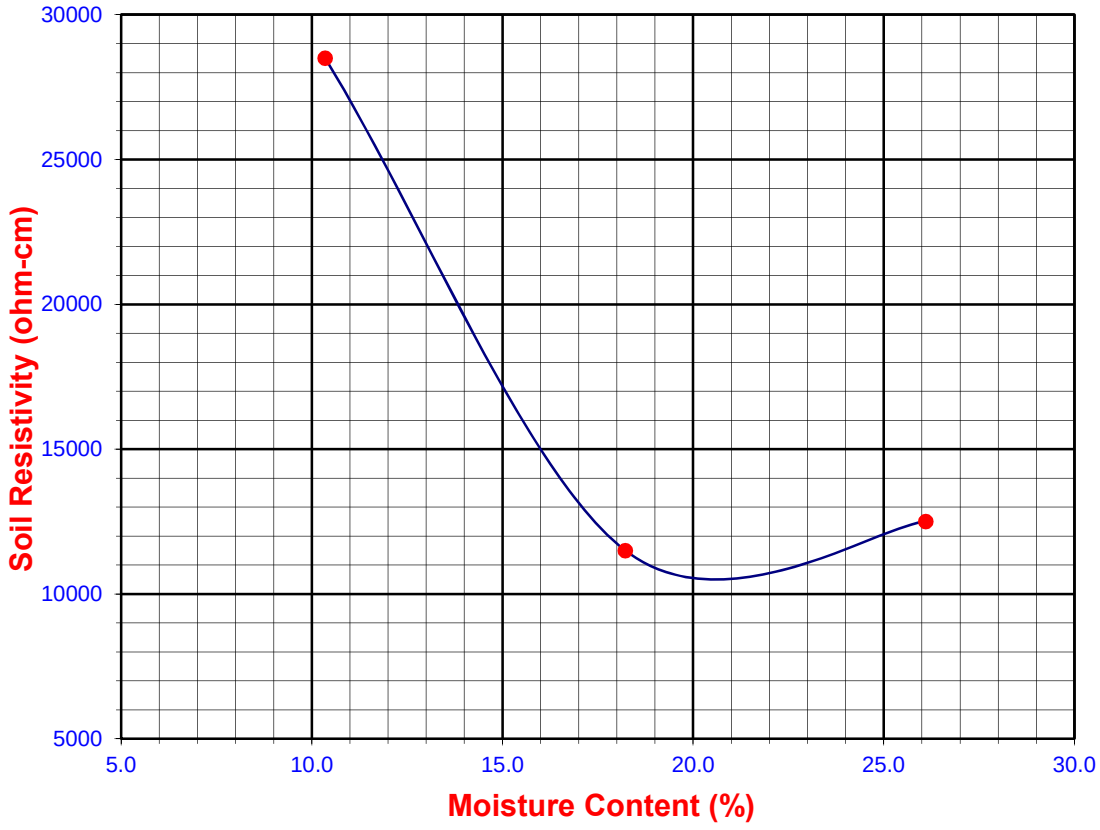
Soil Identification:* Yellowish brown SC

*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	10	10.35	28500	28500
2	20	18.22	11500	11500
3	30	26.10	12500	12500
4				
5				

Moisture Content (%) (MCi)	2.48
Wet Wt. of Soil + Cont. (g)	193.91
Dry Wt. of Soil + Cont. (g)	190.65
Wt. of Container (g)	59.02
Container No.	
Initial Soil Wt. (g) (Wt)	130.15
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	
10500	**20.6**	**148**	**62**	**6.46**	**21.1**



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SOIL RESISTIVITY TEST

DOT CA TEST 643

Project Name:	Civiltec/Victorville - TO-5 and Amethyst Pipeline	Tested By :	G. Berdy	Date:	01/16/18
Project No. :	11770.002	Data Input By:	J. Ward	Date:	01/25/18
Boring No.:	LB-7	Depth (ft.) :	0-5		
Sample No. :	B1				

Soil Identification:* Yellowish brown 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	10	9.78	22500	22500
2	20	17.61	15000	15000
3	30	25.44	18000	18000
4				
5				

Moisture Content (%) (MCi)	1.95
Wet Wt. of Soil + Cont. (g)	219.99
Dry Wt. of Soil + Cont. (g)	216.78
Wt. of Container (g)	52.58
Container No.	
Initial Soil Wt. (g) (Wt)	130.24
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	
14800	**18.4**	**21**	**41**	**6.68**	**21.1**