Valley Water

Clean Water • Healthy Environment • Flood Protection

Pacheco/Santa Clara Conduit Right-of-Way Acquisition Project

CEQA Draft Mitigated Negative Declaration
Project No. 92144001

November 2020

Prepared by:

Valley Water (Santa Clara Valley Water District)
Environmental Planning Unit
5750 Almaden Expressway
San Jose, CA 95118-3686

LIST OF APPENDICES

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APPENDIX A
Air Quality Calculations
California Emissions Estimator Model (CalEEMod)

SCVWD South County PL Improvements - Santa Clara County

Santa Clara County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Other Asphalt Surfaces	35.03	1000sqft	0.80	35,026.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	58
Climate Zone	4			**Operational Year**	2020
Utility Company	Pacific Gas & Electric Company				
CO2 Intensity (lb/MWhr)	641.35	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - Vault Construction in SC County. 13 vaults at 32' x 32'. Also 3 driveways at 30' x 15'. Also 1 roadway at 850' x 24'

Construction Phase - ta

Off-road Equipment - Equipment list provided by SCVWD

Off-road Equipment - Equipment List provided by SCVWD

Off-road Equipment - Equipmment List provided by SCVWD

Grading - Assume entirety of area graded.

Trips and VMT - Assume trip legnth from SCVWD. workers arrive in two trucks.

Table Name	Column Name	Default Value	New Value
tblConstructionPhase	NumDays	5.00	23.00

tblConstructionPhase	NumDays	2.00	26.00
tblConstructionPhase	NumDays	5.00	6.00
tblConstructionPhase	PhaseEndDate	4/30/2018	6/5/2018
tblConstructionPhase	PhaseEndDate	4/30/2018	5/8/2018
tblGrading	AcresOfGrading	16.25	0.80
tblOffRoadEquipment	HorsePower	130.00	142.00
tblOffRoadEquipment	HorsePower	80.00	36.00
tblOffRoadEquipment	HorsePower	130.00	142.00
tblOffRoadEquipment	HorsePower	80.00	36.00
tblOffRoadEquipment	HorsePower	212.00	66.00
tblOffRoadEquipment	HorsePower	402.00	330.00
tblOffRoadEquipment	HorsePower	212.00	66.00
tblOffRoadEquipment	HorsePower	402.00	330.00
tblOffRoadEquipment	HorsePower	212.00	66.00
tblOffRoadEquipment	HorsePower	402.00	330.00
tblOffRoadEquipment	HorsePower	187.00	179.00
tblOffRoadEquipment	LoadFactor	0.43	0.43
tblOffRoadEquipment	LoadFactor	0.38	0.38
tblOffRoadEquipment	LoadFactor	0.43	0.43
tblOffRoadEquipment	LoadFactor	0.38	0.38
tblOffRoadEquipment	LoadFactor	0.43	0.43
tblOffRoadEquipment	LoadFactor	0.38	0.38
tblOffRoadEquipment	LoadFactor	0.41	0.41
tblOffRoadEquipment	OffRoadEquipmentType		Crawler Tractors
tblOffRoadEquipment	OffRoadEquipmentType		Off-Highway Trucks
tblOffRoadEquipment	OffRoadEquipmentType		Crawler Tractors
tblOffRoadEquipment	OffRoadEquipmentType		Off-Highway Trucks
tblOffRoadEquipment	OffRoadEquipmentType		Crawler Tractors
tblOffRoadEquipment	OffRoadEquipmentType		Off-Highway Trucks
tblOffRoadEquipment	OffRoadEquipmentType		Graders

tblOffRoadEquipment	OffRoadEquipmentUnitAmount	4.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	4.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	UsageHours	7.00	10.00
tblOffRoadEquipment	UsageHours	7.00	10.00
tblOffRoadEquipment	UsageHours	7.00	10.00
tblOffRoadEquipment	UsageHours	7.00	10.00
tblProjectCharacteristics	OperationalYear	2018	2020
tblTripsAndVMT	VendorTripLength	7.30	25.00
tblTripsAndVMT	VendorTripLength	7.30	25.00
tblTripsAndVMT	VendorTripLength	7.30	25.00
tblTripsAndVMT	VendorTripNumber	0.00	2.00
tblTripsAndVMT	VendorTripNumber	0.00	2.00
tblTripsAndVMT	VendorTripNumber	0.00	2.00
tblTripsAndVMT	WorkerTripLength	10.80	25.00
tblTripsAndVMT	WorkerTripLength	10.80	25.00
tblTripsAndVMT	WorkerTripLength	10.80	25.00
tblTripsAndVMT	WorkerTripNumber	5.00	4.00
tblTripsAndVMT	WorkerTripNumber	10.00	4.00
tblTripsAndVMT	WorkerTripNumber	13.00	4.00

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	0.0576	0.5594	0.3072	7.3000e-004	3.6800e-003	0.0269	0.0306	9.4000e-004	0.0248	0.0257	0.0000	67.0291	67.0291	0.0192	0.0000	67.5081
Maximum	**0.0576**	**0.5594**	**0.3072**	**7.3000e-004**	**3.6800e-003**	**0.0269**	**0.0306**	**9.4000e-004**	**0.0248**	**0.0257**	**0.0000**	**67.0291**	**67.0291**	**0.0192**	**0.0000**	**67.5081**

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	0.0576	0.5594	0.3072	7.3000e-004	3.6800e-003	0.0269	0.0306	9.4000e-004	0.0248	0.0257	0.0000	67.0290	67.0290	0.0192	0.0000	67.5080
Maximum	**0.0576**	**0.5594**	**0.3072**	**7.3000e-004**	**3.6800e-003**	**0.0269**	**0.0306**	**9.4000e-004**	**0.0248**	**0.0257**	**0.0000**	**67.0290**	**67.0290**	**0.0192**	**0.0000**	**67.5080**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Quarter	Start Date	End Date	Maximum Unmitigated ROG + NOX (tons/quarter)	Maximum Mitigated ROG + NOX (tons/quarter)
1	5-1-2018	7-31-2018	0.2533	0.2533
		Highest	0.2533	0.2533

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Grading	Grading	5/1/2018	6/5/2018	5	26	Gravel Collars
2	Paving	Paving	5/1/2018	5/8/2018	5	6	Driveways
3	SCC8 Roadway	Paving	5/1/2018	5/31/2018	5	23	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0.8

Acres of Paving: 0.8

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
SCC8 Roadway	Cement and Mortar Mixers	0	6.00	9	0.56
Paving	Cement and Mortar Mixers	0	6.00	9	0.56
SCC8 Roadway	Pavers	1	10.00	142	0.42
Grading	Concrete/Industrial Saws	0	8.00	81	0.73
SCC8 Roadway	Rollers	1	10.00	36	0.38
SCC8 Roadway	Tractors/Loaders/Backhoes	0	7.00	97	0.37
Grading	Crawler Tractors	1	10.00	66	0.43
Paving	Pavers	1	10.00	142	0.42
Paving	Rollers	1	10.00	36	0.38
Grading	Off-Highway Trucks	1	10.00	330	0.38
Grading	Rubber Tired Dozers	0	1.00	247	0.40
Paving	Crawler Tractors	1	10.00	66	0.43
Paving	Off-Highway Trucks	1	10.00	330	0.38
Grading	Tractors/Loaders/Backhoes	0	6.00	97	0.37
Paving	Tractors/Loaders/Backhoes	0	7.00	97	0.37
SCC8 Roadway	Crawler Tractors	1	10.00	66	0.43
SCC8 Roadway	Off-Highway Trucks	1	10.00	330	0.38
SCC8 Roadway	Graders	1	10.00	179	0.41

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
SCC8 Roadway	5	4.00	2.00	0.00	25.00	25.00	20.00	LD_Mix	HDT_Mix	HHDT
Grading	2	4.00	2.00	0.00	25.00	25.00	20.00	LD_Mix	HDT_Mix	HHDT
Paving	4	4.00	2.00	0.00	25.00	25.00	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

3.2 Grading - 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					4.2000e-004	0.0000	4.2000e-004	5.0000e-005	0.0000	5.0000e-005	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0168	0.1661	0.0898	2.2000e-004		8.6600e-003	8.6600e-003		7.9700e-003	7.9700e-003	0.0000	19.8125	19.8125	6.1700e-003	0.0000	19.9667
Total	**0.0168**	**0.1661**	**0.0898**	**2.2000e-004**	**4.2000e-004**	**8.6600e-003**	**9.0800e-003**	**5.0000e-005**	**7.9700e-003**	**8.0200e-003**	**0.0000**	**19.8125**	**19.8125**	**6.1700e-003**	**0.0000**	**19.9667**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Vendor	3.7000e-004	7.9600e-003	2.0600e-003	2.0000e-005	5.8000e-004	9.0000e-005	6.8000e-004	1.7000e-004	9.0000e-005	2.6000e-004	0.0000	2.0353	2.0353	7.0000e-005	0.0000	2.0370
Worker	4.1000e-004	3.4000e-004	3.3900e-003	1.0000e-005	9.5000e-004	1.0000e-005	9.6000e-004	2.5000e-004	1.0000e-005	2.6000e-004	0.0000	0.8564	0.8564	2.0000e-005	0.0000	0.8570
Total	**7.8000e-004**	**8.3000e-003**	**5.4500e-003**	**3.0000e-005**	**1.5300e-003**	**1.0000e-004**	**1.6400e-003**	**4.2000e-004**	**1.0000e-004**	**5.2000e-004**	**0.0000**	**2.8916**	**2.8916**	**9.0000e-005**	**0.0000**	**2.8940**

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					4.2000e-004	0.0000	4.2000e-004	5.0000e-005	0.0000	5.0000e-005	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0168	0.1661	0.0898	2.2000e-004		8.6600e-003	8.6600e-003		7.9700e-003	7.9700e-003	0.0000	19.8124	19.8124	6.1700e-003	0.0000	19.9666
Total	**0.0168**	**0.1661**	**0.0898**	**2.2000e-004**	**4.2000e-004**	**8.6600e-003**	**9.0800e-003**	**5.0000e-005**	**7.9700e-003**	**8.0200e-003**	**0.0000**	**19.8124**	**19.8124**	**6.1700e-003**	**0.0000**	**19.9666**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	3.7000e-004	7.9600e-003	2.0600e-003	2.0000e-005	5.8000e-004	9.0000e-005	6.8000e-004	1.7000e-004	9.0000e-005	2.6000e-004	0.0000	2.0353	2.0353	7.0000e-005	0.0000	2.0370
Worker	4.1000e-004	3.4000e-004	3.3900e-003	1.0000e-005	9.5000e-004	1.0000e-005	9.6000e-004	2.5000e-004	1.0000e-005	2.6000e-004	0.0000	0.8564	0.8564	2.0000e-005	0.0000	0.8570
Total	**7.8000e-004**	**8.3000e-003**	**5.4500e-003**	**3.0000e-005**	**1.5300e-003**	**1.0000e-004**	**1.6400e-003**	**4.2000e-004**	**1.0000e-004**	**5.2000e-004**	**0.0000**	**2.8916**	**2.8916**	**9.0000e-005**	**0.0000**	**2.8940**

3.3 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	6.1900e-003	0.0575	0.0372	7.0000e-005		3.0700e-003	3.0700e-003		2.8300e-003	2.8300e-003	0.0000	6.7787	6.7787	2.1100e-003	0.0000	6.8314
Paving	1.0500e-003					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**7.2400e-003**	**0.0575**	**0.0372**	**7.0000e-005**		**3.0700e-003**	**3.0700e-003**		**2.8300e-003**	**2.8300e-003**	**0.0000**	**6.7787**	**6.7787**	**2.1100e-003**	**0.0000**	**6.8314**

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	8.0000e-005	1.8400e-003	4.8000e-004	0.0000	1.3000e-004	2.0000e-005	1.6000e-004	4.0000e-005	2.0000e-005	6.0000e-005	0.0000	0.4697	0.4697	2.0000e-005	0.0000	0.4701
Worker	9.0000e-005	8.0000e-005	7.8000e-004	0.0000	2.2000e-004	0.0000	2.2000e-004	6.0000e-005	0.0000	6.0000e-005	0.0000	0.1976	0.1976	1.0000e-005	0.0000	0.1978
Total	**1.7000e-004**	**1.9200e-003**	**1.2600e-003**	**0.0000**	**3.5000e-004**	**2.0000e-005**	**3.8000e-004**	**1.0000e-004**	**2.0000e-005**	**1.2000e-004**	**0.0000**	**0.6673**	**0.6673**	**3.0000e-005**	**0.0000**	**0.6678**

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	6.1900e-003	0.0575	0.0372	7.0000e-005		3.0700e-003	3.0700e-003		2.8300e-003	2.8300e-003	0.0000	6.7786	6.7786	2.1100e-003	0.0000	6.8314
Paving	1.0500e-003					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**7.2400e-003**	**0.0575**	**0.0372**	**7.0000e-005**		**3.0700e-003**	**3.0700e-003**		**2.8300e-003**	**2.8300e-003**	**0.0000**	**6.7786**	**6.7786**	**2.1100e-003**	**0.0000**	**6.8314**

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	8.0000e-005	1.8400e-003	4.8000e-004	0.0000	1.3000e-004	2.0000e-005	1.6000e-004	4.0000e-005	2.0000e-005	6.0000e-005	0.0000	0.4697	0.4697	2.0000e-005	0.0000	0.4701
Worker	9.0000e-005	8.0000e-005	7.8000e-004	0.0000	2.2000e-004	0.0000	2.2000e-004	6.0000e-005	0.0000	6.0000e-005	0.0000	0.1976	0.1976	1.0000e-005	0.0000	0.1978
Total	**1.7000e-004**	**1.9200e-003**	**1.2600e-003**	**0.0000**	**3.5000e-004**	**2.0000e-005**	**3.8000e-004**	**1.0000e-004**	**2.0000e-005**	**1.2000e-004**	**0.0000**	**0.6673**	**0.6673**	**3.0000e-005**	**0.0000**	**0.6678**

3.4 SCC8 Roadway - 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	0.0308	0.3182	0.1687	3.8000e-004		0.0150	0.0150		0.0138	0.0138	0.0000	34.3210	34.3210	0.0107	0.0000	34.5881
Paving	1.0500e-003					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Total	0.0319	0.3182	0.1687	3.8000e-004		0.0150	0.0150		0.0138	0.0138	0.0000	34.3210	34.3210	0.0107	0.0000	34.5881

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	3.2000e-004	7.0400e-003	1.8200e-003	2.0000e-005	5.2000e-004	8.0000e-005	6.0000e-004	1.5000e-004	8.0000e-005	2.3000e-004	0.0000	1.8004	1.8004	6.0000e-005	0.0000	1.8020
Worker	3.6000e-004	3.0000e-004	3.0000e-003	1.0000e-005	8.4000e-004	1.0000e-005	8.5000e-004	2.2000e-004	0.0000	2.3000e-004	0.0000	0.7576	0.7576	2.0000e-005	0.0000	0.7581
Total	**6.8000e-004**	**7.3400e-003**	**4.8200e-003**	**3.0000e-005**	**1.3600e-003**	**9.0000e-005**	**1.4500e-003**	**3.7000e-004**	**8.0000e-005**	**4.6000e-004**	**0.0000**	**2.5580**	**2.5580**	**8.0000e-005**	**0.0000**	**2.5601**

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	0.0308	0.3182	0.1687	3.8000e-004		0.0150	0.0150		0.0138	0.0138	0.0000	34.3210	34.3210	0.0107	0.0000	34.5881
Paving	1.0500e-003					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0319**	**0.3182**	**0.1687**	**3.8000e-004**		**0.0150**	**0.0150**		**0.0138**	**0.0138**	**0.0000**	**34.3210**	**34.3210**	**0.0107**	**0.0000**	**34.5881**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	3.2000e-004	7.0400e-003	1.8200e-003	2.0000e-005	5.2000e-004	8.0000e-005	6.0000e-004	1.5000e-004	8.0000e-005	2.3000e-004	0.0000	1.8004	1.8004	6.0000e-005	0.0000	1.8020
Worker	3.6000e-004	3.0000e-004	3.0000e-003	1.0000e-005	8.4000e-004	1.0000e-005	8.5000e-004	2.2000e-004	0.0000	2.3000e-004	0.0000	0.7576	0.7576	2.0000e-005	0.0000	0.7581
Total	**6.8000e-004**	**7.3400e-003**	**4.8200e-003**	**3.0000e-005**	**1.3600e-003**	**9.0000e-005**	**1.4500e-003**	**3.7000e-004**	**8.0000e-005**	**4.6000e-004**	**0.0000**	**2.5580**	**2.5580**	**8.0000e-005**	**0.0000**	**2.5601**

SCVWD South County PL Improvements - San Benito County

San Benito County, Summer

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Other Asphalt Surfaces	7.04	1000sqft	0.16	7,044.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.5	**Precipitation Freq (Days)**	50
Climate Zone	4			**Operational Year**	2020
Utility Company	Pacific Gas & Electric Company				
CO2 Intensity (lb/MWhr)	641.35	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use -

Construction Phase - yt

Off-road Equipment -

Off-road Equipment - Sponsor provided equipment list and HP. Truck HP highest for Ford F750.

Off-road Equipment - Sponsor provided equipment list and HP. Truck HP highest for Ford F750.

Trips and VMT - Assume 2 1-way vendor trips per day for gravel (collars) or concrete/asphalt (driveway). Workers to site in two lt duty pickups.

Grading -

Table Name	Column Name	Default Value	New Value
tblConstructionPhase	NumDays	2.00	6.00

tblConstructionPhase	NumDays	5.00	4.00
tblGrading	AcresOfGrading	3.75	0.00
tblGrading	MaterialExported	0.00	48.00
tblLandUse	BuildingSpaceSquareFeet	7,040.00	7,044.00
tblLandUse	LandUseSquareFeet	7,040.00	7,044.00
tblOffRoadEquipment	HorsePower	130.00	142.00
tblOffRoadEquipment	HorsePower	80.00	36.00
tblOffRoadEquipment	HorsePower	212.00	66.00
tblOffRoadEquipment	HorsePower	212.00	66.00
tblOffRoadEquipment	HorsePower	402.00	330.00
tblOffRoadEquipment	HorsePower	402.00	330.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	4.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	UsageHours	7.00	10.00
tblOffRoadEquipment	UsageHours	7.00	10.00
tblProjectCharacteristics	OperationalYear	2018	2020
tblTripsAndVMT	VendorTripNumber	0.00	2.00
tblTripsAndVMT	VendorTripNumber	0.00	2.00
tblTripsAndVMT	WorkerTripLength	10.80	30.00
tblTripsAndVMT	WorkerTripLength	10.80	30.00
tblTripsAndVMT	WorkerTripNumber	5.00	4.00
tblTripsAndVMT	WorkerTripNumber	10.00	4.00

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	2.2166	19.4555	12.7942	0.0262	0.1234	1.0262	1.1310	0.0331	0.9442	0.9723	0.0000	2,639.5537	2,639.5537	0.7924	0.0000	2,659.3632
Maximum	**2.2166**	**19.4555**	**12.7942**	**0.0262**	**0.1234**	**1.0262**	**1.1310**	**0.0331**	**0.9442**	**0.9723**	**0.0000**	**2,639.5537**	**2,639.5537**	**0.7924**	**0.0000**	**2,659.3632**

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	2.2166	19.4555	12.7942	0.0262	0.1234	1.0262	1.1310	0.0331	0.9442	0.9723	0.0000	2,639.5537	2,639.5537	0.7924	0.0000	2,659.3632
Maximum	**2.2166**	**19.4555**	**12.7942**	**0.0262**	**0.1234**	**1.0262**	**1.1310**	**0.0331**	**0.9442**	**0.9723**	**0.0000**	**2,639.5537**	**2,639.5537**	**0.7924**	**0.0000**	**2,659.3632**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Grading	Grading	5/1/2018	5/8/2018	5	6	Gravel Collars
2	Paving	Paving	5/9/2018	5/14/2018	5	4	Driveways

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 0.16

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
Grading	Concrete/Industrial Saws	0	8.00	81	0.73
Grading	Crawler Tractors	1	10.00	66	0.43
Grading	Off-Highway Trucks	1	10.00	330	0.38
Grading	Rubber Tired Dozers	0	1.00	247	0.40
Grading	Tractors/Loaders/Backhoes	0	6.00	97	0.37
Paving	Cement and Mortar Mixers	0	6.00	9	0.56
Paving	Crawler Tractors	1	10.00	66	0.43
Paving	Off-Highway Trucks	1	10.00	330	0.38
Paving	Pavers	1	10.00	142	0.42
Paving	Rollers	1	10.00	36	0.38
Paving	Tractors/Loaders/Backhoes	0	7.00	97	0.37

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Grading	2	4.00	2.00	6.00	30.00	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Paving	4	4.00	2.00	0.00	30.00	7.30	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

3.2 Grading - 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					1.0700e-003	0.0000	1.0700e-003	1.6000e-004	0.0000	1.6000e-004			0.0000			0.0000
Off-Road	1.2928	12.7486	6.8911	0.0166		0.6658	0.6658		0.6125	0.6125		1,674.0035	1,674.0035	0.5211		1,687.0320
Total	**1.2928**	**12.7486**	**6.8911**	**0.0166**	**1.0700e-003**	**0.6658**	**0.6658**	**1.6000e-004**	**0.6125**	**0.6127**		**1,674.0035**	**1,674.0035**	**0.5211**		**1,687.0320**

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	9.9600e-003	0.3166	0.0415	8.4000e-004	0.0175	1.7500e-003	0.0193	4.8100e-003	1.6800e-003	6.4900e-003		88.2557	88.2557	0.0154		88.6399
Vendor	0.0132	0.2869	0.0754	6.1000e-004	0.0136	2.5100e-003	0.0161	3.9100e-003	2.4000e-003	6.3000e-003		63.8993	63.8993	0.0158		64.2942
Worker	0.0395	0.0328	0.3469	9.1000e-004	0.0912	5.4000e-004	0.0918	0.0242	5.0000e-004	0.0247		90.8855	90.8855	3.0400e-003		90.9616
Total	**0.0627**	**0.6363**	**0.4638**	**2.3600e-003**	**0.1223**	**4.8000e-003**	**0.1271**	**0.0329**	**4.5800e-003**	**0.0375**		**243.0405**	**243.0405**	**0.0342**		**243.8957**

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					1.0700e-003	0.0000	1.0700e-003	1.6000e-004	0.0000	1.6000e-004			0.0000			0.0000
Off-Road	1.2928	12.7486	6.8911	0.0166		0.6658	0.6658		0.6125	0.6125	0.0000	1,674.0035	1,674.0035	0.5211		1,687.0320
Total	**1.2928**	**12.7486**	**6.8911**	**0.0166**	**1.0700e-003**	**0.6658**	**0.6668**	**1.6000e-004**	**0.6125**	**0.6127**	**0.0000**	**1,674.0035**	**1,674.0035**	**0.5211**		**1,687.0320**

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	9.9600e-003	0.3166	0.0415	8.4000e-004	0.0175	1.7500e-003	0.0193	4.8100e-003	1.6800e-003	6.4900e-003		88.2557	88.2557	0.0154		88.6399
Vendor	0.0132	0.2869	0.0754	6.1000e-004	0.0136	2.5100e-003	0.0161	3.9100e-003	2.4000e-003	6.3000e-003		63.8993	63.8993	0.0158		64.2942
Worker	0.0395	0.0328	0.3469	9.1000e-004	0.0912	5.4000e-004	0.0918	0.0242	5.0000e-004	0.0247		90.8855	90.8855	3.0400e-003		90.9616
Total	**0.0627**	**0.6363**	**0.4638**	**2.3600e-003**	**0.1223**	**4.8000e-003**	**0.1271**	**0.0329**	**4.5800e-003**	**0.0375**		**243.0405**	**243.0405**	**0.0342**		**243.8957**

3.3 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	2.0591	19.1357	12.3719	0.0247		1.0231	1.0231		0.9413	0.9413		2,484.7689	2,484.7689	0.7735		2,504.1074

Paving	0.1048					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	2.1639	19.1357	12.3719	0.0247		1.0231	1.0231		0.9413	0.9413		2,484.7689	2,484.7689	0.7735		2,504.1074

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	0.0132	0.2869	0.0754	6.1000e-004	0.0136	2.5100e-003	0.0161	3.9100e-003	2.4000e-003	6.3000e-003		63.8993	63.8993	0.0158		64.2942
Worker	0.0395	0.0328	0.3469	9.1000e-004	0.0912	5.4000e-004	0.0918	0.0242	5.0000e-004	0.0247		90.8855	90.8855	3.0400e-003		90.9616
Total	0.0527	0.3197	0.4223	1.5200e-003	0.1048	3.0500e-003	0.1078	0.0281	2.9000e-003	0.0310		154.7848	154.7848	0.0188		155.2558

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	2.0591	19.1357	12.3719	0.0247		1.0231	1.0231		0.9413	0.9413	0.0000	2,484.7689	2,484.7689	0.7735		2,504.1074
Paving	0.1048					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	2.1639	19.1357	12.3719	0.0247		1.0231	1.0231		0.9413	0.9413	0.0000	2,484.7689	2,484.7689	0.7735		2,504.1074

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	0.0132	0.2869	0.0754	6.1000e-004	0.0136	2.5100e-003	0.0161	3.9100e-003	2.4000e-003	6.3000e-003		63.8993	63.8993	0.0158		64.2942
Worker	0.0395	0.0328	0.3469	9.1000e-004	0.0912	5.4000e-004	0.0918	0.0242	5.0000e-004	0.0247		90.8855	90.8855	3.0400e-003		90.9616
Total	**0.0527**	**0.3197**	**0.4223**	**1.5200e-003**	**0.1048**	**3.0500e-003**	**0.1078**	**0.0281**	**2.9000e-003**	**0.0310**		**154.7848**	**154.7848**	**0.0188**		**155.2558**

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APPENDIX B
Biological Resource Studies

H. T. HARVEY & ASSOCIATES
Ecological Consultants

Memorandum

November 12, 2018 **Project 3700-15**

To: **Mike Coleman, Santa Clara Valley Water District**

From: **Steve Rottenborn and Kelly Hardwicke, H. T. Harvey & Associates**

Subject: **South County Pipeline Access Improvements Project—Proposed Mitigation Measures for Impacts to State and Federally Listed Species in San Benito County**

Introduction

The Santa Clara Valley Water District (District) is proposing the South County Pipeline Access Improvements Project, which entails improving access through formal agreements with landowners and implement cost-effective physical improvements to vaults and above-ground maintenance sites along the Pacheco Conduit and Santa Clara Conduit. As the California Environmental Quality Act (CEQA) lead agency, the District is preparing a Mitigated Negative Declaration (MND) to assess the environmental impacts of the project.

Among the resources that have the potential to be impacted by the project are the California tiger salamander (*Ambystoma californiense*), which is listed as threatened under the state and federal Endangered Species Acts; the California red-legged frog (*Rana draytonii*), which is federally listed as threatened; and the San Joaquin kit fox (*Vulpes macrotis mutica*), which is federally listed as endangered and state listed as threatened. As described in the MND that is in preparation, there are records of all three species in the vicinity of the project alignment, and potential habitat for these species occurs in a number of locations.

A majority of the project sites would be located within Santa Clara County and the plan area of the Santa Clara Valley Habitat Plan (VHP). The VHP is a joint Habitat Conservation Plan and Natural Communities Conservation Plan developed to serve as the basis for issuance of incidental take permits and authorizations pursuant to Section 10 of the federal Endangered Species Act, the California Endangered Species Act, and the California Natural Community Conservation Planning Act. Components of the proposed South County Pipeline Access Improvements Project that are located within Santa Clara County would be considered "covered activities" under the VHP. All activities associated with the proposed construction and operation of the project within Santa Clara County will be implemented consistent with the VHP's requirements. The California tiger salamander, California red-legged frog, and San Joaquin kit fox are all considered "covered species" under the VHP. As a result, compliance with VHP conditions, including the payment of impact fees for Santa Clara County components, will adequately mitigate impacts to these three species under CEQA for

project components in Santa Clara County and will enable the District to receive any necessary approval for take of these species, under the state and federal Endangered Species Acts, that may result from Santa Clara County project activities.

However, the VHP does not cover components of the project within San Benito County, or take of listed species that may result from those components. The purpose of this memo is to characterize the extent of impacts to the California tiger salamander, California red-legged frog, and San Joaquin kit fox, and their habitats, that may occur within the San Benito County portion of the project and to identify measures that will be implemented by the District to avoid, minimize, and compensate for impacts to these species from San Benito County activities. These mitigation measures are derived from measures required by the U.S. Fish and Wildlife Service (USFWS) and/or California Department of Fish and Wildlife (CDFW) for similar San Benito County projects in the vicinity of the South County Pipeline Access Improvements Project, most notably the District's Calaveras Fault Inlet/Outlet Access Road Culvert Replacement Project.

Proposed San Benito County Impacts and Mitigation Measures

California Tiger Salamander

Within San Benito County, driveway construction at Santa Clara Conduit (SCC) location 11 and SCC 12 would result in the permanent loss of 1.13 acres of upland habitat as a result of driveway paving, while driveway paving and and collar construction would result in the permanent loss of 0.86 acres of aquatic habitat at SCC 11 and SCC 12. Temporary impacts would occur to 1.75 acres of aquatic habitat for a new access route from SCC 12 to SCC 13. It is unlikely that California tiger salamanders breed within the impacted aquatic habitat at SCC 11, SCC 12, and SCC 13 due to the abundance of non-native predators (such as fish, bullfrogs, and crayfish) in these floodplain areas, but the possibility of breeding cannot be eliminated. Therefore, eggs or larvae could be destroyed by fill associated with collar construction (and larvae could be affected by increased turbidity in the remainder of the wetland) in these areas, and these wetland areas would be permanently lost as potential breeding habitat. Collar construction at SCC 17-SCC 18 would also result in the loss of up to 0.09 acre of upland refugial habitat, although these sites are bordered by actively farmed lands, reducing the likelihood that California tiger salamanders occur at these sites.

The Proposed Action falls within East Bay Unit 12 of designated critical habitat for the California tiger salamander (Central Distinct Population Segment). Specifically, vault SCC 13 is located within this critical habitat unit. Gate construction at SCC13 could impact one or two burrows that potentially provide upland refugial habitat for the California tiger salamander. However, given the very limited impacts to habitat at SCC 13 (mainly from occasional ATV-based trips from SCC 12 to SCC 13), the project will not result in substantial impacts to designated critical habitat of this species.

VHP impact fees would not be paid for habitat impacts, and VHP conditions would not be implemented, in San Benito County, as such impacts are not covered by the VHP. As a result, residual impacts on the California tiger salamander would be significant due to this species' regional rarity. Implementation of Mitigation Measures BIO-1 and BIO-2, which will be implemented for the San Benito County portion of the Project,

would reduce impacts to the California tiger salamander (and California red-legged frog, discussed below) to less than significant levels.

Mitigation Measure BIO-1. The following measures will be implemented during all Project activities in San Benito County to avoid and minimize impacts on the California tiger salamander and California red-legged frog (and San Joaquin kit fox, as indicated):

A. Between 14 and 30 days prior to the start of construction, a qualified biologist approved by the USFWS and CDFW will conduct a pre-construction survey for the California red-legged frog, California tiger salamander, and San Joaquin kit fox.

B. Equipment shall utilize existing levee surfaces for excavation and placement work and avoid disturbance of areas designated as wetlands if possible; otherwise, notice shall be given prior to entering area and work shall be limited to established bounded area(s).

C. Work will not be performed during days that rain/ surface runoff is expected to be generated.

D. Soil stockpile areas will be covered at night to prevent/discourage habitation by animals.

E. Excavation sidewalls will be covered to prevent runoff if rain occurs.

F. Before any heavy equipment stored overnight is moved, the qualified biologist shall inspect the area underneath and around the equipment to ensure that no California red-legged frogs, California tiger salamanders, or San Joaquin kit foxes are present and at risk of being crushed by moving equipment. If any tiger salamanders or kit foxes are present, the USFWS and CDFW will be contacted for further instructions, and if any red-legged frogs are present, the USFWS will be contacted for further instruction.

G. A qualified biologist will be on-site or on-call during all activities that could result in the take of the California tiger salamander, California red-legged frog, or San Joaquin kit fox. The qualifications of the biologist(s) will be presented to the USFWS and CDFW for review and approval prior to any groundbreaking at the project site. The biologist will have oversight over implementation of all components of Mitigation Measure 1, and if any of the requirements associated with these measures are not being fulfilled he/she will have the authority to stop project activities through communication with the Project Manager. If the biologist(s) exercises this authority, the USFWS and CDFW will be notified by telephone and electronic mail within one (1) working day.

H. Prior to initiation of any on-site preparation/construction activities, the approved biologist will conduct an education and training session for all available individuals who will be involved in the site preparation or construction, including the project representative(s) responsible for reporting take to the USFWS and CDFW. Training sessions will be required for all new or additional personnel before they are allowed to access the project site. Attendance sheets identifying attendees and the contractor/company they represent will be provided to the Service with the post-construction

compliance report. At a minimum, the training will include a description of the California red-legged frog, California tiger salamander, and San Joaquin kit fox, and their habitat requirements. Additional information will include the general measures, as they relate to the project, that are being implemented to conserve the species; the penalties for non-compliance with these measures; travel within the marked project site will be restricted to established roadbeds and the boundaries (work area) within which the project must be accomplished. To ensure that employees and contractors understand their roles and responsibilities, training may have to be conducted in languages other than English.

I. The limits of the construction area will be flagged, if not already marked by other fencing, and all activity will be confined within the marked area. All access to and from the project area will be clearly marked in the field with appropriate flagging and signs. Prior to commencing construction activities, the contractor will determine construction vehicle parking sites and all access routes. All construction activity will be confined within the project site, which may include temporary access roads, haul roads, and staging areas specifically designated and marked for these purposes. At no time will equipment or personnel be allowed to adversely affect habitat areas outside the project site without authorization from the USFWS.

J. To the extent possible, nighttime construction will be minimized.

K. Permanent and temporary disturbances to habitats of the California red-legged frog, California tiger salamander, and San Joaquin kit fox will be minimized to the maximum extent practicable. To minimize temporary disturbances, all project-related vehicle traffic will be restricted to established roads and other designated areas. These areas also will be included in pre-construction surveys and, to the maximum extent possible, will be established in locations disturbed by previous activities to prevent further adverse effects.

L. A 15-mile-an-hour speed limit will be required on unpaved roads within listed species habitats.

M. To prevent harassment, injury or mortality of special-status animals, or destruction of their burrows or dens, no pets of any kind will be permitted on construction sites.

N. The onsite biological monitor will check for animals under all vehicles and equipment such as stored pipes before the start of work each morning.

O. To prevent inadvertent entrapment of California red-legged frogs, California tiger salamanders, or San Joaquin kit foxes during construction, all excavated, steep-walled holes or trenches more than two feet deep shall be covered at the close of each working day by plywood or similar materials or provided with one or more escape ramps (with no greater than a 3:1 slope) constructed of earth fill or wooden planks. Before such holes or trenches are filled, they shall be thoroughly inspected for trapped animals by a qualified biologist. If an individual of one of these species is trapped, then it shall be allowed to escape on its own. In addition, all construction pipe, culverts, or similar structures with a diameter of 7.6 centimeters (3 inches) or greater that are stored at the construction site for one or more overnight periods will be thoroughly inspected for listed animals before the pipe is subsequently moved, buried,

or capped. If during inspection one of these animals is discovered inside a pipe that section of pipe shall not be moved until the animal has escaped on its own. If at any time a trapped listed animal is discovered, the on-site biologist will immediately place escape ramps or other appropriate structures to allow the animal to escape from the opening, or will contact the USFWS and/or CDFW by telephone for guidance. The USFWS and CDFW will be notified of the incident by telephone and electronic mail within one (1) working day.

P. All equipment will be maintained in accordance with the manufacturer's directions so there will be no leaks of fluids such as gasoline, oils, or solvents.

Q. To eliminate the attraction of predators into the action area, all food-related trash items such as wrappers, cans, bottles, and food scraps will be disposed of in closed containers; these containers will be removed at least once every day from the entire project site.

Mitigation Measure BIO-2. The District will provide compensatory mitigation for impacts to habitat of the California tiger salamander and California red-legged frog that occur in San Benito County. Mitigation will be provided at a 2:1 (mitigation:impact) ratio, on an acreage basis, for permanent impacts to suitable habitat. Mitigation may be satisfied through the preservation and management of suitable habitat occupied by these species and/or the purchase of credits at a conservation bank that has been approved by the USFWS and CDFW.

Prior to project implementation, the District will purchase credits from a conservation bank and/or prepare a Habitat Mitigation and Monitoring Plan (HMMP) describing the proposed mitigation lands and monitoring that will occur to ensure that those lands provide suitable habitat conditions in perpetuity. If the mitigation lands are suitable for both species, then the same land acreage can mitigate impacts to both species. The HMMP will be prepared by a qualified ecologist and will include the following:

- A summary of habitat impacts and proposed acres of habitat preservation
- The location of habitat enhancement site(s) and description of existing site conditions
- A monitoring plan (including final and performance criteria, monitoring methods, data analysis, reporting requirements, monitoring schedule, etc.). At a minimum, success criteria will include demonstration of the presence of suitable habitat for the California tiger salamander and California red-legged frog.

The mitigation lands will be preserved in perpetuity, and a funding mechanism to provide for maintenance and monitoring of the mitigation lands will be established.

California Red-legged Frog

Within San Benito County, driveway construction at SCC 11 and SCC 12 would result in the permanent loss of 1.13 acres of upland habitat as a result of driveway paving, while driveway paving and collar construction would result in the permanent loss of 0.86 acres of aquatic habitat at SCC 11 and SCC 12. Temporary impacts would

occur to 1.75 acres of aquatic habitat for a new access route from SCC 12 to SCC 13. It is unlikely that California tiger salamanders breed within the impacted aquatic habitat at SCC 11, SCC 12, and SCC 13 due to the abundance of non-native predators (such as fish, bullfrogs, and crayfish) in these floodplain areas, but the possibility of breeding cannot be eliminated. Therefore, eggs or larvae could be destroyed by fill associated with collar construction (and larvae could be affected by increased turbidity in the remainder of the wetland) in these areas, and these wetland areas would be permanently lost as potential breeding habitat. Collar construction at SCC 17 and SCC 18 would also result in the loss of up to 0.09 acre of upland dispersal habitat, although these sites are bordered by actively farmed lands, reducing the likelihood that California red-legged frogs occur at these sites.

As discussed above for the California tiger salamander, VHP impact fees would not be paid for habitat impacts, and VHP conditions would not be implemented, in San Benito County, as such impacts are not covered by the VHP. As a result, residual impacts on the California red-legged frog would be significant due to this species' regional rarity. Implementation of Mitigation Measures BIO-1 and BIO-2, described above, would reduce impacts to the California red-legged frog to less than significant levels.

San Joaquin Kit Fox

Within San Benito County, driveway construction at SCC 11 and SCC 12 would result in the permanent loss of 0.02 acres of potential upland habitat for kit foxes as a result of paving. Collar construction at SCC 17 and SCC 18 would result in the loss of approximately 0.05 acre of potential foraging and dispersal habitat.

VHP impact fees would not be paid for habitat impacts, and VHP conditions would not be implemented, in San Benito County, as such impacts are not covered by the VHP. Due to the rarity of the San Joaquin kit fox, impacts on this species from work in San Benito County could be significant, necessitating mitigation measures. Implementation of Mitigation Measure BIO-1 above will reduce impacts to kit foxes. In addition, implementation of Mitigation Measure BIO-3 will reduce impacts to kit foxes to less-than-significant levels. Due to the infrequency of occurrence of San Joaquin kit foxes in the project area, the loss of a small amount of potential habitat for the species is not expected to result in any substantive adverse effects on the species' population or distribution. As a result, no compensatory mitigation for impacts to potential San Joaquin kit fox habitat is necessary.

Mitigation Measure BIO-3. The following measures will be implemented during all Project activities in San Benito County to avoid and minimize impacts on the San Joaquin kit fox:

- Within 15 days prior to any ground disturbance, a qualified biologist will conduct a preconstruction survey in areas identified in the field evaluation as being suitable breeding or denning habitat. The surveys will evaluate use of dens by kits foxes using methods appropriate for the northern edge of the species' range, such as placing a tracking medium in the project area where suitable dens occur. Surveys will conclude no more than two calendar days prior to construction. To avoid last minute changes in schedule or contracting that may occur if a kit fox or active den is found, the qualified biologist may

also conduct a preliminary survey up to 14 days before construction. The survey area will include the proposed disturbance footprint and a 250-ft radius from the perimeter of the proposed footprint to identify San Joaquin kit foxes and/or suitable dens. The status of all dens will be determined and mapped. Written results of the preconstruction surveys will be submitted to USFWS and CDFW within two calendar days after survey completion and before the start of ground disturbance. If San Joaquin kit foxes and/or suitable dens (i.e., dens greater than 5 inches in diameter) are identified in the survey area, the following measures will be implemented:

- If a suitable San Joaquin kit fox den is discovered in the survey area, the den will be monitored for 3 days by a USFWS and CDFW-approved biologist using a tracking medium or an infrared beam camera to determine if the den is currently being used.
- Unoccupied dens will be destroyed immediately to prevent subsequent use.
- If a natal or pupping den is found, USFWS and CDFW will be notified immediately. The den will not be destroyed until the pups and adults have vacated and then only after further consultation with USFWS and CDFW.
- If kit fox activity is observed at the den during the initial monitoring period, the den will be monitored for an additional 5 consecutive days from the time of the first observation to allow any resident animals to move to another den while den use is actively discouraged. For dens other than natal or pupping dens, use of the den can be discouraged by partially plugging the entrance with soil such that any resident animal can easily escape. Once the den is determined to be unoccupied, it may be excavated under the direction of the biologist. Alternatively, if the animal is still present after 5 or more consecutive days of plugging and monitoring, the den may have to be excavated by hand when, in the judgment of a biologist, it is temporarily vacant (i.e., during the animal's normal foraging activities). If at any point during excavation a kit fox is discovered inside the den, the excavation activity shall cease immediately and monitoring of the den as described above will be resumed. Destruction of the den may be completed when, in the judgment of the biologist, the animal has escaped from the partially destroyed den.
- If active or suitable dens are identified within the proposed disturbance footprint or outside the proposed Project footprint but within a 250-foot buffer, exclusion zones around each den entrance or cluster of entrances will be demarcated. The configuration of exclusion zones will be circular, with a radius measured outward from the den entrance(s). No covered activities will occur within the exclusion zones. Exclusion zone radii for atypical dens and suitable dens will be at least 50 feet and will be demarcated with four to five flagged stakes. Exclusion zone radii for known dens will be at least 100 feet and will be demarcated with staking and flagging that encircles each den or cluster of dens but does not prevent access to the den by the foxes.
- If construction takes place while kit fox dens are occupied, a qualified biologist will be present to ensure compliance with the avoidance and minimization measures listed above. The frequency of monitoring will be approved by USFWS and CDFW and will be based on the frequency and intensity of construction activities and the likelihood of disturbance to the active dens. In most cases, monitoring will occur at least weekly, but in some cases daily monitoring may be appropriate to ensure that disturbance of San Joaquin kit fox is minimized.

- If a San Joaquin kit fox is found in the Project area during construction activities, the on-site biologist will halt construction and allow the animal to disperse on its own.

Wetlands and Waters of the U.S.

Wetlands or other waters of the U.S. were identified at fourteen vault or project impact locations. Of these, eleven (SCC 57, SCC 54, SCC 52, SCC 43, SCC 24, SCC 22, SCC 21, SCC 20, SCC 8, PC 34, and PC 2) are located within Santa Clara County and are within the Plan area for the VHP. An additional three vault impact sites with wetlands occur at locations SCC 11, SCC 12, and SCC 13 in San Benito County, outside of the Plan area. The study area for the wetland delineation included the proposed vault improvement area, which would include the placement of a gravel collar, as well as the footprint for any access improvements such as roads or gates. Some areas will be subject to fill placement to install the gravel collar (SCC 57, SCC 52, SCC 21, PC 34, PC 2, SCC 11, and SCC 12), or to install a new stabilized low water crossing for site access (SCC 54, SCC 8, and SCC 11-SCC 12). These fill-based impacts to wetlands or other waters of the U.S./state would be considered permanent. The gravel collars or stabilization for the road or asphalt driveways will preclude the re-establishment of wetland vegetation, and in the case of the unnamed ephemeral drainages at SCC 54 and SCC 8, will permanently alter the substrate of the bed and banks through placement of the road stabilization materials. Other impacts, such as gate installation, access routes that will not be paved, and new signs are activities that are not expected to place fill in or cause the permanent loss of wetlands or aquatic features, and therefore, these impacts are considered temporary. The extent of impacts at each site, and which habitat types will be impacted at each site, are described below in Table 1.

Table 1. Impacts to Waters of the U.S/State at Each Impact Site by Impact Type and Habitat

Pipeline	Vault No.	Activities Impacting Waters of the U.S./State	Impacted Habitat Type	Area of Impact (ac)
Santa Clara County Locations				
Pacheco Conduit (PC)	2	New gravel collar	Seasonal Wetland	< 0.001 Perm.
	34	New Unimproved Access Route	Seasonal Wetland	0.012 Temp.
Santa Clara Conduit (SCC)	8	New road to vault, stream crossing	Ephemeral Stream	< 0.001 Perm. (12 linear feet)
	20	Gate to Vault 21	Seasonal Wetland	0.004 Temp.
	21	New gravel collar	Seasonal Wetland	0.014 Perm.
	22	Gates (2), new gravel collar	Perennial Marsh	0.003 Perm.
	24	None, no wetlands at collar and gate will not impact ES24	None	0
	43	New gravel collar	Ephemeral Stream	0.003 Perm. (38 linear feet)
	52	New gravel collar	Seasonal Wetland	0.028 Perm.
	54	New driveway	Ephemeral Stream	0.004 Perm.

				(49 linear feet)
	57	New gravel collar	Seasonal Wetland in bed of Ephemeral Stream, Non-wetland portion of Ephemeral Stream	SW: <0.001 Perm. (12 linear feet) ES: 0.002 Perm. (31 linear feet)
	SANTA CLARA COUNTY TOTALS	Permanent Aquatic Impacts: 0.07 ac	Temporary Aquatic Impacts: 0.03 ac	County Aquatic Impact Total: 0.10 ac
San Benito County Locations				
Santa Clara Conduit (SCC)	11	New gate	Seasonal Wetland	0.018 Temp.
	12	New driveway, new gravel collar	Perennial Marsh, Ephemeral Stream	0.855 Perm. (793 linear feet)
	13	New access route	Perennial Marsh, Seasonal Wetland	1.73 Temp.
	SAN BENITO COUNTY TOTALS	Permanent Aquatic Impacts: 0.855 ac	Temporary Aquatic Impacts: 1.75 a	County Aquatic Impact Total: 2.61 ac
TOTALS	**Permanent Aquatic Impacts: 0.92 ac**		**Temporary Aquatic Impacts: 1.76 ac**	

These impacts represent a small surface area of wetland loss or impacts to streams at each location, both in terms of actual acreage and in terms of the unimpacted wetlands and stream areas surrounding each vault location. Total impacts to wetlands or waters of the U.S. would include approximately 0.92 acres of permanent impacts and 1.76 acres of temporary impacts. Of these, 0.052 acres of permanent impact and 0.016 acres of temporary impact would occur within Santa Clara County, in the VHP Plan Area. Payment of VHP stream and wetland fees would mitigate these impacts to a less than significant level. In San Benito County, outside the VHP Plan area, 0.855 acres of permanent impact and approximately 1.75 acres of temporary impact would occur. Impacts within San Benito County, outside the VHP area, are minor and will be minimized through observance of AMMs described in Section 2. As such, these impacts are considered less than significant and no compensatory mitigation is required.

Riparian and Other Sensitive Habitats

Impacts to sensitive riparian habitats, consisting of the grassy areas below top of bank and above the ordinary high water marks of two ephemeral streams regulated by the California Department of Fish and Wildlife, would occur at SCC 57, SCC 54, SCC 43, and SCC 8, all located in Santa Clara County, and SCC 12 in San Benito County. Impacts would occur from stabilization to create a permanent road crossing at SCC 54, SCC 8, and SCC 12, and from installation of a gravel collar at SCC 57 and SCC 43. These impacts are expected to permanently alter the banks of these ephemeral streams by placing stabilizing materials, such as gravel, in a keyed-in area of the bank. Though none of these riparian areas supports tree cover, the placement of these materials will preclude the reestablishment of grassy vegetation below top of bank. At a third location, PC 2, the

project has avoided impacts to sycamore alluvial woodland, a sensitive habitat type tracked by CNDDB and also considered regulated by the CDFW as riparian through vault collar redesign. Across all sites, impacts to riparian banks will comprise approximately 0.032 acres over 923 linear feet. These impacts would be mitigated to a less than significant level through the payment of VHP riparian impact fees for mixed riparian forest and woodland[1].

[1] This riparian category is what the Habitat Agency has asked us to use for grassy riparian banks (as such a category does not exist in the VHP land cover types), to ensure that VHP fee payment mitigates for LSAA impacts to this type of bank.

H. T. HARVEY & ASSOCIATES
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South County Right of Way Project

Santa Clara and San Benito Counties, California
Preliminary Delineation of
Wetlands and Other Waters

Project #3270-35

Prepared for:
Santa Clara Valley Water District

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October 9, 2018

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Executive Summary

H. T. Harvey & Associate biologists surveyed the Biological Study Area (BSA) for the South County Right of Way Project in Santa Clara and San Benito Counties, California for jurisdictional features that may be subject to regulation under the Clean Water Act, administered by the U.S. Army Corps of Engineers (USACE). Specifically, the 21.34 acres (ac) BSA was surveyed for potentially jurisdictional waters, including wetlands and other waters.

The results of the on-site determination are based upon existing conditions present at the time of the 2014 and 2018 surveys. The 30-year normal annual precipitation (1981-2010) for the site is an estimated 19.8 inches, with the majority falling between October and June (PRISM Climate Group 2014).

The 2014 surveys took place during the wet season, but the overall conditions observed during the delineation surveys were not considered to represent normal site conditions in the BSA because of below average precipitation in the five months prior to the delineation. The BSA receivedapproximately 4.7 inches of precipitation between October 2013 and February 2014, which was only 24 percent of normal annual rainfall (NCDC 2014 and PRISM Climate Group 2014). Below-average precipitation likely contributed to a lack of observed or recent hydrology indicators in some locations, but the wetland boundaries remained clear due to the presence of hydrophytic vegetation and persistent hydric soil indicators.

In 2018, newly added areas to the BSA were surveyed for jurisdictional waters. The surveys took place in the dry season in and the overall conditions observed during the delineation surveys were considered to represent normal site conditions in the BSA. Total precipitation recorded for the five months prior to the May delineation survey (December 2017 to April 2018) at the Hollister 5.4 NNE weather station was 7.8 in, which was within the normal range of precipitation (NOAA 2018).

Approximately 3.36 ac of potential jurisdictional waters were identified within the BSA, including 3.14 acof Section 404 wetlands and 0.22 ac of Section 404 other waters situated below the ordinary high water mark of creeks. All potentially jurisdictional features connect with the Pajaro River, a traditionally navigable water that empties into Monterey Bay. The remaining land within the study area does not meet the definition of wetlands or other waters potentially subject to USACE jurisdiction; this includes 17.98 ac of upland habitat. The table below summarizes the potential jurisdictional waters within the study area.

Summary of Potential Jurisdictional Waters

Potential Jurisdictional Waters	Acres*
Section 404 Wetlands	**3.14**
Perennial marsh wetlands	1.34
Seasonal wetlands	1.80
Section 404 Other Waters	**0.22**
Ephemeral streams	0.22
Culverts	0.004
Total of Jurisdictional Waters	**3.36**
Upland	**17.98**
Study Area Total	**21.34**

*Values are approximate due to rounding errors.

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Section 1.0 Introduction

1.1 Study Area Description

The Biological Study Area (BSA) for the South County Right of Way Project (Project) is located within in unincorporated areas of Santa Clara and San Benito Counties, California between the cities of Morgan Hill and Hollister (Figure 1). The Project is located within the *Gilroy*, *Chittenden*, *San Felipe*, and *Pacheco Peak* U.S. Geological Survey (USGS) 7.5-minute quadrangle maps, in Township 9 South, Range 3 East, Sections 26 and 36; Township 10 South, Range 4 East, Sections 6, 7, 20, 28; Township 10, Range 6 East, Section 24; Township 11 South, Range 4 East, Sections 3, 11, and 13; Township 11 South, Range 5 East, Sections 15, 16 and 17; and Township 11 South, Range 6 East, Section 6 (Figure 2). Elevation within the BSA ranges from approximately 140 feet (WGS84) above mean sea level in the central portion of the BSA, near the border of Santa Clara and San Benito counties, and 450 feet (WGS84) in the eastern portion along Pacheco Creek (Google Inc. 2018). The BSA is within the Santa Clara Valley and foothills of the Diablo Mountains. There is little natural topographic variation within the BSA, with the gradient of slopes ranging from 0 to 5 percent (Figure 3). Annual temperature of the BSA ranges from a low of 47.4 to a high of 73.5 degrees Fahrenheit, and annual precipitation is approximately 19.8 inches (PRISM Climate Group 2014).

The BSA includes 29 vault locations of the Santa Clara (SCC) and Pacheco Conduits (PC), which are a part of the of the San Felipe Division conduit and tunnels supplying raw water to both the Santa Clara Valley Water District (SCVWD) and San Benito County Water District (SBCWD). The BSA encompasses a total area of of 21.34 ac within the Pajaro River watershed, which flows toward Monterey Bay (Figures 1 and 2). The BSA runs parallel to U.S. Route 101 (US101) and State Route 152 (SR152) and is comprised of rural residences, agricultural land, and ranchland.

Table 1 provides a summary of the 20 soil units mapped in the BSA, along with their associated textures, drainage classification, and hydric soil status (NRCS 2014). Soils are dominated by clay loams, although of variety of soil textures have been mapped on the BSA with a wide range of drainage classifications, from well-drained to poorly drained (Table 1, Figure 3, Appendix B). Hydric soils include Campbell silty clay loam, muck substratum; Clear Lake clay, saline; Cropley clay, 2 to 9 percent slopes; Riverwash; San Ysidro loam, 0-2 percent slopes; and Willows clay. Soils that include hydric inclusions in the Clear Lake series when found in low depressions, or low alluvial floodplains include Campbell silty clay loam; Cropley clay, 0 to 2 percent slopes; Pacheco fine sandy loam; and Pacheco clay loam over clay. Rincon clay loam, 2 to 9 percent slopes contains hydric inclusions within the Cropley series. Mild to moderate alkaline soil types within the BSA include Campbell silty clay loam; Cropley clay, 0 to 2 percent slopes; Pacheco fine sandy loam; Pacheco clay loam over clay; and Willows clay.

The U.S. Fish and Wildlife Service (USFWS) National Wetlands Inventory (NWI) mapping for the BSA is depicted in Figure 4. The NWI identifies several wetland and aquatic features within the vicinity of or in the

BSA (NWI 2018). The portions of Tennant Creek and Elephant Head Creek within the BSA at SCC57 and PC34, respectively, are classified as riverine, intermittent streambeds that are seasonally flooded (R4SBC). At PC 2, Pacheco Creek is classified as riverine, upper perennial, unconsolidated bottom, and permanently flooded (R3UBH). Directly north of the BSA at SCC 18 and 19, the NWI has mapped a palustrine, unconsolidated shore, seasonally flooded wetland within an excavated basin (PUSCx). At SCC56, an unnamed tributary to Little Llagas Creek enters the BSA and is classified as a riverine, intermittent streambed that is seasonally flooded (R4SBC).

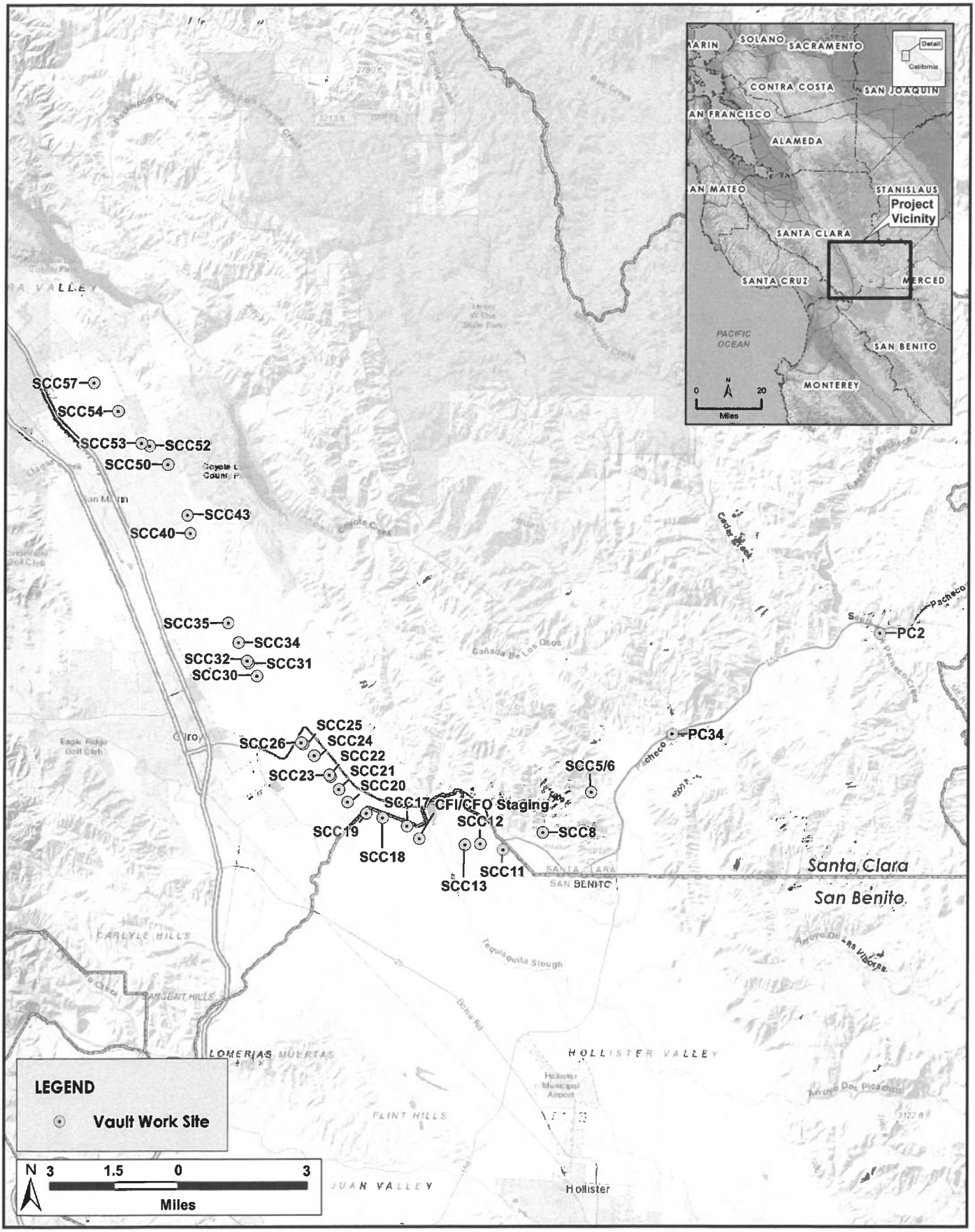
1.2 Project Description

The South County Right of Way Project would obtain new easements for the purpose of accessing existing vaults along the SCC and PC for maintenance and repairs by the SCVWD and SBCWD. The facilities were constructed by the U.S. Bureau of Reclamation (USBR) in the 1980's as a part of the Federal Central Valley Project which conveys water from the water-rich northern part of California to the more arid parts of the state. Full maintenance access easements were not obtained in the 1980's when the pipeline was originally constructed by USBR. The era of obtaining vehicle and worker access by verbal agreement to conduct pipeline maintenance will not likely be viable in future years due to growing development pressure in the region and thus formal access for the pipeline is necessary.

The Project would improve access to these sites by: (1) installing gravel collars around vaults at selected locations so these areas would be kept free weeds and brush for full access by crews; (2) constructing new driveway exits off of public roads to provide access to vaults at selected locations; (3) installing a number of new gates as needed to control safe access at certain vaults; (4) grading several new gravel access roads; and (5) installing one new sign post at vault SCC 12 to make the vault location more visible to crews. The BSA areas were determined through information provided by Project engineers for each repair location. A small buffer surrounding these expected impacts was also included.

1.3 Survey Purpose

H. T. Harvey & Associates (HTH) surveyed the BSA (Figure 2) on 5, 6, 11, 19 March 2014, 29 April 2014, and 1 May 2014 for areas that may meet the physical criteria and regulatory definition of "waters of the United States" (jurisdictional waters). The BSA was expanded in 2018 to include additional proposed access roads and gates. These newly added areas were surveyed for jurisdictional waters on 3, 24 May 2018, 25 June 2018, and 27 July 2018. The purpose of the field surveys was to identify the extent and distribution of potentially jurisdictional waters such as wetlands and other waters occurring within the study area boundaries under conditions existing at the time of the survey.



N:\Projects\3700\3700-01\15\Reports\USACE June 2018\Fig 1 Vicinity Map.mxd

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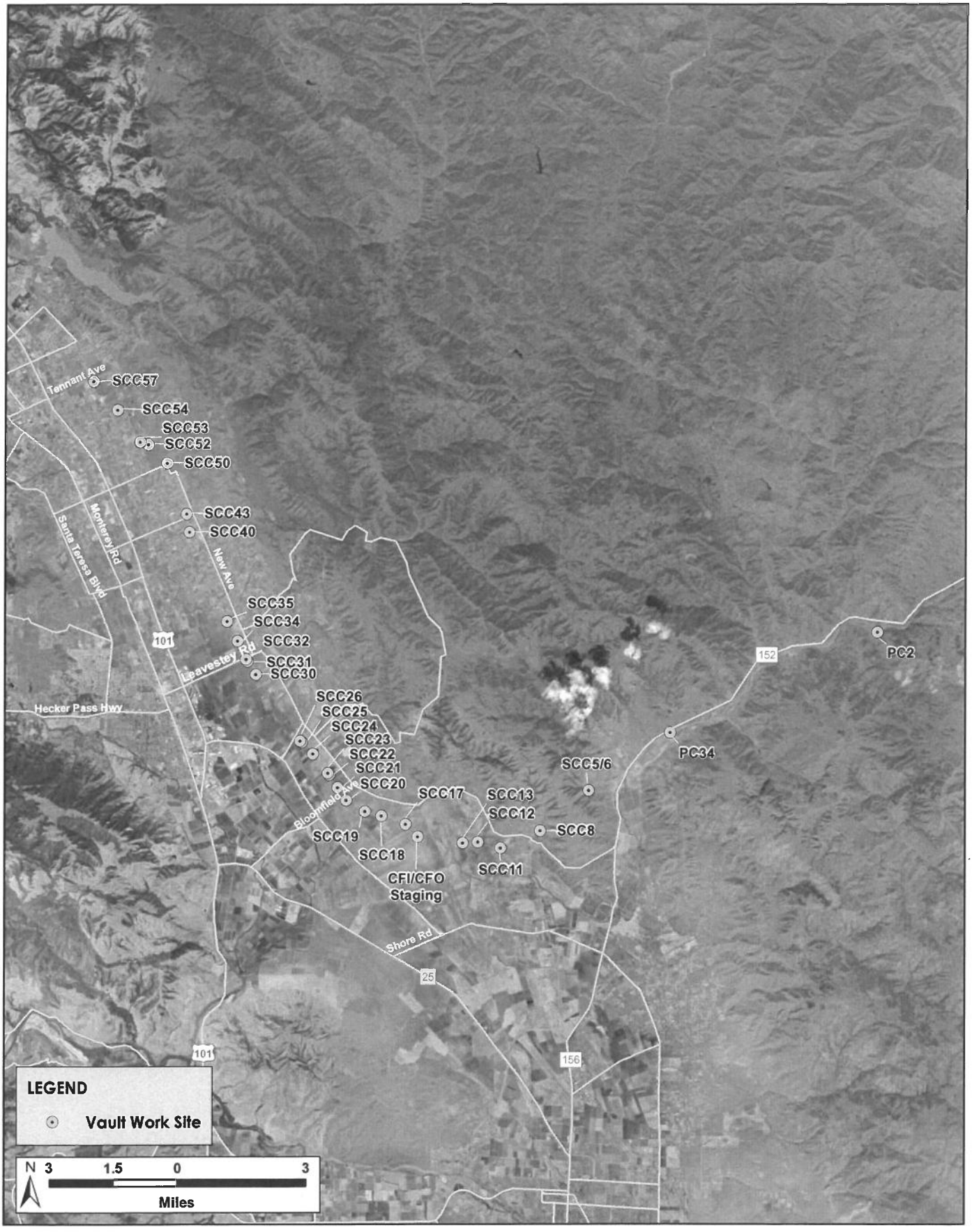
Figure 1. Vicinity Map
SCVWD South County Right of Way
ID of Waters of the U.S. (3700-15)
October 2018



N:\Projects3700\3700-01\15\Reports\USACE June 2018\Fig 2 Study Area.mxd

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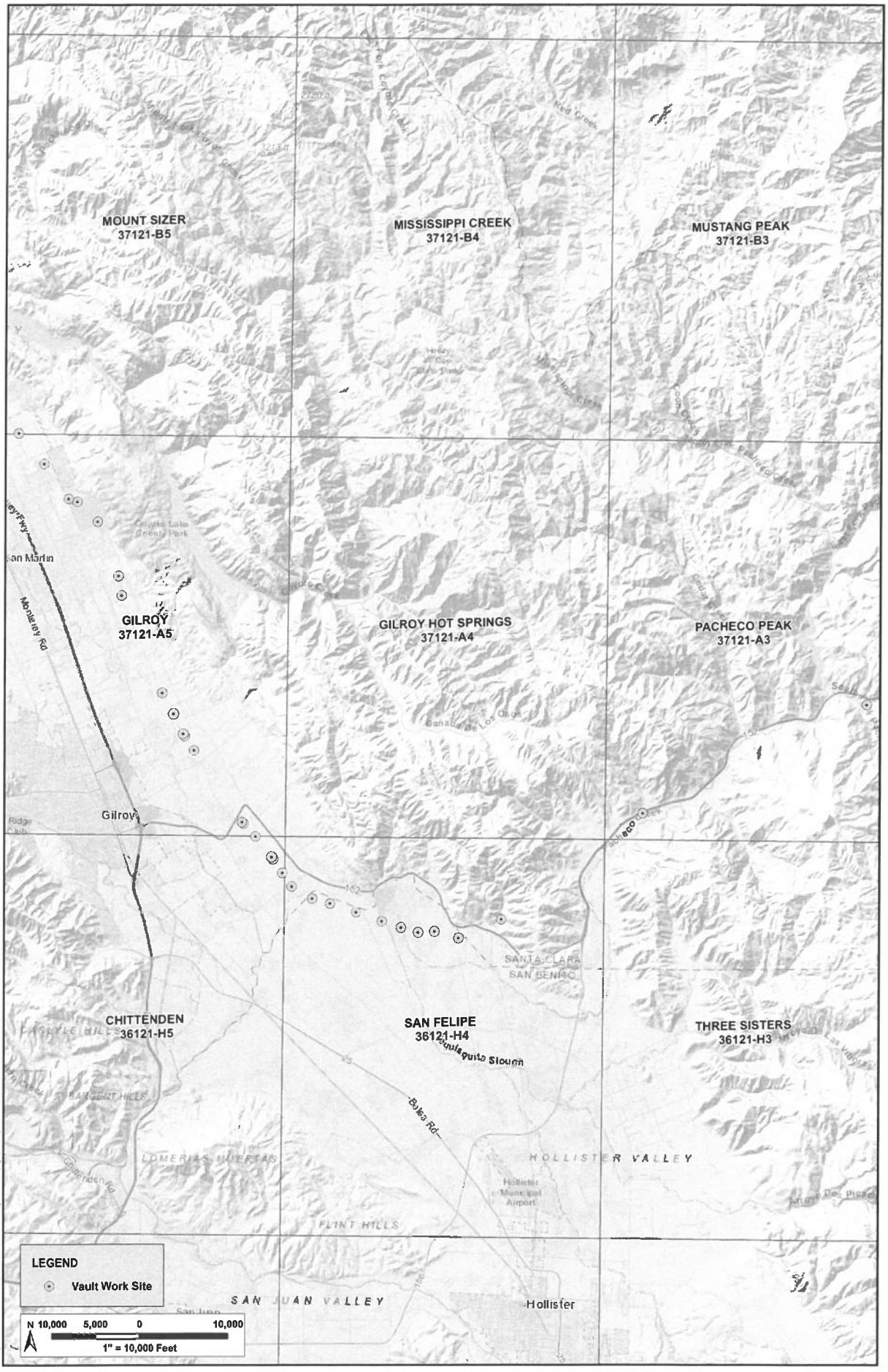
Figure 2. Study Area and Aerial Photohraphy
SCVWD South County Right of Way
ID of Waters of the U.S. (3700-15)
October 2018



N:\Projects\3700\3700-011\Reports\USACE June 2018\Fig 3 USGS Topographic Map.mxd

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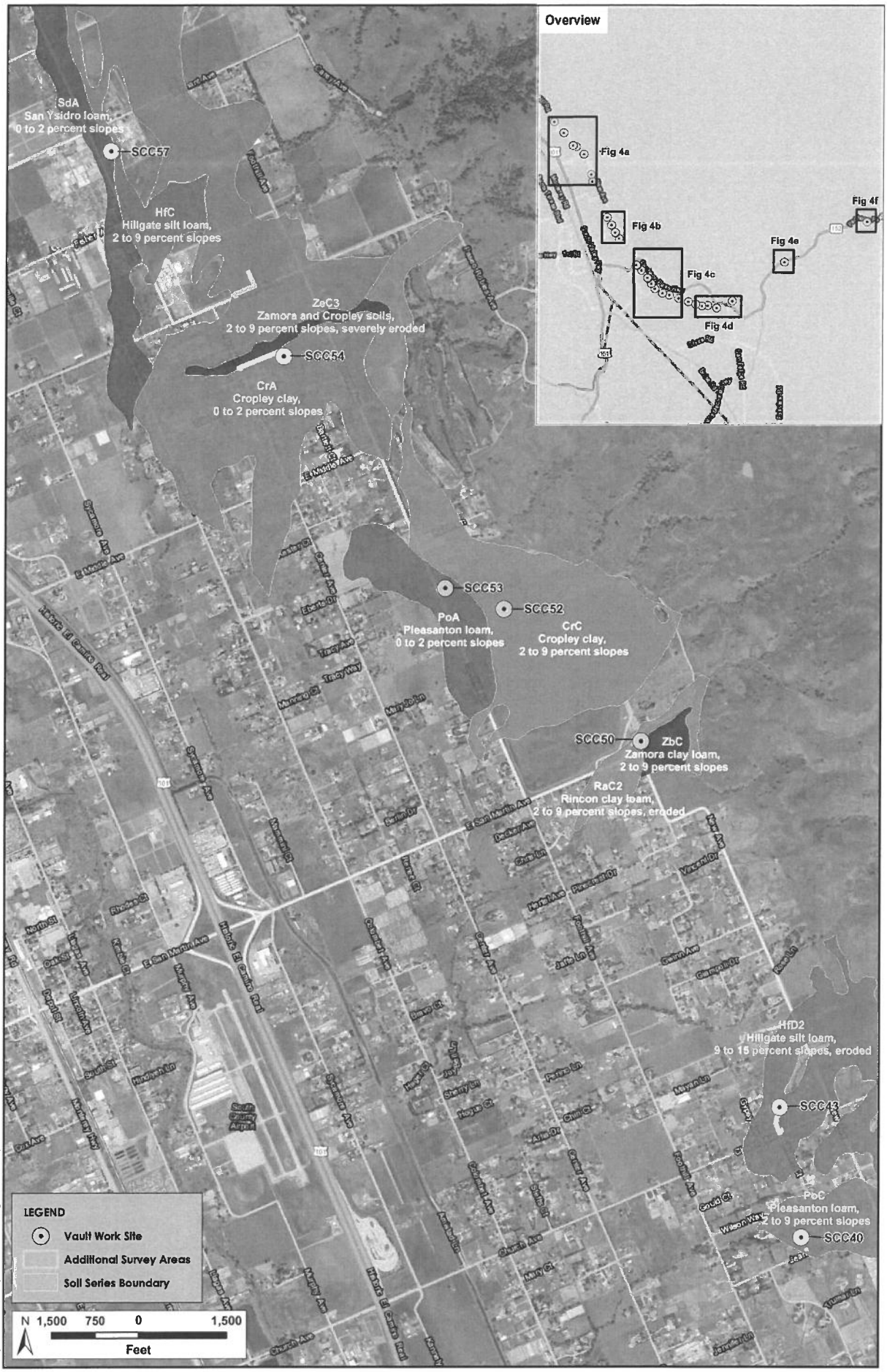
Figure 3: USGS Topographic Map
SCVWD South County Right of Way
ID of Waters of the U.S. (3700-15)
October 2018



N:\Projects\3700\3700-011\5\Reports\USACE_June 2018\Fig 4a NRCS Soils Map.mxd

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Figure 4a. NRCS Soils Map
SCVWD South County Right of Way
ID of Waters of the U.S. (3700-15)
October 2018

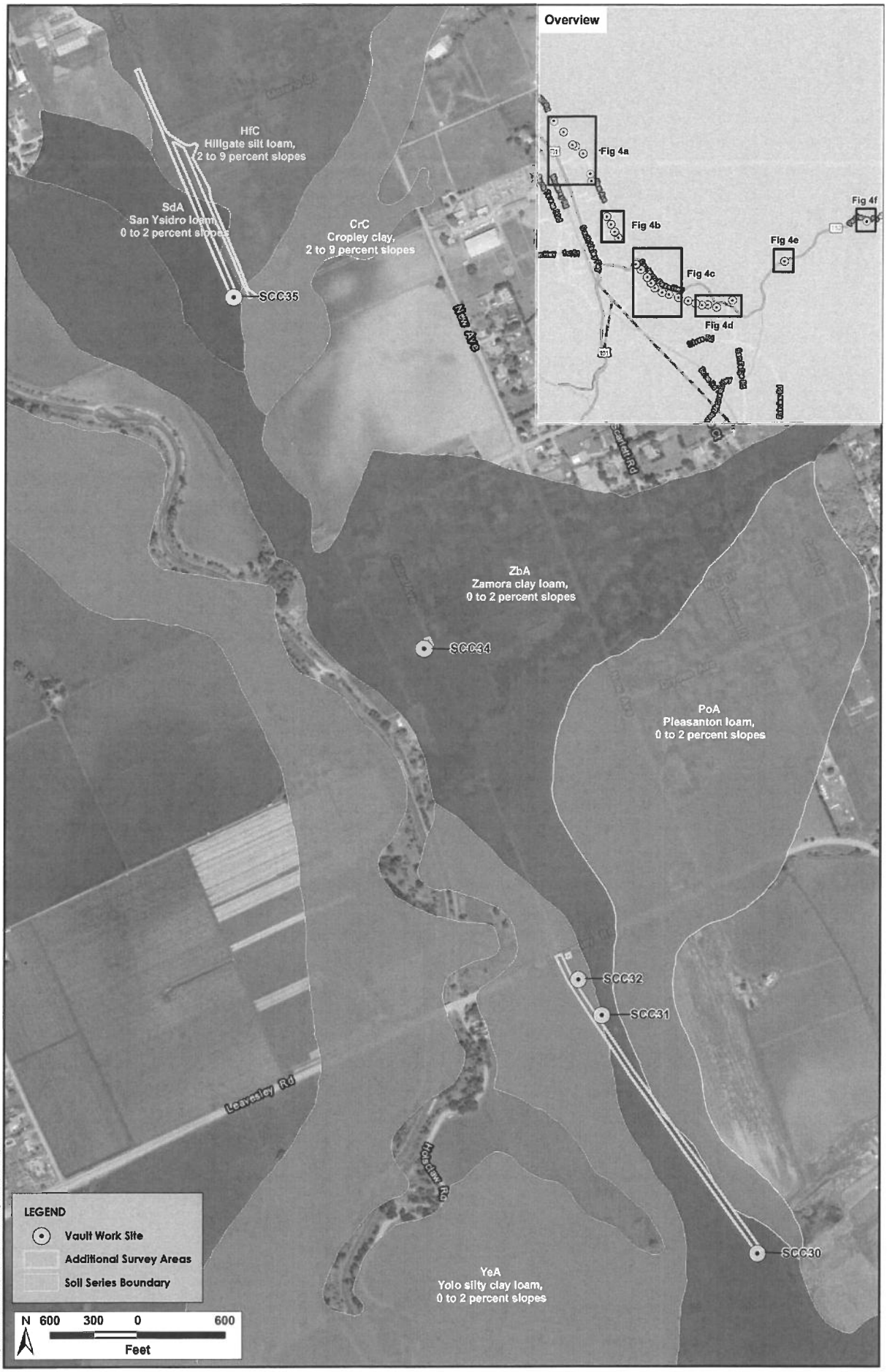

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Figure 4b. NRCS Soils Map
SCVWD South County Right of Way
ID of Waters of the U.S. (3700-15)
October 2018

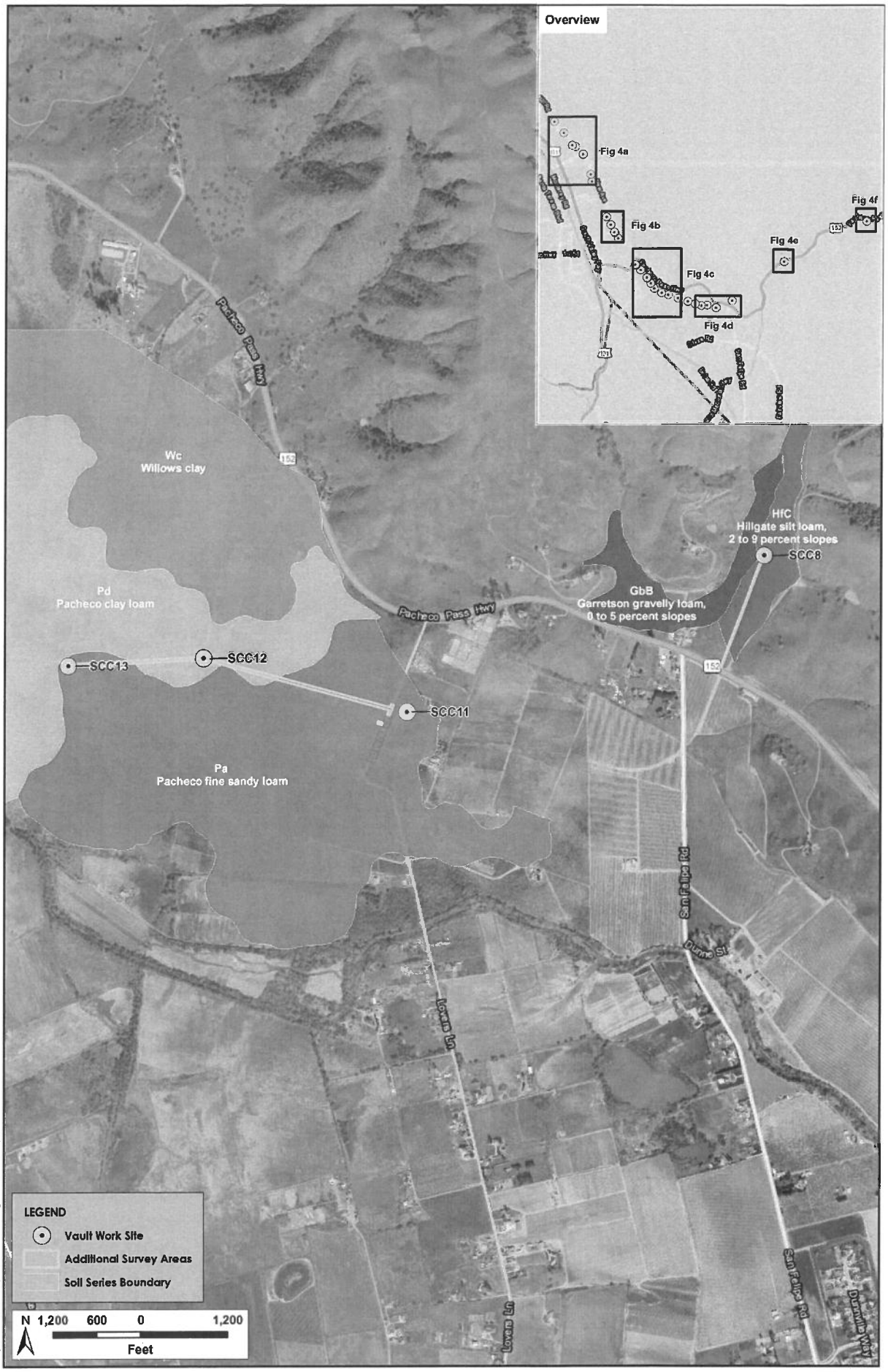

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Figure 4d: NRCS Soils Map
SCVWD South County Right of Way
ID of Waters of the U.S. (3700-15)
October 2018

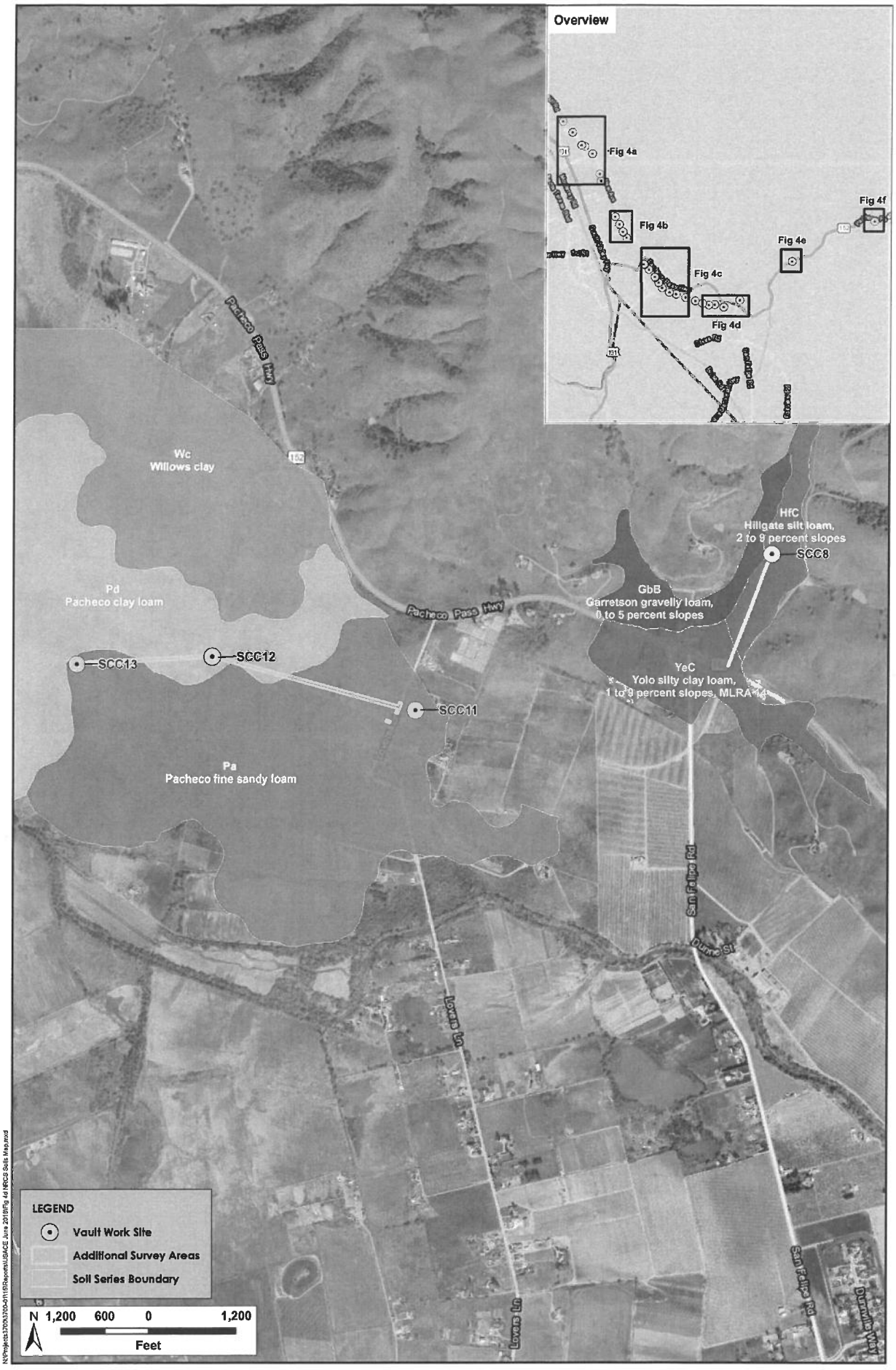

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Figure 4d. NRCS Soils Map
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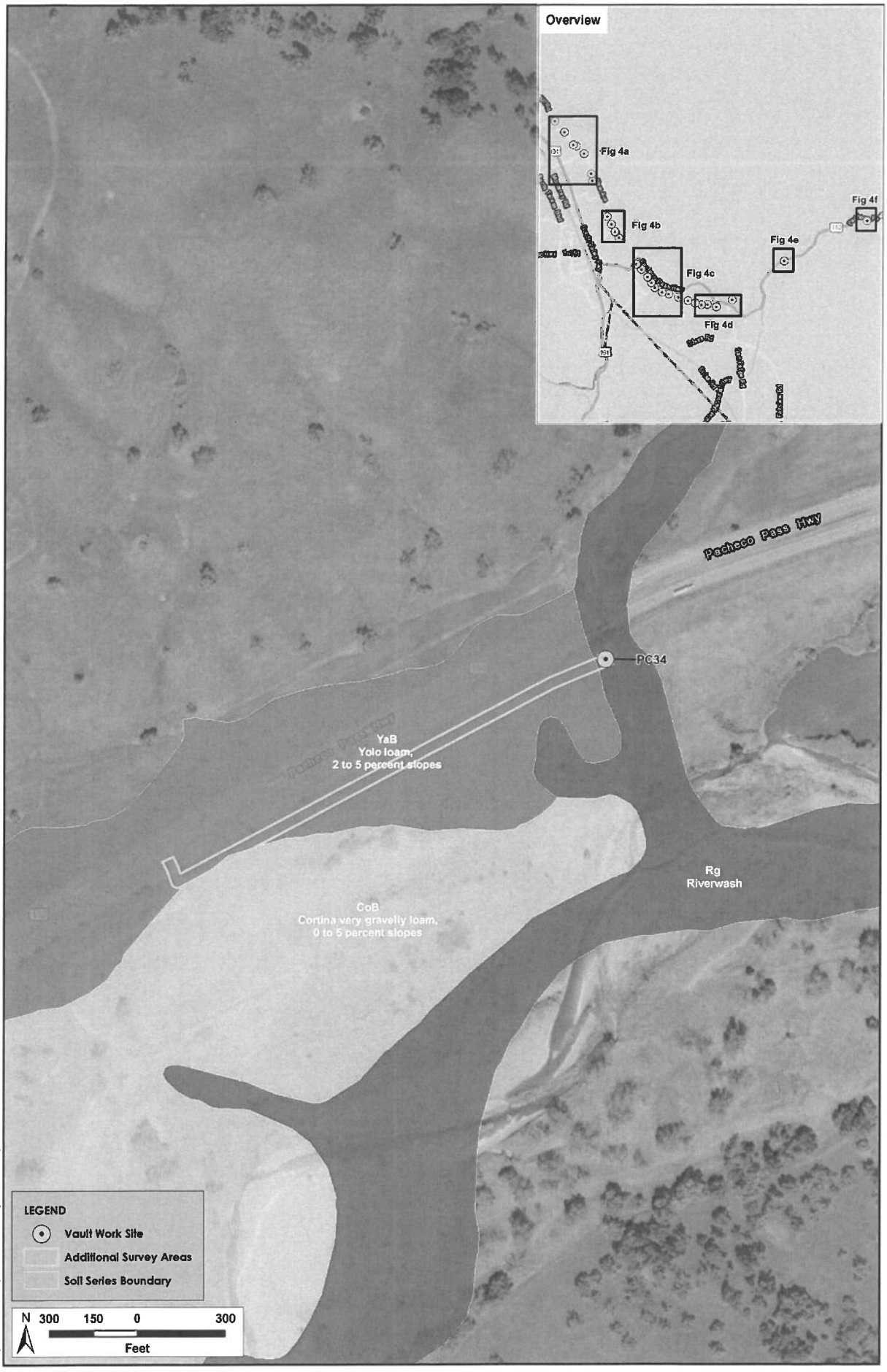
ID of Waters of the U.S. (3700-15)
October 2018



N:\Projects\3700\3700-011\5\Reports\USACE-June 2018\Fig 4e NRCS Soils Map.mxd

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Figure 4e. NRCS Soils Map
SCVWD South County Right of Way
ID of Waters of the U.S. (3700-15)
October 2018

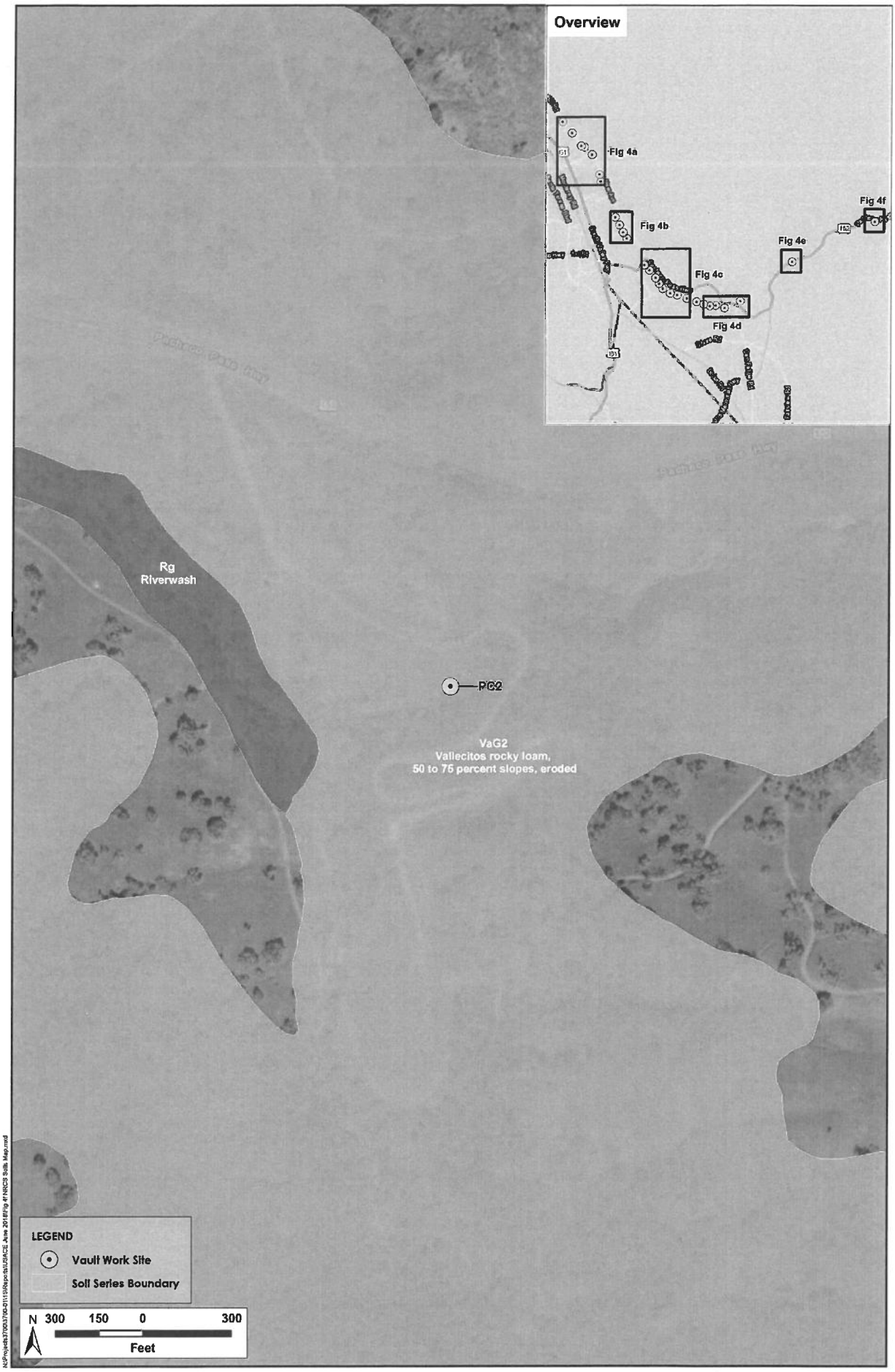

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Figure 4f. NRCS Soils Map
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October 2018

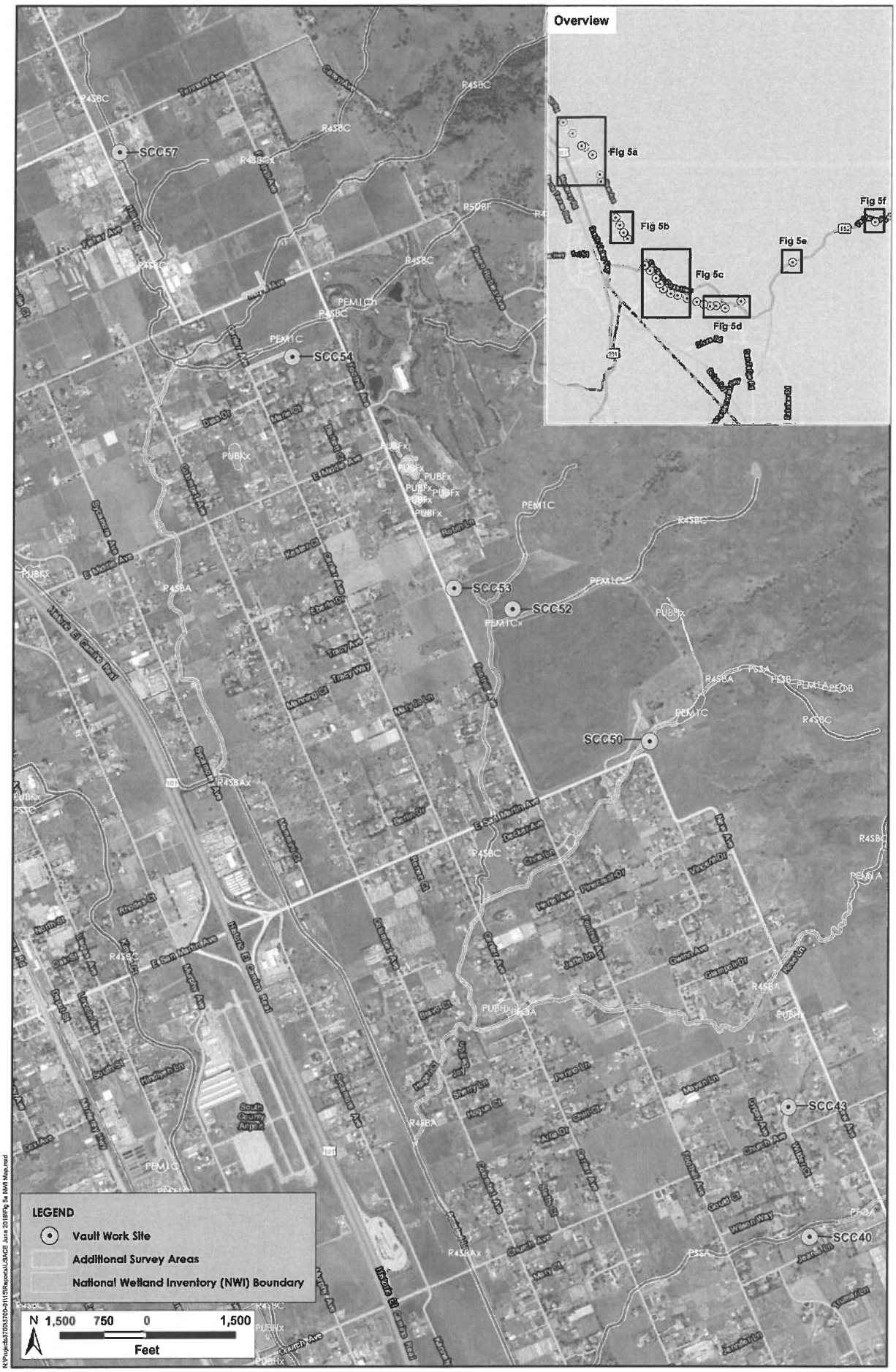

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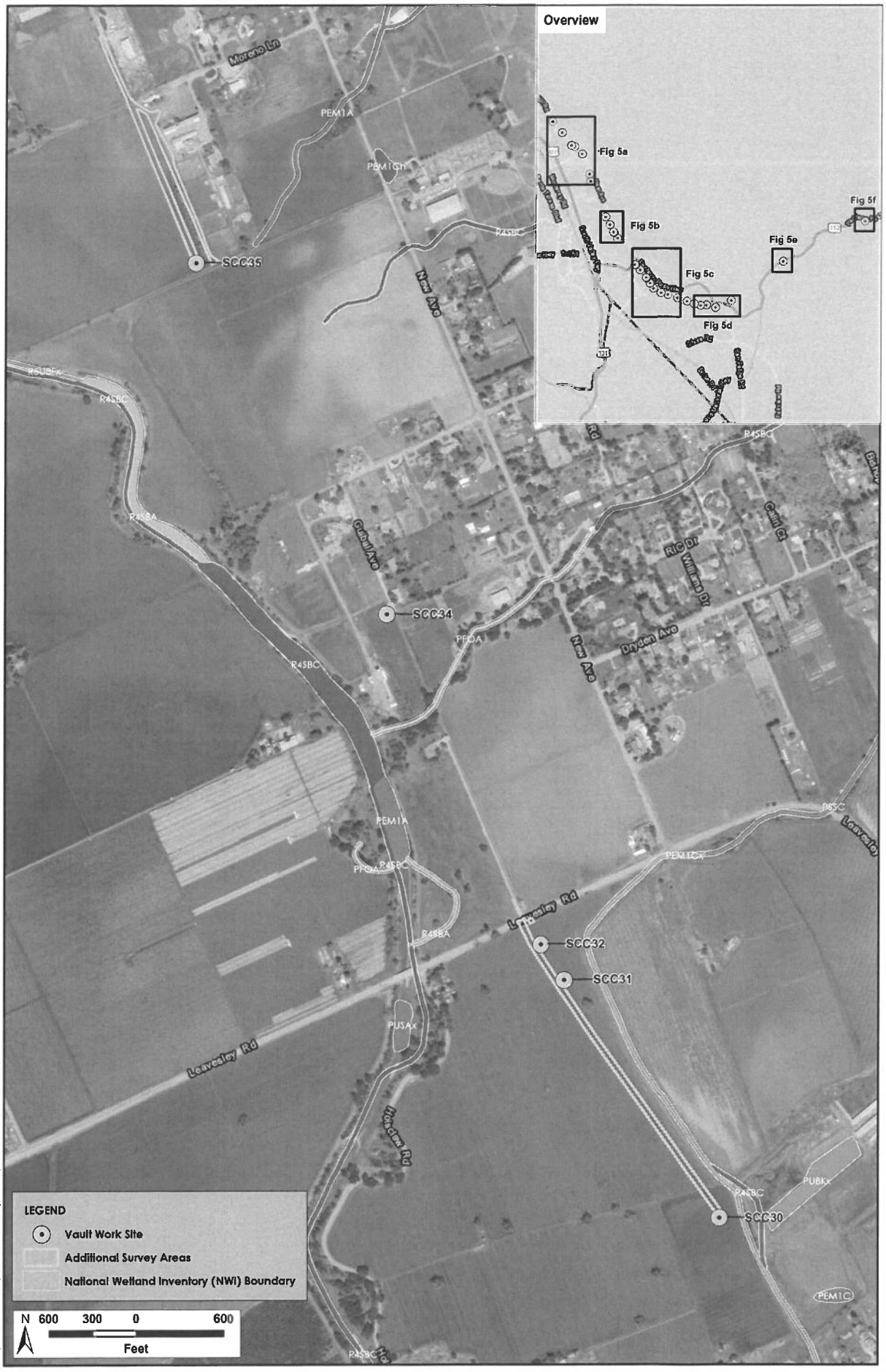
Figure 5a. NWI Map
SCVWD South County Right of Way
ID of Waters of the U.S. (3700-15)
October 2018



N:\Projects\3700\3700-01\19\Reports\USACE June 2018\Fig 5b NWI Map.mxd

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Figure 5b. NWI Map
SCVWD South County Right of Way
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October 2018

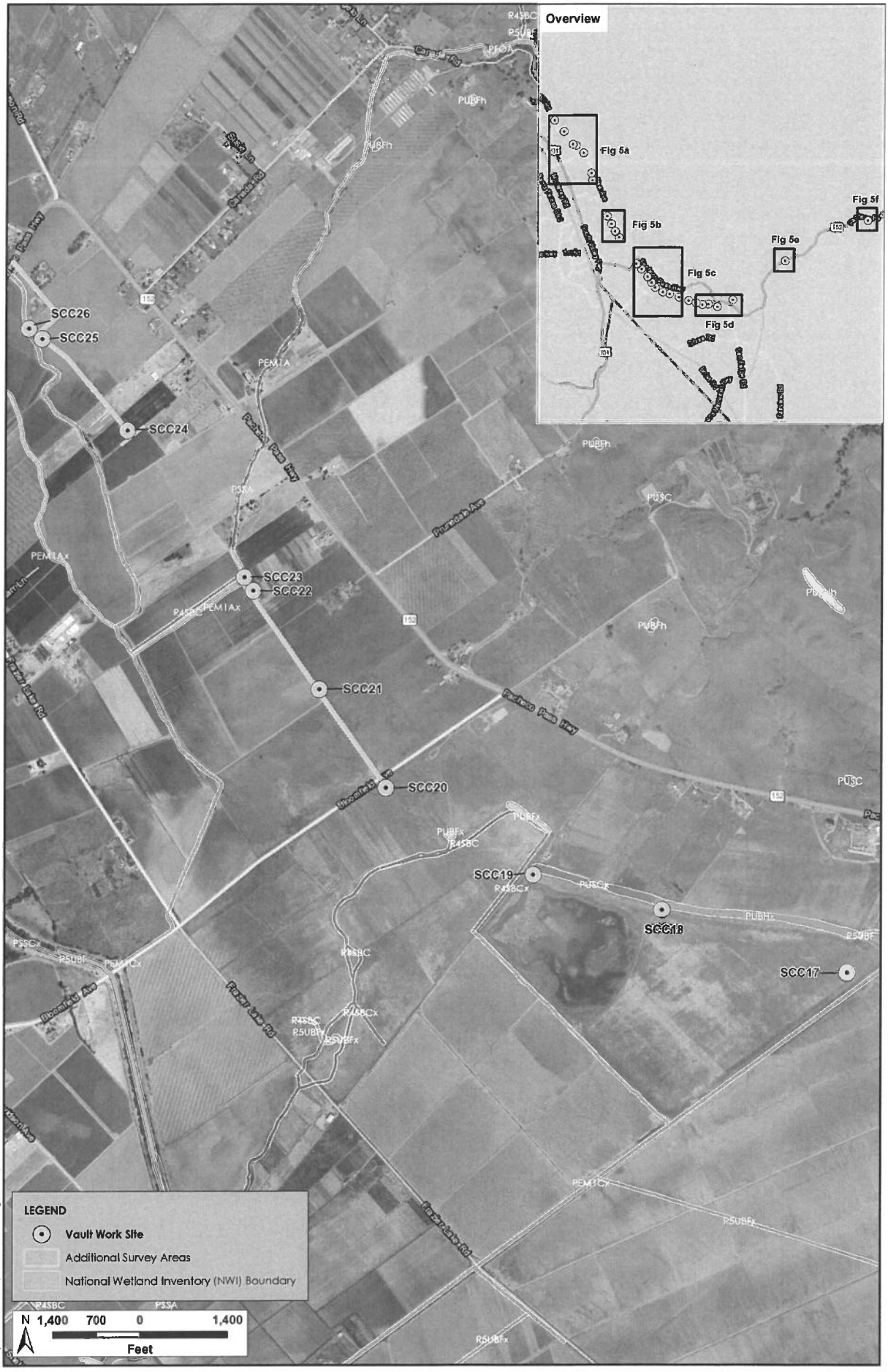

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Figure 5c. NWI Map
SCVWD South County Right of Way
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October 2018

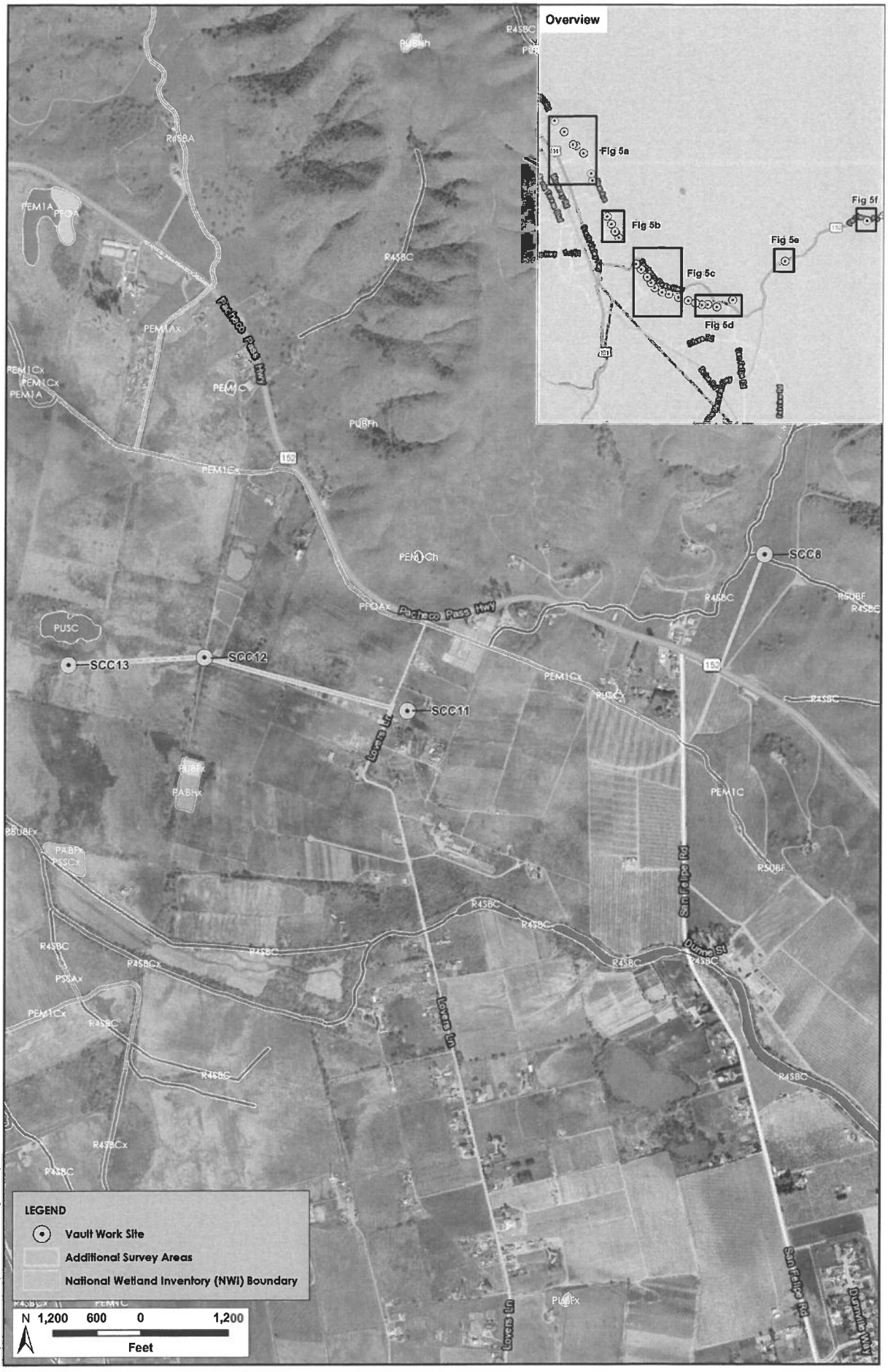

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Figure 5d. NWI Map
SCVWD South County Right of Way
ID of Waters of the U.S. (3700-15)
October 2018

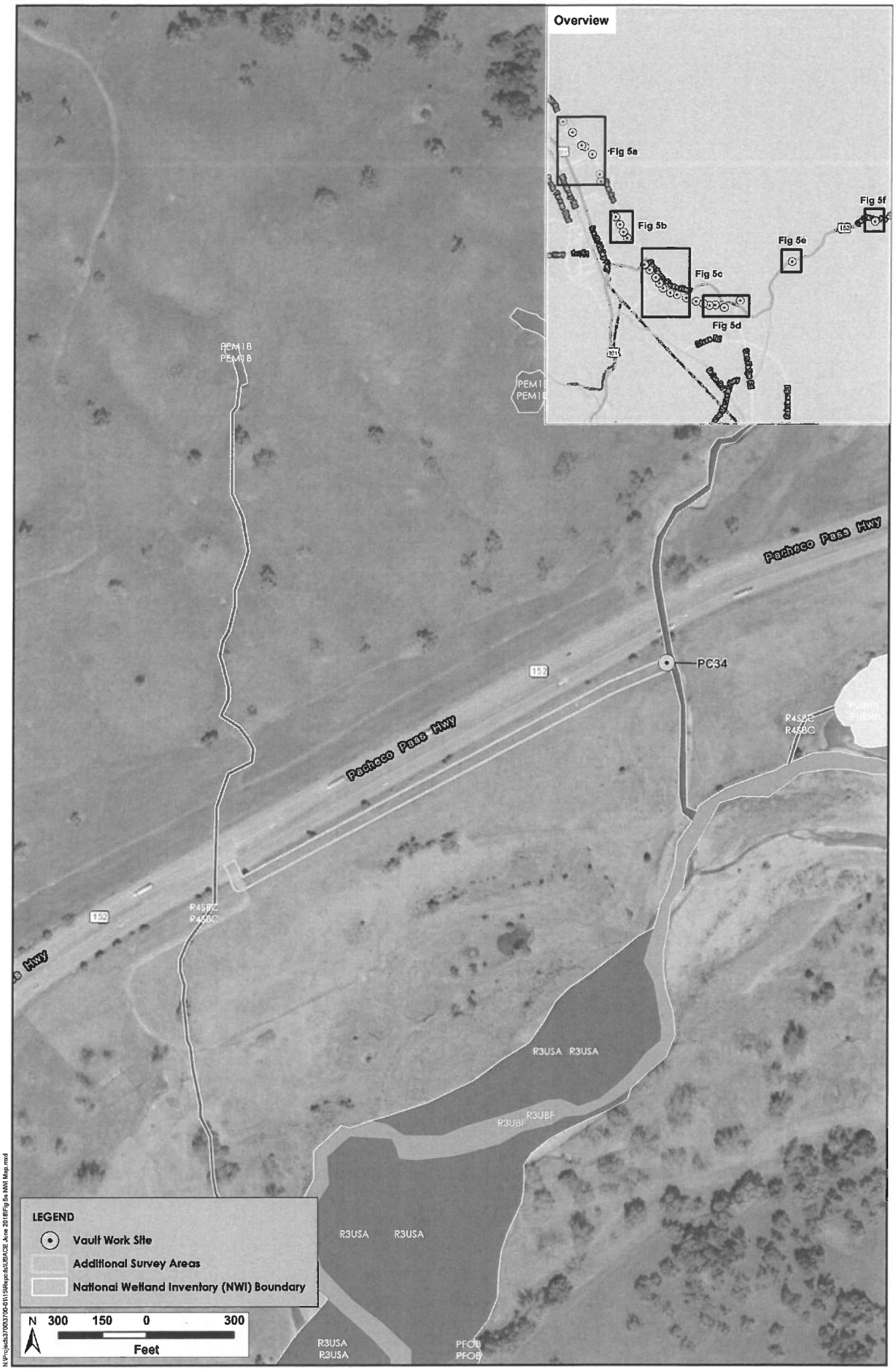

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Figure 5e. NWI Map
SCVWD South County Right of Way
ID of Waters of the U.S. (3700-15)
October 2018

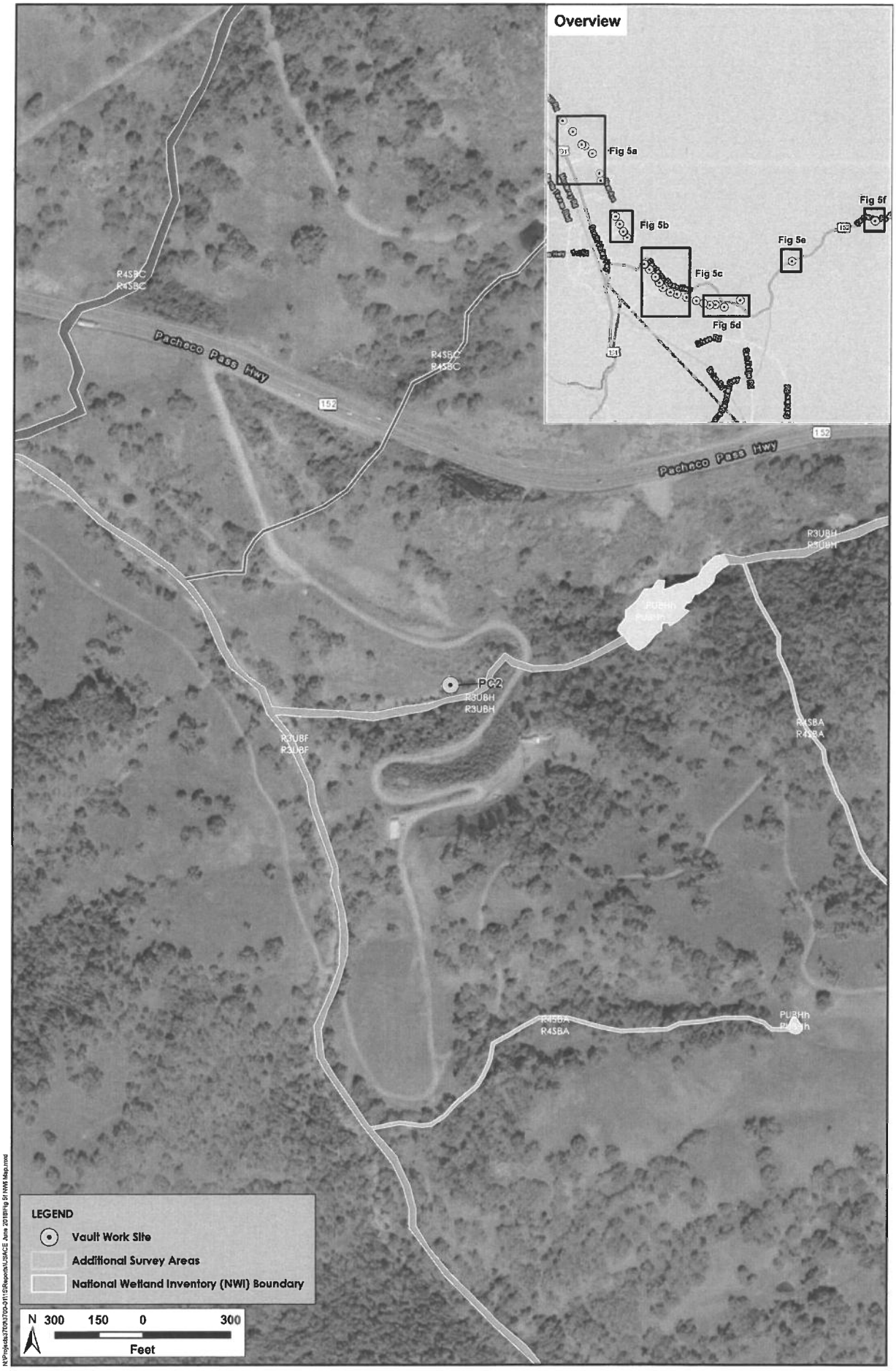

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Figure 5f. NWI Map
SCVWD South County Right of Way
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Table 1. Soil Type, Texture, Drainage Classification, and Hydric Soil Status for 20 Different Soil Types Occurring within the BSA

Soil Symbol	Soil Name	Soil Texture	Drainage Classification	Hydric Status
Ca	Campbell silty clay loam	silty clay loam	somewhat poorly drained	Y
Ce	Campbell silty clay loam, muck substratum	silty clay	somewhat poorly drained	Y
Ck	Clear Lake clay, saline	clay	poorly drained	Y
CrA	Cropley clay, 0 to 2 percent slopes	clay	well-drained	Y
CrC	Cropley clay, 2 to 9 percent slopes	clay	well-drained	Y
GbB	Garretson gravelly loam, 0 to 5 percent slopes	gravelly loam	well-drained	N
HfC	Hillgate silt loam, 2 to 9 percent slopes	silt loam	well-drained	N
HfD2	Hillgate silt loam, 9-15 percent slopes, eroded	silt loam	well-drained	N
Pa	Pacheco fine sandy loam	sandy loam	poorly drained	Y
Pd	Pacheco clay loam over clay	clay loam	poorly drained	Y
PoA	Pleasanton loam, 0 to 2 percent slopes	loam	well-drained	N
PoC	Pleasanton loam, 2 to 9 percent slopes	loam	well-drained	N
RaC2	Rincon clay loam, 2 to 9 percent slopes	clay loam	well-drained	Y
Rg	Riverwash	sand, gravel, cobble	not listed	not listed
SdA	San Ysidro loam, 0-2 percent slopes	loam	moderately well-drained	Y
VaG2	Vallecitos rocky loam, 50 to 75 percent slopes, eroded	loam	well-drained	N
Wc	Willows clay	clay loam	poorly drained	Y
YeA	Yolo silty clay loam, 0 to 2 percent slopes	loam	well-drained	N
ZaC	Zamora clay loam, 0 to 2 percent slopes	clay loam	well-drained	N
ZbC	Zamora clay loam, 2 to 9 percent slopes	clay loam	well-drained	N

Section 2.0 Survey Methods

H. T. Harvey & Associates plant biologists, Maya Goklany, M.S. , Chris Gurney, M.S., covered the entire BSA on foot in March 2014 to determine all potential jurisdictional waters (wetlands and other waters) on the site, and to map these features using sub-meter Global Positioning System (Trimble GeoXT™ GPS unit). The BSA was revisited in April and May 2014 by Maya Goklany to confirm the species of several plant genera that did not initially have the vegetative or reproductive structures necessary for identification. H. T. Harvey & Associates plant ecologist David Gallagher, M.S surveyed the newly added areas of the BSA on foot in May, June, and July 2018 to identify and map all potential jurisdictional waters and survey for rare plants. Jurisdictional habitats and sample points were mapped with a submeter GPS.

2.1 Identification of Jurisdictional Waters

The vegetation, soils, and hydrology of the study area were examined following the guidelines outlined in the Routine Determination Method in the *Corps of Engineers 1987 Wetlands Delineation Manual* (Corps Manual; Environmental Laboratory 1987). In addition, the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region (Version 2.0)* (Regional Supplement; USACE 2008a) was followed to document site conditions relative to hydrophytic vegetation, hydric soils, and wetland hydrology. As noted in the latter report, the *Regional Supplement* is designed for use with the current version of the Corps Manual, except where superseded by instruction issued in the more recent and location-specific Regional Supplement. This report was also compiled in accordance with guidance provided in *Information Needed for Verification of Corps Jurisdiction* (USACE San Francisco District 2000), *Final Map and Drawing Standards for the South Pacific Division Regulatory Program* (USACE 2012), and *Updated Map and Drawing Standards for the South Pacific Regulatory Division Regulatory Program* (USACE 2016). These documents list information that must be submitted as part of a request for a Jurisdictional Determination. This information includes: locality map (Figure 1); study area and aerial photograph (Figure 2); USGS quadrangle sheets (Figure 3); applicable sections of the current soil survey report (Appendix B); wetland delineation data forms (Appendix C); written rationale for sample point choice (Section 3.0, *Survey Results and Discussion*); and color photos (Appendix E).

The study areas were examined for topographic features, drainages, alterations to site hydrology or vegetation, and areas of significant recent disturbance. A determination was then made as to whether normal environmental conditions were present at the time of the field surveys. Data were used to document which portions of the study area were wetlands. Generally, surveys examined the vegetation, soils, and hydrology using the "Routine Determination Method, On-Site Inspection Necessary (Section D)" outlined in the Corps Manual, and using the updated data forms, vegetation sampling methods, and hydric soil and hydrology indicators developed for the Regional Supplement (USACE 2008a). This three-parameter approach to identifying wetlands is based upon the presence of hydrophytic vegetation, hydric soils, and wetland hydrology. Alternatively, a two-parameter approach to identifying wetlands is utilized in situations where vegetation, soils, or hydrology indicators are

absent due to human activities or natural events, and is described in the "Difficult Wetland Situations in the Arid West" (USACE 2008a).

Prior to site surveys, topographic maps and aerial photographs of the study area were obtained from several sources and reviewed. These sources included the USGS, NWI, and Google Earth (Microsoft 2013). Overall, the approach used to identify wetlands included digging 20-inch soil pits to identify hydric indicators, observing vegetative cover in proximity to the sampling location and identifying hydrophytic plant species, and determining current surface and subsurface hydrologic features present near the sampling location. Features meeting these criteria were then mapped in the field using a Trimble GeoXT™ GPS unit. A brief overview of the USACE methodology specifically applicable to the identification of jurisdictional waters on the site is summarized below.

2.2 Identification of Section 404 Wetlands

2.2.1 Vegetation

Plants observed at each of the sample sites were identified to species, when possible, using *The Jepson Manual, Vascular Plants of California, Second Edition* (Baldwin et al. 2012). The wetland indicator status of each species was obtained from the Arid West 2013 Regional Wetland Plant List (Lichvar 2013). The recent revision of plant names within the Jepson Manual has led to several differences in nomenclature between the latest Jepson Manual and the 2012 Wetland Plant List. In these cases, synonyms recognized by Calflora (2013) were also searched for their indicator status. A list of species for each observation area was then compiled and a visual estimate of the percent cover of plant species was made following guidance provided in the Regional Supplement. It was then determined which of the observation areas supported wetland vegetation using the applicable Indicator (i.e., 1-Dominance Test; 2-Prevalence Test; or, 3-Morphological Adaptations) as described in the Regional Supplement.

Wetland indicator species are designated according to their frequency of occurrence in wetlands. For instance, a species with a presumed frequency of occurrence of 67 to 99 percent in wetlands is designated a facultative wetland indicator species. The five basic levels of wetland indicator groups, described in the Regional Supplement do not include plus (+) or minus (-) indicators. The wetland indicator groups, indicator symbol, and the frequency of occurrence of species within them in wetlands are presented in Table 2.

Table 2. Wetland Indicator Status Categories for Vascular Plants

Indicator Category	Symbol	Frequency of Occurrence
Obligate	OBL	greater than 99%
Facultative Wetland	FACW	67 - 99%
Facultative	FAC	34 - 66%
Facultative Upland	FACU	1 - 33%
Upland	UPL	less than 1%

* Based upon information contained in *Corps of Engineers Wetlands Delineation Manual* (Environmental Laboratory 1987).

Obligate and facultative wetland indicator species are hydrophytes that occur "in areas where the frequency and duration of inundation or soil saturation produce permanently or periodically saturated soils of sufficient duration to exert a controlling influence on the plant species present" (Environmental Laboratory 1987). Facultative indicator species may be considered wetland indicator species when found growing in hydric soils that experience periodic saturation. A complete list of the vascular plants observed within the study area, and their current indicator status has been provided in Appendix A. Plants species that are not on the regional list of wetland indicator species are considered upland species.

2.2.2 Soils

Where possible, the top 20-inch of the soil profile was examined for hydric soil indicators. Diagnostic features include numerous indicators defined and described by the National Technical Committee for Hydric Soils. These indicators include the presence of Histosols (A1) (organic soils), histic epipedons (A2), hydrogen sulfide odor (A4), depleted matrix (F3), redox depressions (F8), redox dark surface (F6), and mottling indicated by the presence of gleyed or bright spots of colors (in the former case, blue grays; in the latter case, orange red, or red brown) within the soil horizons observed, among other features. Munsell Soil Notations (Munsell 2009) were recorded for the soil matrix for each soil sample. The last digit of the Munsell Soil Notation refers to the chroma of the sample. This notation consists of numbers beginning with 0 for neutral grays and increasing at equal intervals to a maximum of about 20. Soil matrix chroma values that are one (1) or less, or two (2) or less when mottling is present, are typical of soils which have developed under anaerobic conditions. The first digit of the Munsell Soil notation refers to the value of the sample, with numbers beginning from 2 for saturated colors to a maximum of about 8 for faded or light colors. Hydric soils often show low value colors when soils have accumulated sufficient organic material to indicate development under wetland conditions, but can show high value colors when iron depletion has occurred, removing color value from the soil matrix.

The Soil Survey of Eastern Santa Clara County, California (SCS 1974) and *The Soil Survey of San Benito County, California* (SCS 1969) were consulted to determine which soil types have been mapped in the study area (see Table 1). Detailed descriptions of these soil mapping units are provided in Appendix B.

2.2.3 Hydrology

Each of the sample sites was examined for positive field indicators (primary and secondary) of wetland hydrology following the guidance provided in the Regional Supplement. Primary indicators might include visual observation of surface water (A1), high water table (A2), soil saturation (B1), water-stained leaves (B9), and hydrogen sulfide odor (C1). Secondary indicators might include riverine drift deposits (B3), drainage patterns (B10), and passing score for the FAC-neutral test (D5).

2.3 Identification of Section 404 Other Waters

In concert with the USACE's efforts to revise the wetland delineation manuals, making them more specific to different geographic regions of the United States, as described above, efforts have been initiated by the USACE to develop an ordinary high water (OHW) delineation manual. In particular, five relatively recent publications have attempted to further refine the definition of OHW and the delineation of the OHW mark in the arid west (including California):

- *Review of Ordinary High Water Mark Indicators for Delineating Arid Streams in the Southwestern United States* (USACE 2004);
- *Distribution of Ordinary High Water Mark (OHWM) Indicators and Their Reliability in Identifying the Limits of "Waters of the United States" in Arid Southwestern Channels* (USACE 2006);
- *Review and Synopsis of Natural and Human Controls on Fluvial Channel Processes in the Arid West* (USACE 2007);
- *A Field Guide to the Identification of the Ordinary High Water Mark (OHWM) in the Arid West Region of the Western United States: A Delineation Manual* (USACE 2008b);and
- *Updated Datasheet for the Identification of the Ordinary High Water Mark (OHWM) in the Arid West Region of the Western United States* (USACE 2010).

Historically, in non-tidal waters, USACE jurisdiction extends to the OHW mark which is defined in 33 CFR Part 328.3 as "the line on the shore established by the fluctuations of water and indicated by physical characteristics, such as a clear, natural line impressed on the bank, shelving, changes in the character of the soil, destruction of terrestrial vegetation or the presence of litter and debris." This guidance is based upon the identification of the OHW mark by examining physical evidence of surface flow in the stream channel; there is no hydrologic definition of the OHW mark.

In addition, *Regulatory Guidance Letter 05-05* (dated: 7 December 2005) deals specifically with the topic of OHW mark identification. That publication lists the following physical characteristics that should be considered when making an OHW mark determination: (1) natural line impressed on the bank; (2) shelving; (3) changes in the character of the soil; (4) destruction of terrestrial vegetation; (5) wracking; (6) vegetation matted down, bent, or absent; (7) sediment sorting; (8) leaf litter disturbed or washed away; (9) scour; (10) deposition; (11) multiple observed flow events; (12) bed and banks; (13) water staining; and (14) and change in plant community.

Just as with the Corps Manual, development of the definition of the OHW mark and description of the field indicators to be used were primarily based on environmental conditions present in more temperate climates of the United States. In these areas, rain distribution and amounts are more consistent from one year to the next and the channel geomorphology has responded to develop field characteristics that reflect a system in relative equilibrium. Such "ordinary" precipitation events occurring in these temperate climates are more likely to cause the development of "ordinary" features commonly used by the USACE in identifying the OHW mark as defined under 33 CFR Part 328.3.

The difficulty with this approach is that the environmental conditions present in the arid west are very different than those encountered in temperate climates. In particular, the Mediterranean climate present throughout central California is characterized by a high degree of seasonal and inter-annual variability in precipitation. Occurrences of drought conditions followed by extreme discharges are more common in the arid west. Thus, much of what is observed in the field in terms of geomorphic features such as channel down-cutting, erosion, and channel formation, is not in response to "ordinary" precipitation events but to relatively high intensity and infrequent rainfall events.

For purposes of the current study, the identification of the OHW mark in the field was based upon observation of a suite of natural geomorphic field indicators that have formed during channel forming events. These features included staining of rocks and culverts, erosion of soil to bedrock, and channel bed morphology, among other factors.

The presence of one or more of the natural geomorphic field indicators listed above, taking into consideration such factors as size of watershed, channel slope, landscape setting, elevation, gradient, land use practices, and soil type, were taken as direct evidence of an OHW mark and such channels were identified as "other waters."

Section 3.0 Survey Results and Discussion

Seventeen formal sample points were taken throughout the BSA during the delineation surveys in 2014 and 2018 (Figures 6a, 6c, 6e, 6m-o, 6q, and 6s-t; Appendices C and D). Within the study area boundaries, approximately 3.36 ac of potential jurisdictional waters were identified (Figures 6a, 6c 6e, 6g, 6l-m, and 6q-t). This included 3.14 ac of Section 404 wetlands and 0.22 ac of other waters (Table 3). The project features, soil pits, and jurisdictional features within the BSA are shown in Figures 6a-t. Additionally, in the lower left hand corner of each figure is an overview inset that shows the location of each figure along the project route. Table 3 below summarizes the jurisdictional waters within the BSA and Table 4 summarizes the jurisdictional features pertinent to each of the 29 vault locations.

Table 3. Summary of Jurisdictional Waters within the Study Area

Potential Jurisdictional Waters	Acres*
Section 404 Wetlands	**3.14**
Perennial marsh wetlands	1.34
Seasonal wetlands	1.80
Section 404 Other Waters	**0.22**
Ephemeral streams	0.22
Culverts	0.004
Total of Jurisdictional Waters	**3.36**
Upland	**17.98**
Study Area Total	**21.34**

*Values are approximate due to rounding errors.

Information pertinent to the identification of jurisdictional wetlands and other waters assembled during this investigation is presented in six appendices attached to this report. Please note Appendix F has also been provided as an electronic attachment in Microsoft Excel format, per USACE (2012) guidelines.

- Appendix A — Plants Observed
- Appendix B — Soils of Eastern Santa Clara County, CA and Soils of San Benito County, CA
- Appendix C — USACE Arid West Wetland Determination Data Forms
- Appendix D— USACE Arid West OHWM Data Forms
- Appendix E — Photo-documentation of the BSA
- Appendix F — Aquatic Resources Table

Table 4. Summary matrix listing the report figure number, jurisdictional feature identifier, Appendix C and D data forms, soil pit number, and Appendix E photography number for each of the 27 different vault study areas.

PC/SCC Number	Figure Number	Jurisdictional Feature	Appendix C/D Data Form	Appendix E Photograph
PC 2	6t	SW2a and SW2b	SP2a, SP2b, and OHWM35	40-43
PC 34	6s	SW34a and SW34b		44,45,47
SCC 8	6r	ES8	OHW8a and OHW8b	1,2
SCC 11	6q	SW11, PM11a, PM11b, ES11a, and ES11b	SP11a, SP11b, SP58a, SP58b	3,4
SCC 12	6q	PM12a, PM12b	SP12	5,9,49
SCC 13	6q	SW13		46
SCC 17	6p	None		6
SCC 18	6o	None	SP18	7
SCC 19	6n	None	SP19b	8
SCC 20	6m	SW20a, SW20b, SW20c, and C20	SP20	10,48
SCC 21	6m	SW21a, SW21b, and C21	SP21a, SP21b	11-13, 48
SCC 22	6m	SW22 and PM22		14,15
SCC 23	6m	None		16
SCC 24	6l	ES24		17,18
SCC 25	6l	None		19
SCC 26	6l	None		20
SCC 30	6k	None		21
SCC 31	6k	None		None
SCC 32	6k	None		None
SCC 34	6j	None		22,23
SCC 35	6i	None		24-26
SCC 40	6h	None		27
SCC 43	6g	ES43		28
SCC 50	6f	None		29
SCC 52	6e	SW52	SP52a, SP52b	30-32
SCC 53	6d	None		33,34
SCC 54	6c	ES54	SP54	35,36,50
SCC 56	6b	None		None
SCC 57	6a	SW57, ES57	SP57a, SP57b, OHW57a, and OHWM57b	37-39

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Figure 6a: USACE Jurisdictional Waters of the U.S.
SCVWD South County Right of Way
ID of Waters of the U.S. (3700-15)
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Figure 6b: USACE Jurisdictional Waters of the U.S.
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Figure 6c: USACE Jurisdictional Waters of the U.S.
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Figure 6d: USACE Jurisdictional Waters of the U.S.
SCVWD South County Right of Way
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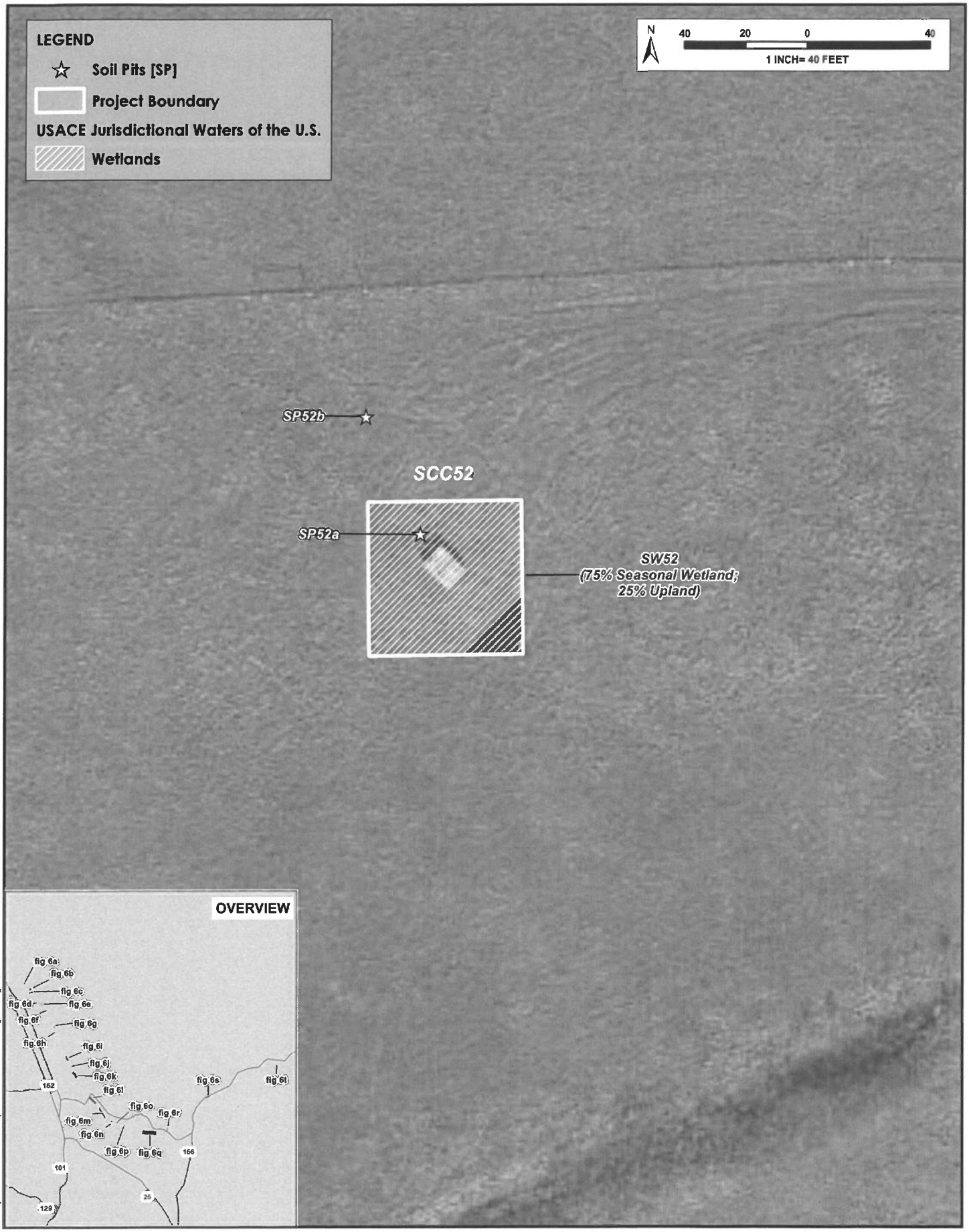

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Figure 6e: USACE Jurisdictional Waters of the U.S.
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Figure 6f: USACE Jurisdictional Waters of the U.S.
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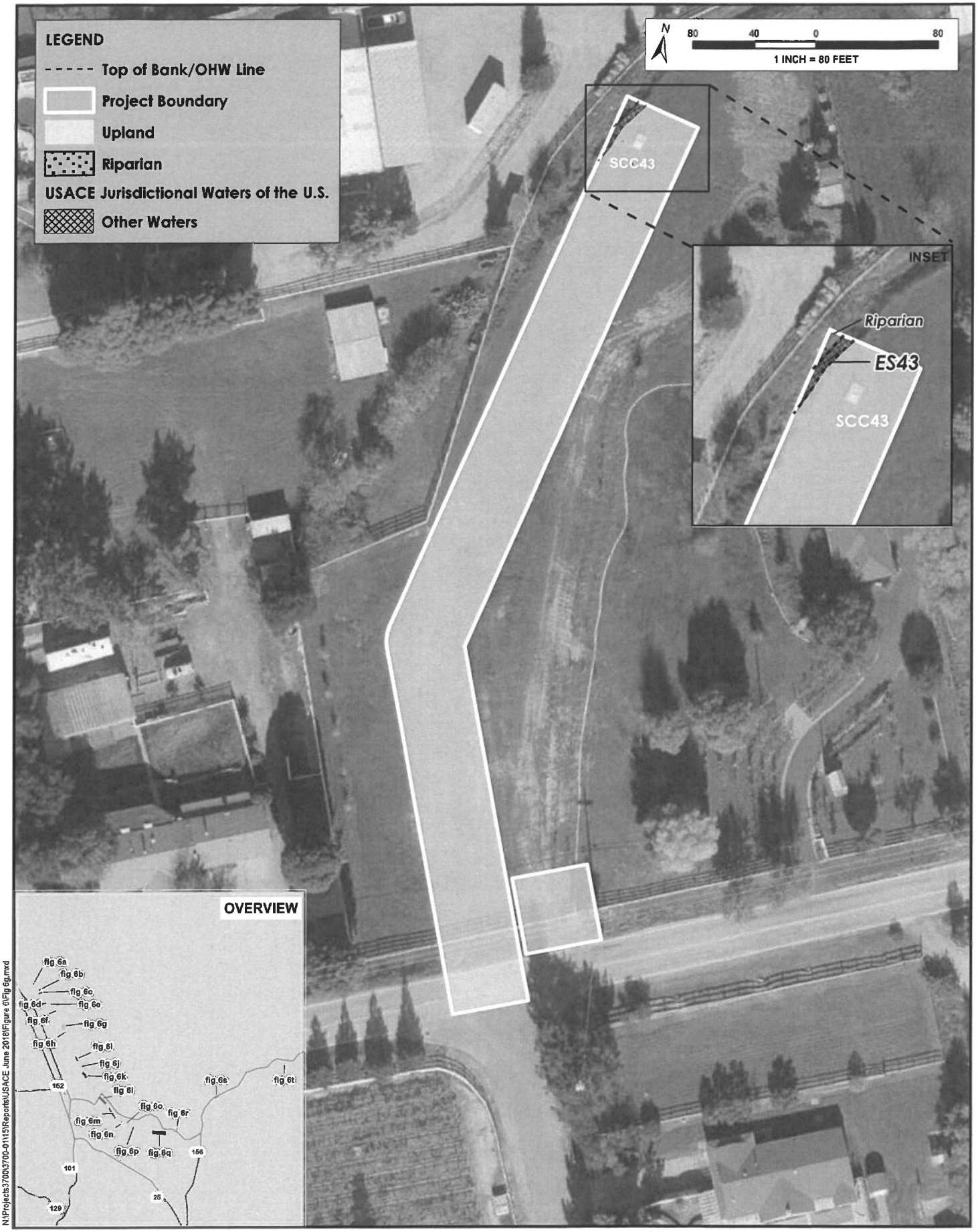

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Figure 6g: USACE Jurisdictional Waters of the U.S.
SCVWD South County Right of Way
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Figure 6h: USACE Jurisdictional Waters of the U.S.
SCVWD South County Right of Way
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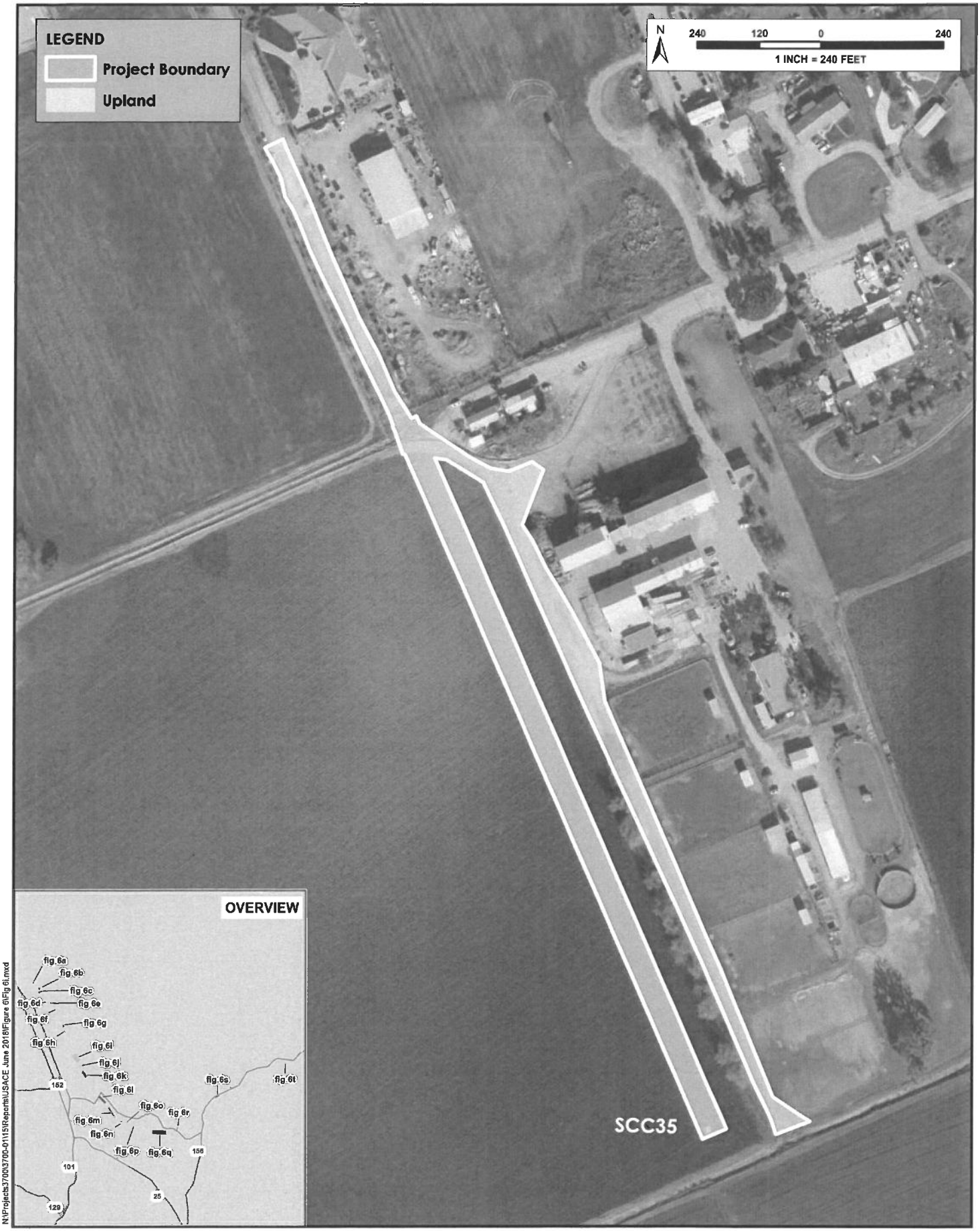

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Figure 6i: USACE Jurisdictional Waters of the U.S.
SCVWD South County Right of Way
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October 2018

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Figure 6j: USACE Jurisdictional Waters of the U.S.
SCVWD South County Right of Way
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October 2018

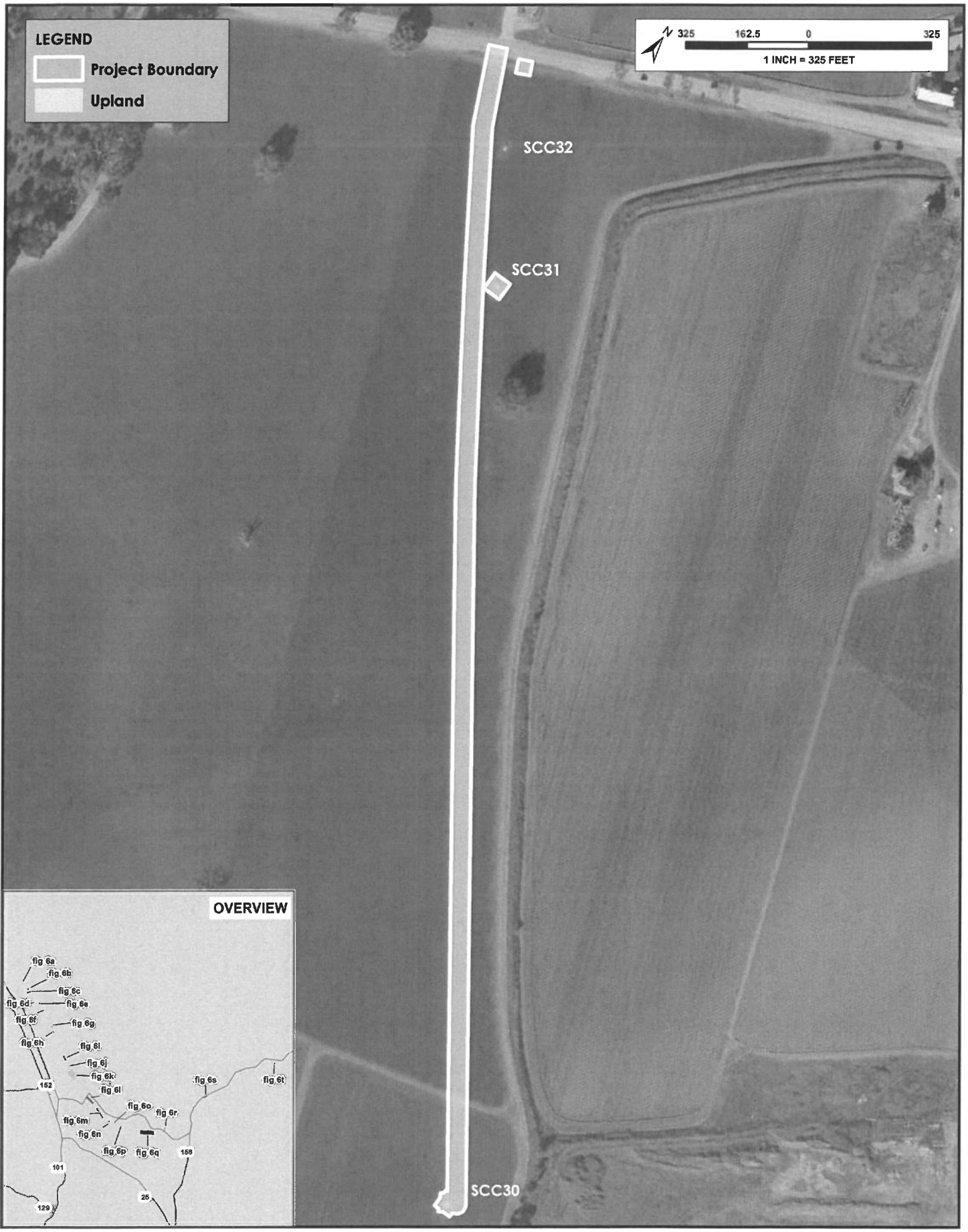

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Figure 6k: USACE Jurisdictional Waters of the U.S.
SCVWD South County Right of Way
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October 2018

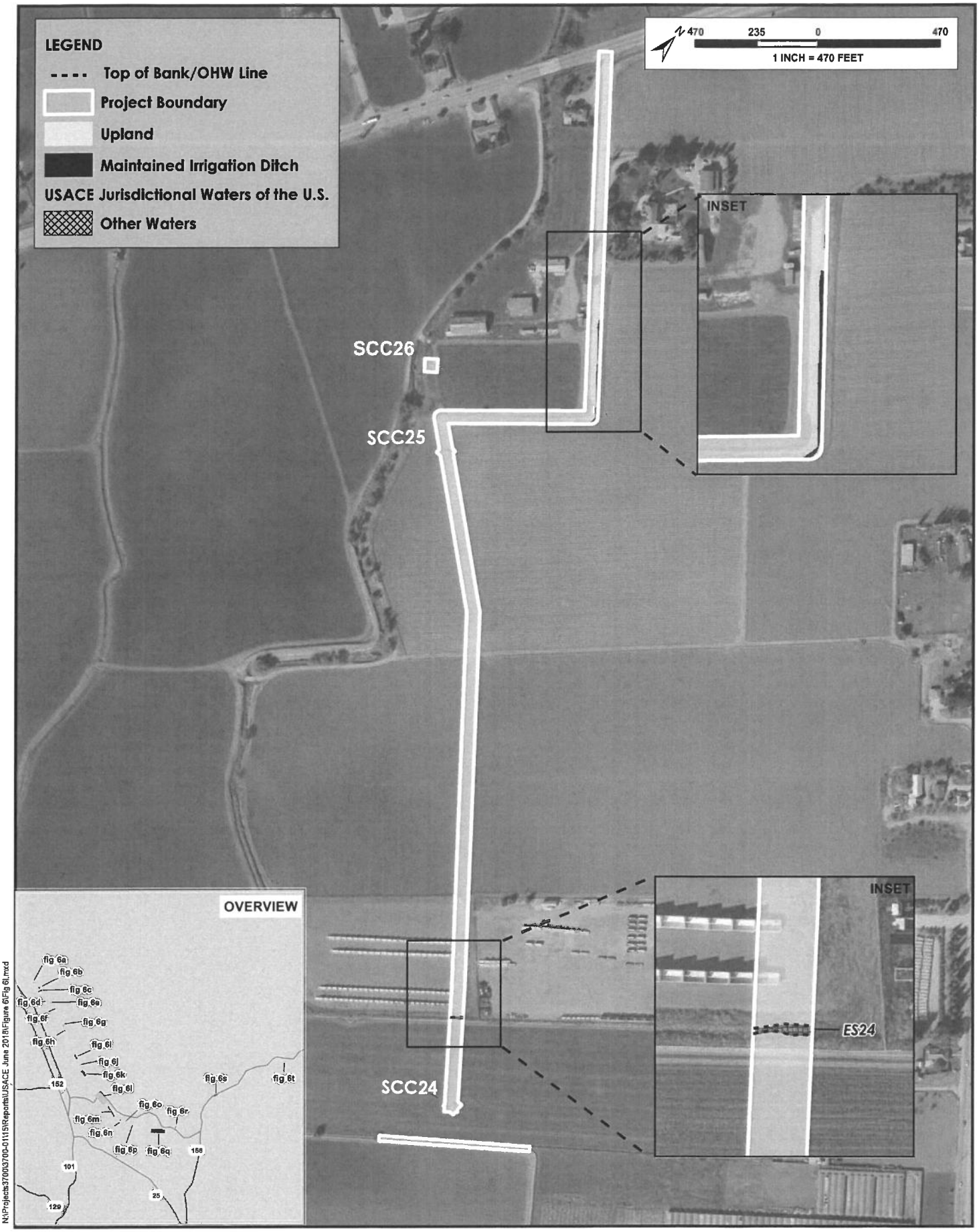

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Figure 6l: USACE Jurisdictional Waters of the U.S.
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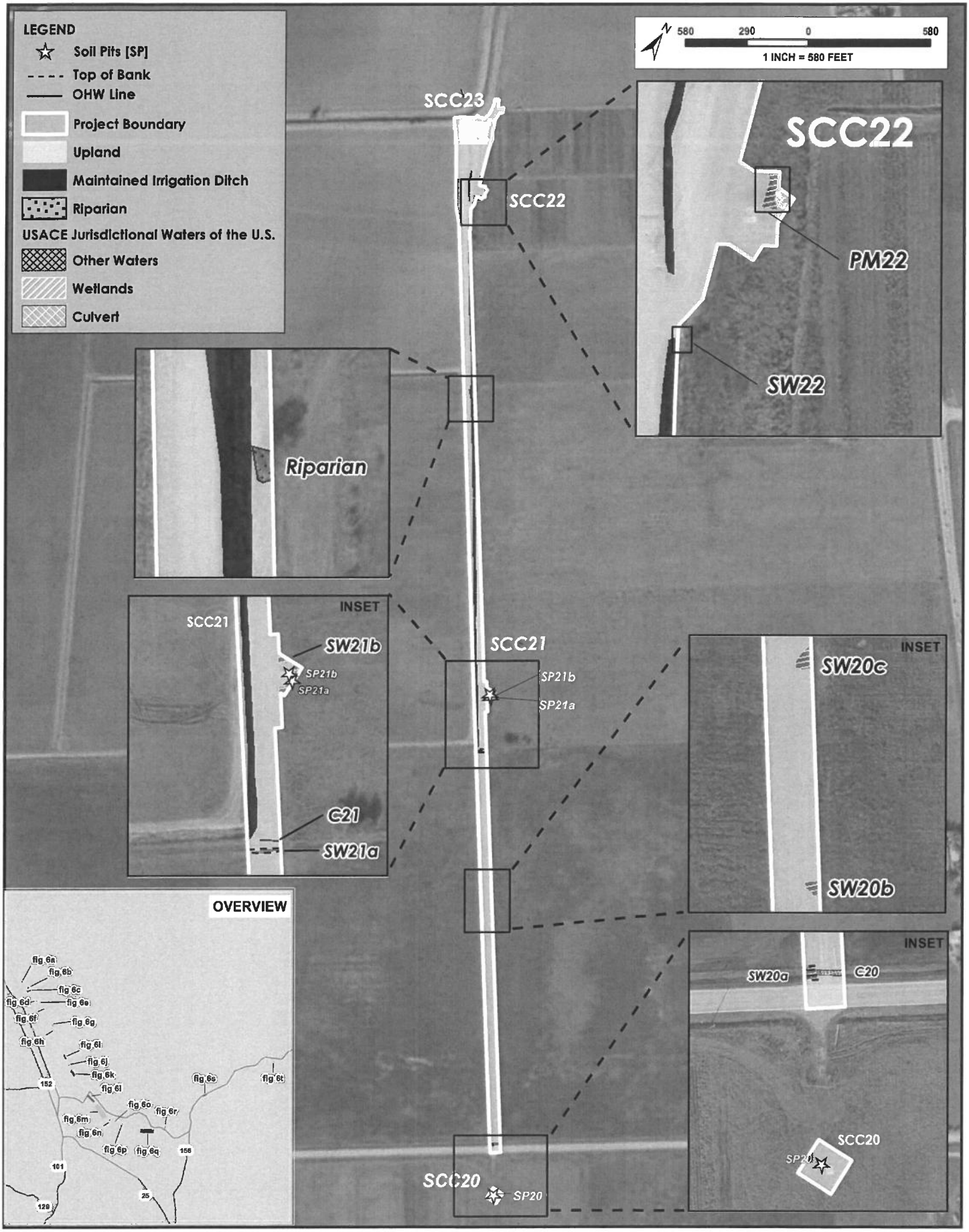

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Figure 6m: USACE Jurisdictional Waters of the U.S.
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Figure 6n: USACE Jurisdictional Waters of the U.S.
SCVWD South County Right of Way
ID of Waters of the U.S. (3700-15)
October 2018

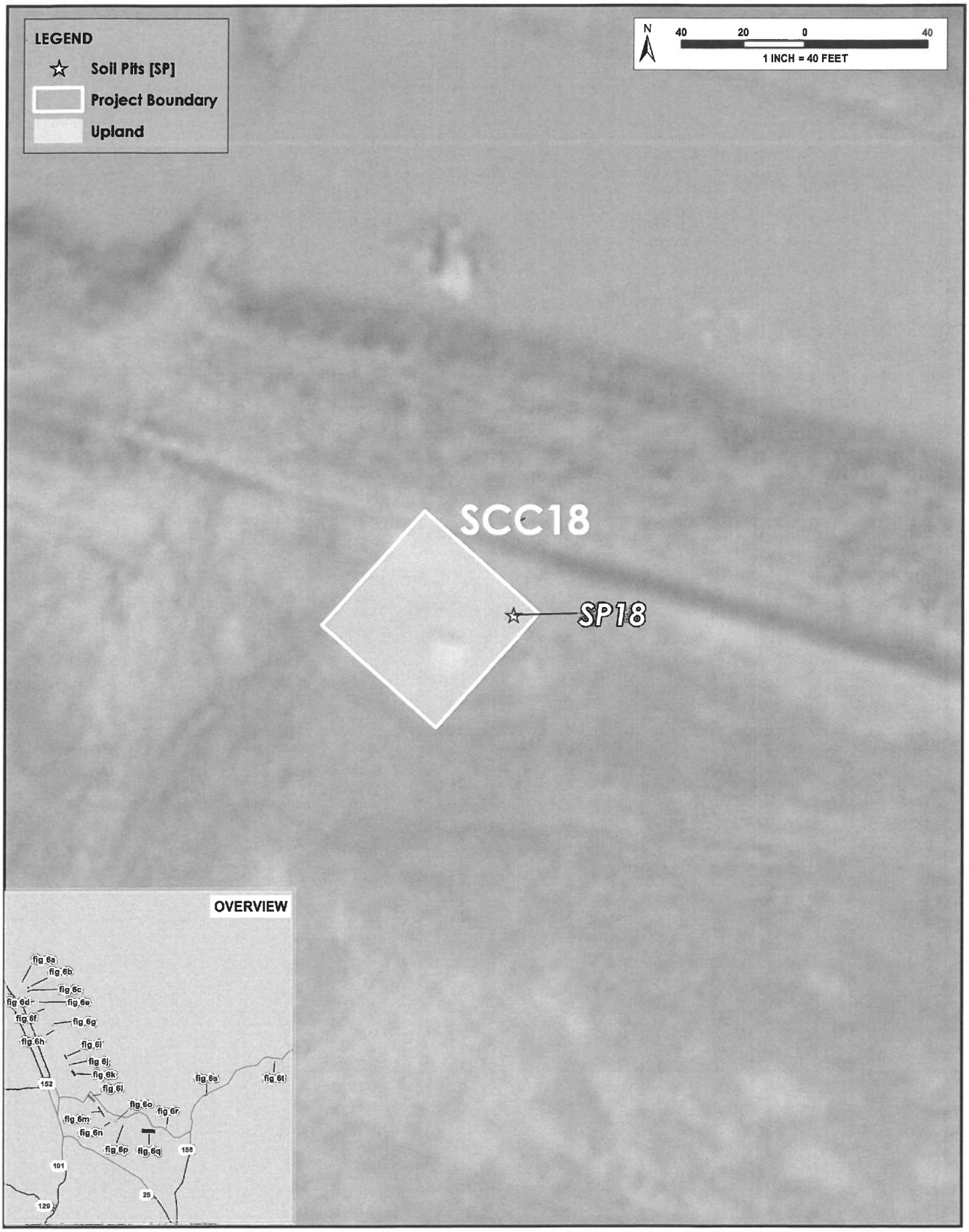

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Figure 6o: USACE Jurisdictional Waters of the U.S.
SCVWD South County Right of Way
ID of Waters of the U.S. (3700-15)
October 2018

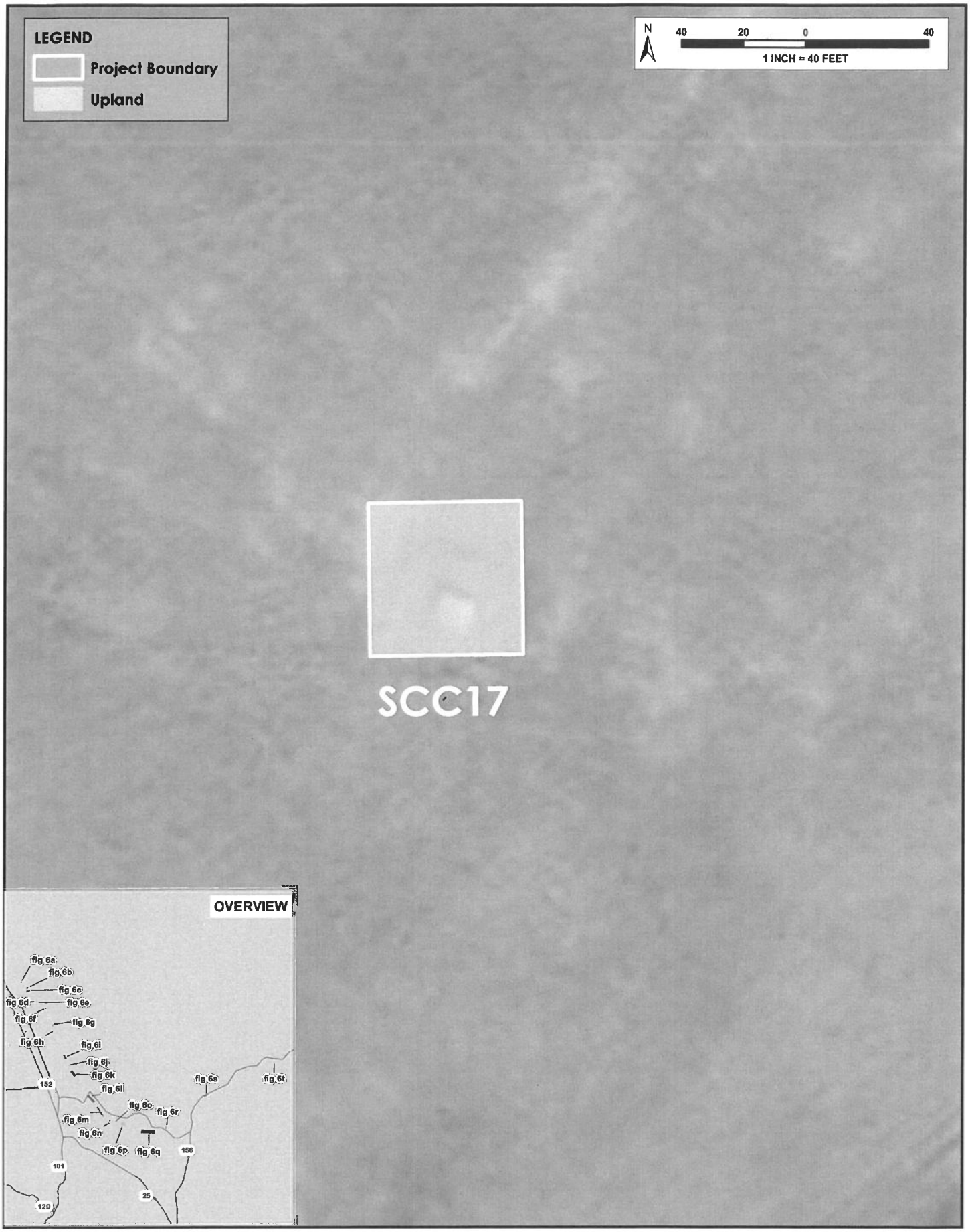

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Figure 6p: USACE Jurisdictional Waters of the U.S.
SCVWD South County Right of Way
ID of Waters of the U.S. (3700-15)
October 2018

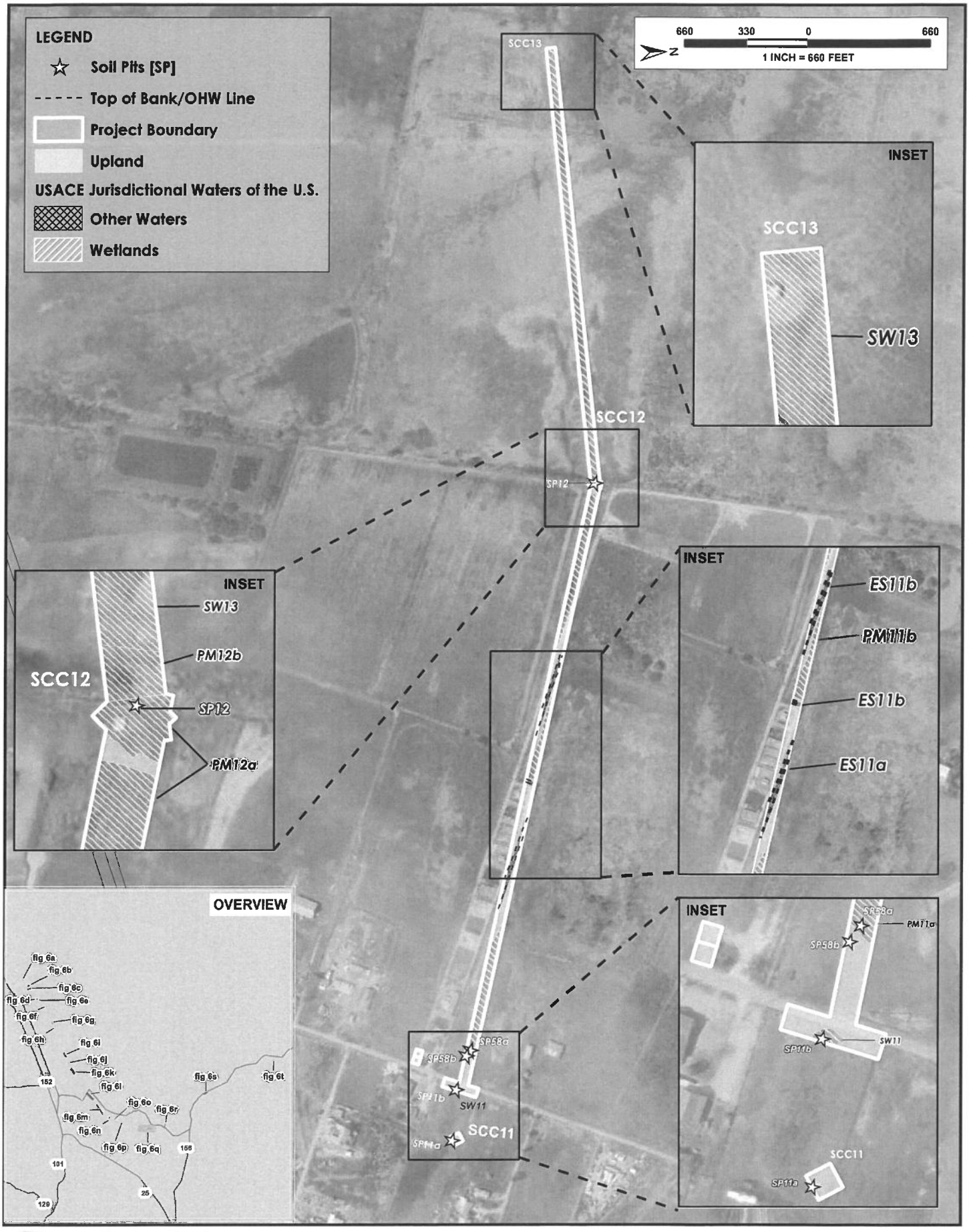

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Figure 6q: USACE Jurisdictional Waters of the U.S.
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October 2018

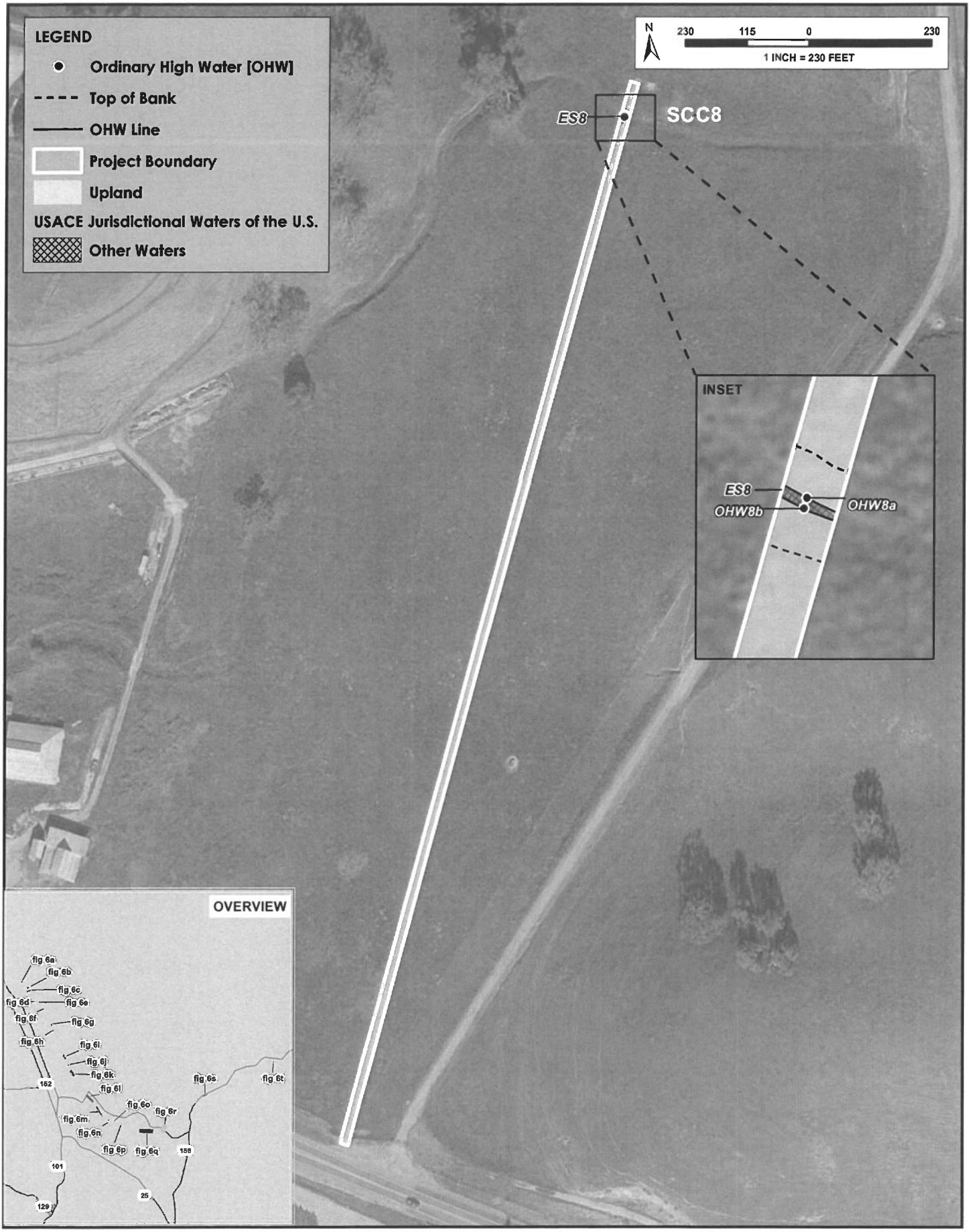

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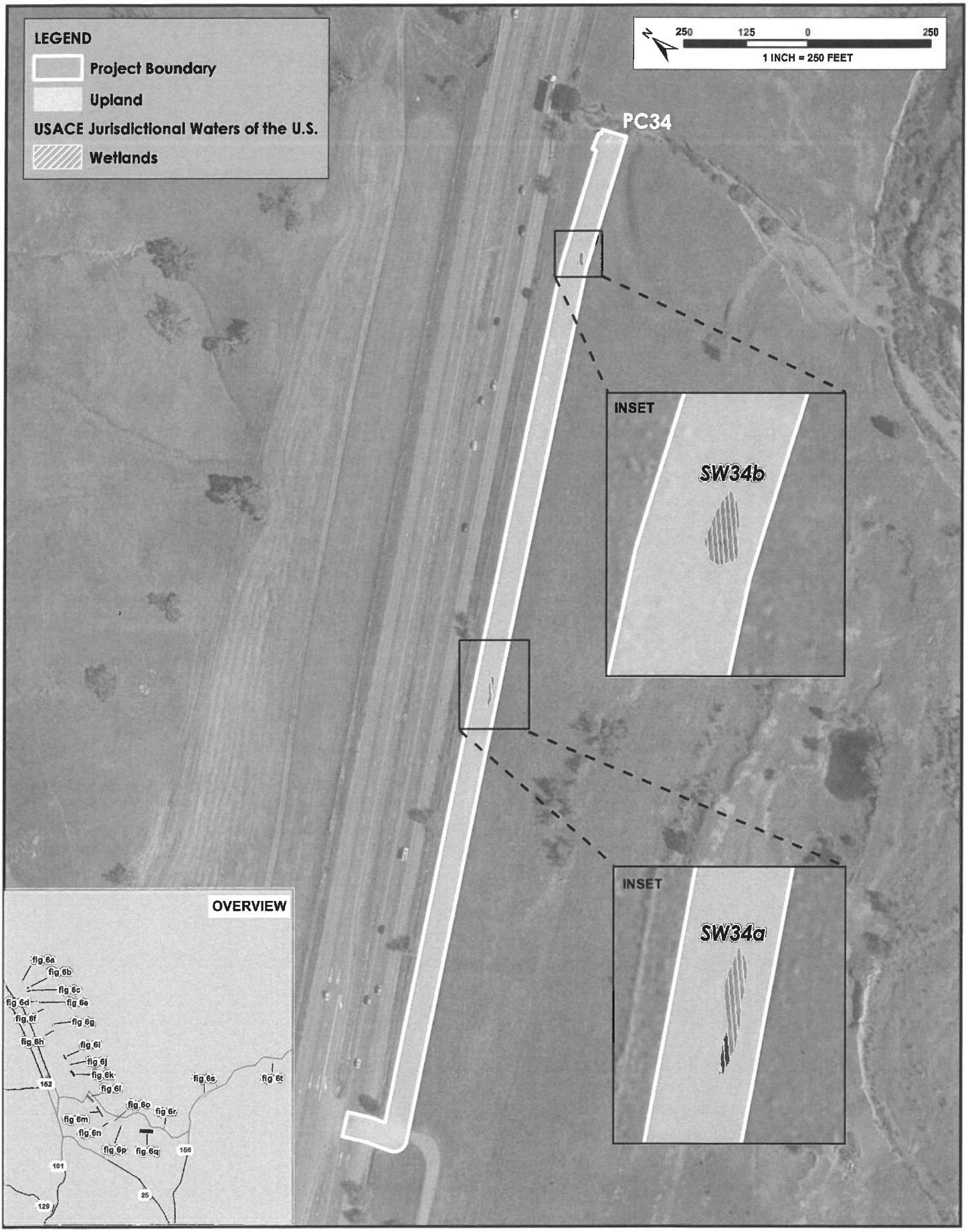
Figure 6r: USACE Jurisdictional Waters of the U.S.
SCVWD South County Right of Way
ID of Waters of the U.S. (3700-15)
October 2018



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Ecological Consultants

Figure 6s: USACE Jurisdictional Waters of the U.S.
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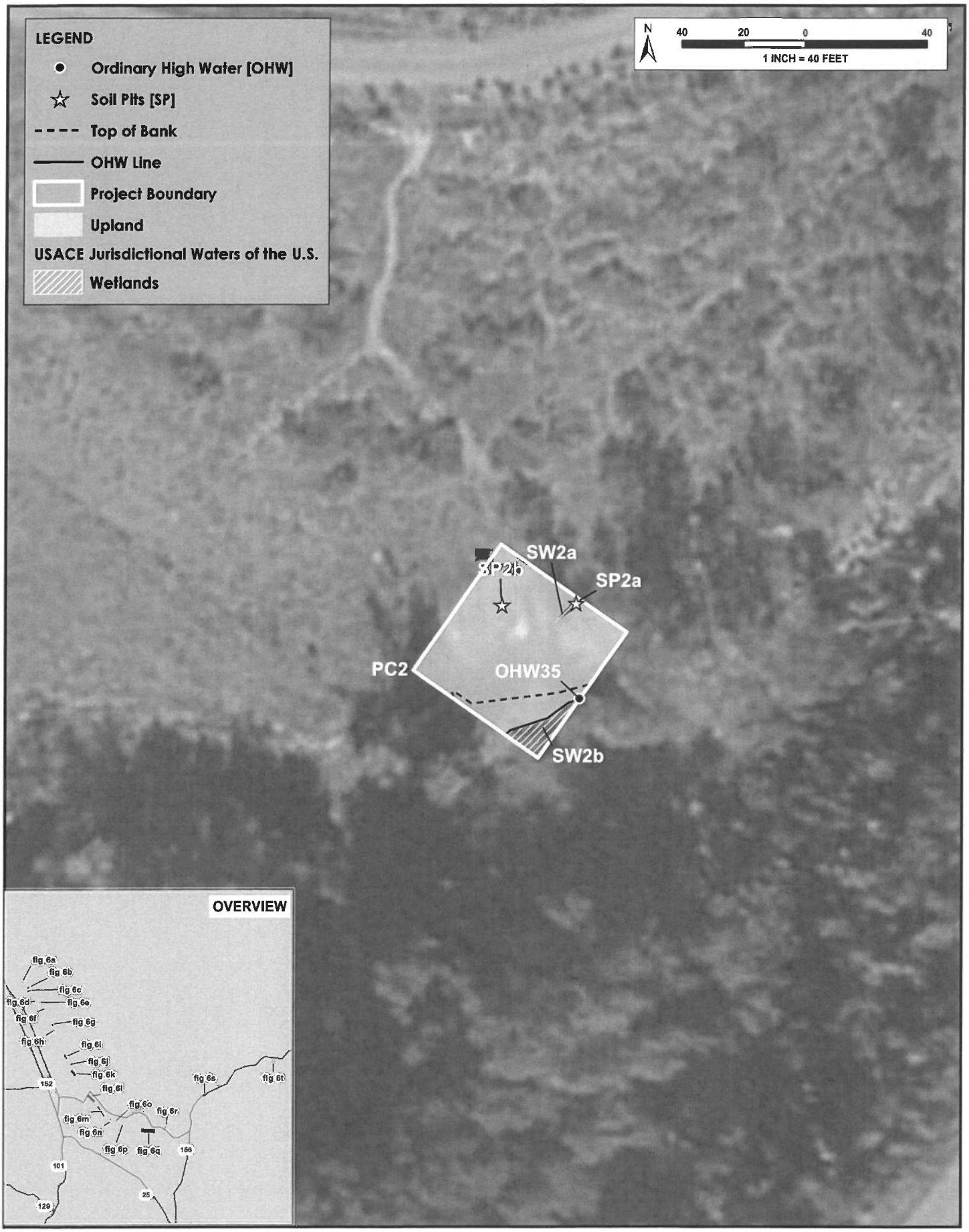
October 2018



N:\Projects3700\3700-01115\Reports\USACE June 2018\Figure 6\Fig 6t.mxd

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Figure 6t: USACE Jurisdictional Waters of the U.S.
SCVWD South County Right of Way
ID of Waters of the U.S. (3700-15)
October 2018

Figure 6a. USACE Jurisdictional Waters of the U.S.

Figure 6b. USACE Jurisdictional Waters of the U.S.

Figure 6c. USACE Jurisdictional Waters of the U.S.

Figure 6d. USACE Jurisdictional Waters of the U.S.

Figure 6e. USACE Jurisdictional Waters of the U.S.

Figure 6f. USACE Jurisdictional Waters of the U.S.

Figure 6g. USACE Jurisdictional Waters of the U.S.

Figure 6h. USACE Jurisdictional Waters of the U.S.

Figure 6i. USACE Jurisdictional Waters of the U.S.

Figure 6j. USACE Jurisdictional Waters of the U.S.

Figure 6k. USACE Jurisdictional Waters of the U.S.

Figure 6l. USACE Jurisdictional Waters of the U.S.

Figure 6m. USACE Jurisdictional Waters of the U.S.

Figure 6n. USACE Jurisdictional Waters of the U.S.

Figure 6o. USACE Jurisdictional Waters of the U.S.

Figure 6p. USACE Jurisdictional Waters of the U.S.

Figure 6q. USACE Jurisdictional Waters of the U.S.

Figure 6r. USACE Jurisdictional Waters of the U.S.

Figure 6s. USACE Jurisdictional Waters of the U.S.

Figure 6t. USACE Jurisdictional Waters of the U.S.

3.1 Observations/ Rationale/ Assumptions

The results of the on-site determination of jurisdictional waters are based upon existing conditions present at the time of the surveys. Project site conditions were observed during the delineation surveys and are reported here along with pertinent background information and precipitation records.

- The on-site determination did not assume that conditions were typical for this time of year due to below-average rainfall. Although the surveys took place during the wet season, the site received approximately 4.7 inches of precipitation since October 2013, only 24 percent of normal annual rainfall (NCDC 2014 and PRISM Climate Group 2014). Approximately 2.45 inches of precipitation fell during the week prior to the March 2014 delineation surveys at the NCDC Campbell Station (GHCND:US1CASC0032), the nearest weather station with recent, daily precipitation data (NCDC 2014).
- Below-average precipitation during the 2013/2014 thus far may have contributed to a lack of observed or recent hydrology indicators in some locations, but the wetland boundaries remained clear due to the presence of hydrophytic vegetation and persistent hydric soil indicators. We delineated boundaries somewhat conservatively, under the assumption that wetland boundaries may enlarge slightly in normal years, by considering the distribution of hydric soils carefully and microtopography.
- In 2014, the BSA was surveyed by H. T. Harvey & Associates biologists during the period of seasonal water flow within the intermittent stream channels, below-average water levels allowed for the observation of OHW mark indicators such as distinct changes in vegetation cover, sediment sorting, shelving, and channel incision. Such indicators are formed during regular channel-forming storm events, such as the 2– to 5- year events.
- During the 2018 surveys, open water, wetland, and upland habitats were observed throughout the study area. The overall conditions observed during the delineation surveys were considered to represent normal site conditions in the BSA. Total precipitation recorded for the five months prior to the May delineation survey (December 2017 to April 2018) at the Hollister 5.4 NNE weather station was 7.8 in, which is approximately 72% of the 30-year average (1971-2000), but still within the normal range of precipitation (NOAA 2018).
- Ephemeral streams were identified by the absence of water within the channel and a lack of connection to groundwater. Ephemeral, single-thread channels were observed at SCC8, SCC11, SCC24, SCC43, SCC54, and SCC57, and include portions of Tennant Creek, an unnamed tributary that drains into Ortega Creek, Elephant Head Creek, Pacheco Creek, San Ysidro Creek, Church Creek, and an unnamed Tributary to Little Llagas Creek, (Figures 6a, 6c, 6g, 6l, 6q, and 6r;ES8, ES34, and EW57, Appendix D; Photographs 2and 45, Appendix E). All potentially jurisdictional features connect with the Pajaro River, a TNW that empties into Monterey Bay. No perennial streams were identified within the BSA.
- Perennial marshes were identified at SCC11, SCC12, and SCC22 by the presence of perennial hydrophyte community, including cattails (*Typha* sp., OBL),smartweed (*Persicaria* sp., FACW/OBL), Parish's glasswort (*Arthrocnemum subterminale,* FACW), and broadfruit bur reed (*Sparganium eurycarpum,* OBL). Hydrology indicators observed included the presence of a strong hydrogen-sulfide odor, presence of surface water, a high water table, and saturation (Figures 6m and 6q;SP12 and SP58a, Appendix C; Photographs 5 and 9, Appendix E).
- Access to SCC12 vault was restricted as a result of deep water and mud, and fencing constructed by landowners over the course of the survey period. This prevented HTH biologists from revisiting this location to identify the species of plant genera that did not have the reproductive structures necessary for identification present during the March 2014 survey period. Dominance of plants in genera with only OBL or FACW species found in the region of the BSA, in addition to strong hydric soil and hydrology

indicators, allowed for the determination of this area as a perennial marsh. Uplands at near the SCC12 vault were restricted to a berm, approximately 5 feet high. SCC12 was visited during the surveys in 2018 and the March 2014 observations were confirmed. Additionally, a second perennial marsh was identified at SCC12 in 2018 and mapped as PM12b.

- Seasonal wetlands were identified at SCC11, SCC13, SCC20, SCC21, SCC22, SCC52, SCC57, PC2, and PC34 Seasonal wetlands within stream channels (below the OHW marks) were documented at SC20 and SC21, both within an unnamed tributary to LLagas Creek, SCC57 within Tennant Creek, and at PC2 within Pacheco Creek (Figures 6a, 6m, and 6s; SP57a, Appendix C; SP19a and SP57a, Appendix C; Photographs 4, 12, 30-32, 39, and 40-42; Appendix E). One seasonal wetland at PC2 was outside the active (5 to 10 year) floodplain of Pacheco Creek; it is seep-fed and situated just above the top of bank (Figure 6s; SP2a, Appendix C; Photographs 41-42, Appendix E). Other seasonal wetlands (SCC11, SCC13, SCC21, SCC22, SCC52, and PC34) were situated on flat, poorly drained, low-lying agricultural land and meadows (Figures 6e, 6q, 6m, and 6s; SP11b, SP21a, and SP52a, Appendix C). These areas are without standing water for much of the year, but a high water table in years with normal rainfall would allow the soil to remain saturated.
- The BSA at SCC52 is a mosaic of wetland and upland patches (Photograph 30, Appendix E). Microtopographic variation in this low-lying meadow has contributed to the colonization of hydrophytic species, allowed for the processes of reduction and translocation to remove or transform iron in the soil, and the collect surface water over much portions of the area (SP52a, Appendix C; Photograph 31-32, Appendix E). This site is comprised of approximately 75 percent wetland and 25 percent upland. These percentages were taken into account when calculating the total wetland and upland acreages across the BSA.
- Non-jurisdictional waters (maintained agricultural irrigation ditches) are included in the upland habitat type and acreage. These features were observed at SCC21, SCC22, SCC24, SCC35, SCC53, and SCC54 (Photographs 13, 15, and 26, Appendix E). Maintained irrigation ditches did not have OHW mark indicators, and are artificial features that do not replace any natural stream channels or drainages. In addition, they are currently managed to keep vegetation from establishing in the channels. Maintained irrigation ditches did not support a significant hydrophytic community and only carry surface runoff from irrigation and immediately after rainfall events.

3.2 Areas Meeting the Regulatory Definition of Jurisdictional Waters

3.2.1 Identification of Section 404 Potential Jurisdictional Wetlands

For purposes of this report, and as required by the USACE mapping requirements, wetland features have been divided into several categories, including coastal and valley freshwater march and seasonal wetlands. The figures (i.e. 6a through 6t) have these categories identified as "wetlands."

Coastal and Valley Freshwater Marsh. Within the BSA, approximately 0.60 ac of coastal and valley freshwater marsh were mapped (Appendix F). During the 2014 surveys, a coastal and valley freshwater marsh was mapped in a low-lying area utilized by cattle at SCC12 (Figure 6q; SP12, Appendix C; Photograph 5, Appendix E). The marsh surrounds the vault at SCC12, and is part of a larger wetland system that extends to the north and east. Vegetation in this habitat is dominated by perennial aquatic emergent vegetation, such as cattails and smartweed. At the time of the field survey, the wetland contained approximately 4-12 inches of surface water over approximately 60 percent of the wetland (Photograph 5, Appendix E). The high water table was at a depth of 2 inches, and the entire soil profile was saturated. The substrate of the wetland is clay with

prominent redox concentrations, overlain by a 1-inch layer of dark colored clay with high organic material content (SP12, Appendix C).

During the 2018 surveys, the boundaries of the marsh mapped in 2014 at SCC12 was expanded south across a small berm to include a proposed access road that connects Lovers Lane (public road) to the vault at SCC12 (Figure 6q). The conditions observed were similar to the conditions observed in 2014. The expanded marsh is mapped as PM12a (Figure 6q; SP12, Appendix C; Photograph 5, Appendix E). Additionally, a riverine freshwater marsh was mapped as PM12b adjacent to SCC12 to the north. Vegetation in this riverine habitat is dominated by perennial aquatic emergent vegetation, such as hardstem bulrush (*Schoenoplectus acutus*), broadleaf cattail and broadfruit bur reed. At the time of the field survey, the wetland contained approximately 12-24 in of surface water (Photograph 9, Appendix C). A broadleaf cattail dominated perennial marsh was mapped adjacent to SCC22 (Figure 6m).

Alkali Sink. Within the BSA, approximately 0.74 ac of alkali sink were mapped (Appendix F). During the 2018 surveys, alkali sink wetlands were mapped as PM11a and PM11b in low-lying, active cattle areas within the proposed access road from Lovers Lane to SCC12 (Figure 6q; SP58a, Appendix C; Photograph 49, Appendix E). This habitat is dominated by Parish's glasswort, a perennial emergent hydrophytic herb (FACW). At the time of the survey, the soil was moist but not saturated and the water table was below 16 in. The substrate was silty clay with prominent redox concentrations (SP58a, Appendix C).

Seasonal Wetland. Within the BSA, approximately 1.8 ac of seasonal wetlands were mapped within 14 features (Figures 6a, 6e, 6m, 6q, 6s, and 6t; features SW57, SW52, SW22, SW21a, SW21b, SW20a, SW20b, SW20c, SW13, SW11, SW34a, SW34b, SW2a, and SW2b; Appendix F). Six of sixteen soil pits were located within seasonal wetlands (SP2a, SP11b, SP21a, SP52a, and SP57a, Appendix C). At SCC11, the seasonal wetland was situated on low-lying land near rural residences (Figure 6q; SP11b, Appendix C; Photograph 4, Appendix E). The area around SCC11 is a used for cattle grazing. In addition, evidence of fill soil placement interspersed around the BSA at SCC11 was observed during the survey. This seasonal wetland was dominated by Parish's glasswort (FACW), and the substrate was clay loam with prominent redox concentrations in the soil matrix and along pore linings. While no primary hydrology indicators were observed, vegetation at SCC11 passed the FAC-neutral test (1:1) and saturation is visible on aerial images from October 2007, September 2009, and September 2011.

The seasonal wetlands at SCC21 were situated on low-lying agricultural or ranch land, although the area was not planted with crops at the time of the survey and no cattle were observed (Figure 6m; SP21a, Appendix C; Photograph 12, Appendix E). These wetlands were dominated by Italian ryegrass (*Festuca perennis*, FAC), and the substrate was clay loam with prominent redox concentrations. Two inches of stagnant surface water was observed in low-lying areas in-between hummocks, and covered approximately 10 percent of the wetland at the time of the survey.

At SCC52, the BSA is a mosaic of approximately 75 percent seasonal wetland, and 25 percent upland. This location is in a low-lying meadow near Coyote Lake – Harvey Bear County Park, and is in the active floodplain of San Martin Creek (Figure 6e; SP2a, Appendix C; Photographs 30-32, Appendix E). Seasonal wetland patches were in concave depressions, and were dominated by seaside barley (*Hordeum marinum*, FAC), and iris-leaved rush (*Juncus xiphioides*, OBL). The substrate was silty clay loam, and the processes of reduction and translocation have removed or transformed iron, creating a soil color of low chroma and high value. This feature, in concert with the presence of prominent redox concentrations along pore linings is indicative of a depleted soil matrix (SP2a, Appendix C). Surface water covered approximately 10 percent of the wetland patches, and was recorded at a depth of 2 inches. The high water table was observed at 6 inches in depth, and the entire soil profile was saturated.

At SCC57, the seasonal wetland was below the OHW marks of an ephemeral section of Tennant Creek, adjacent to rural residences and greenhouses (Figure 6a; SP57a, Appendix C; Photograph 39, Appendix E). The herbaceous layer of this wetland was dominated by spearmint (*Mentha spicata*, OBL), and the overstory was dominated by Northern California walnut (*Juglans hindsii*, FAC) and camphora tree (*Cinnamomum camphora*, UPL). The substrate was silty clay loam with prominent redox concentrations. Water stained leaves of previous year's vegetation were observed at this location, along with drainage patterns, identified by vegetation matted in one direction.

Two distinct seasonal wetlands were identified at PC2 (Figure 6t). The northernmost seasonal wetland at this location occurred outside of the active floodplain and above the top of bank of Pacheco Creek. It is seep-fed, and was situated in a concave depression (SP2a, Appendix C; Photographs 41-42, Appendix E). The herbaceous layer was dominated by bird's foot trefoil (*Lotus corniculatus*, FAC), the shrub layer was dominated by mulefat (*Baccharis salicifolia*, FAC), and the overstory was dominated by California sycamore (*Platanus racemosa*, FAC). This area was underlain by loam, but a layer of cobble prevented sampling at a depth greater than 6 in. At the time of the survey, 2-inch deep stagnant, surface water covered approximately 10 percent of this wetland, and the entire soil profile was saturated.

The southernmost seasonal wetland at this location occurred in the active floodplain and below the OHW marks of Pacheco Creek, although it was outside the low flow channel which is perennially inundated (Photographs 40 and 43, Appendix E). This wetland was a monoculture of naked sedge (*Carex nudata*, OBL), and was situated on a low terrace that receives flows during 5 to 10 year storm events. Soil sampling was prevented at this location by the cobble substrate. A primary hydrology indicator observed at this location included water-stained leaves at the base of naked sedge plants.

During the 2018 surveys, seasonal wetlands were mapped within the proposed roads to PC34, SCC13, SCC21, and SCC22 (Figures 6q, 6s). The seasonal wetlands within the proposed road to PC34 were situated in depressions within upland grassland habitat and were dominated by hydrophytic vegetation, including seaside barley, curly dock (*Rumex crispus,* FAC), hyssop loosestrife (*Lythrum hyssopfolia,* OBL), and spikerush (*Eleocharis* sp., OBL). The seasonal wetland mapped within the proposed road between the vaults at SCC12 and SCC13

was in a low-lying floodplain of San Felipe Lake and is an active cattle grazing area. This wetland was dominated by curly dock (FAC), fat-hen (*Atriplex prostrata,* FACW), salt grass (*Distichlis spicata,* FAC), Italian rye grass (FAC), and tall flatsedge (*Cyperus eragrostis,* FACW). At the time of the survey, the soil was slightly moist at a depth of approximately 6 in and prominent redox concentrations were observed in the soil matrix. Seasonal wetlands within stream channels (below the OHW marks) were documented at SC20 and SC21, both within an unnamed tributary to Llagas Creek.

3.2.2 Identification of Section 404 Potential Jurisdictional Other Waters

Within the BSA, 0.224 ac of jurisdictional "other waters" were mapped as ephemeral streams and culverts.

Culverts. Two culverts were mapped in the BSA as C20 and C21 and cover 0.004 ac (Figure 6m). The culvert C20 runs under the proposed access road to SCC21 connects to SW20a. The culvert C21 runs under the proposed access road to SCC21 and empties into a maintained irrigation ditch. All jurisdictional "other waters" mapped connect with the Pajaro River, a TNW that empties into Monterey Bay.

Ephemeral Stream. Ephemeral streams cover 0.22 ac and were mapped at SCC8, SCC11, SCC24, SCC43, SCC54, and SCC57. These include portions of Tennant Creek, an unnamed tributary that drains into Ortega Creek, Elephant Head Creek, Pacheco Creek, San Ysidro Creek, Church Creek, and an unnamed Tributary to Little Llagas Creek (Figures 6a, 6c, 6g, 6l, 6q, and 6r; ES57, ES54, ES43, ES24, ES11a, ES11b, and ES8, Appendix D; Photographs 2 and 45, Appendix E, Appendix F).

The streambed of the unnamed tributary at SCC8 was vegetated with upland herbaceous plant species such as wild oats (*Avena* sp., UPL) and was underlain by a soil substrate (Figure 6r; ES8, Appendix D). The OHW marks were identified by a slight break in slope, and a decrease in vegetative cover from the stream banks to the low-flow channel, which was consistent with the OHW marks. Outside of the seasonal wetland at SCC57, the streambed of Tennant Creek has a soil substrate and was sparsely vegetated with upland herbaceous plant species such as bigleaf periwinkle (*Vinca major*, UPL) (Figure 6a; ES57, Appendix D). The lack of hydrophytic vegetation in this portion of the channel allowed for the determination of this area as other waters, rather than a part of the abutting seasonal wetland. The canopy of camphora and Northern California walnut trees also hung above the channel. The OHW marks at SCC57 were identified by the presence of a slight break in slope, drainage patterns (matted vegetation), the presence of drift and debris, and a decrease in vegetative cover from the stream banks to the bed. The low-flow channels at SCC8 and SCC57 were consistent with the OHW marks. Flowing water was not observed at the time of the March 2014 delineation survey and the soil was dry to slightly saturated as a result of the rains during the week prior to the survey. The active floodplain was not observed at any of these streams, and upper terraces are expected only to receive flows during 100-year flood events.

During the 2018 surveys, ephemeral streams were mapped within the proposed roads to SCC12, SCC24, and SCC54 as well as adjacent to the vault at SCC43 (Figures 6c, 6g. 6l, and 6q). These ephemeral streams were vegetated with upland vegetation and flowing water was not observed at the time of the site visit (Photograph 50, Appendix E). They were all man-made, earth-excavated low-flow channels and likely function as irrigation

ditches for surrounding agricultural activities. The OHWM and top of bank were mapped at the same point due to the almost vertical banks present in each of the streams. Upland species observed include Italian rye grass (FAC), bristly ox-tongue (*Helminthotheca echioides*, FACU), jointed charlock (*Raphanus sativus*, UPL), black mustard (*Brassica nigra*, UPL), and Harding grass (*Phalaris aquatica*, FACU).

3.2.3 Areas Not Meeting the Regulatory Definition of Waters of the U.S.

Approximately 17.98 ac of the BSA did not meet the regulatory definitions of jurisdictional waters (Figures 6a-t; Photographs 1, 3, 6-8, 10, 11, 13-29, 33, 35-37, and 44; Appendix E). Nine of fifteen soil pits were located in uplands (SP58b, SP57b, SP54, SP52b, SP21b, SP20, 18, SP11a, and SP2b, Appendix C). Uplands within the BSA were comprised of annual grassland, agricultural land, ornamental woodland, California sycamore alluvial woodland, and urban-suburban habitat. Potentially non-jurisdictional waters were also included in the upland habitat type, and were observed within the limits of the BSA at SCC21, SCC22, SCC24, SCC35, SCC53, and SCC54 (Photographs 13, 15, and 26, Appendix E). These features were roadside and agricultural ditches with no OHW mark indicators. In addition, these drainage ditches are artificial features that do not replace any natural stream channels or drainages, and they are currently managed to keep vegetation from establishing in the channels. One soil pit was placed in an agricultural ditch at SCC54 (SP54, Appendix C). Ditches did not support a significant hydrophytic community and only carry surface runoff from irrigation and during and immediately rainfall events. As such, they are not expected to be considered potentially jurisdictional other waters.

During the 2014 and 2018 site visits, annual grassland habitat and ranch lands were dominated by wild oats, ripgut brome (*Bromus diandrus*, UPL), meadow barley (*Hordeum murinum*, FACU), seaside barley, lamb's quarters (*Chenopodium album*, FACU), and spring vetch (*Vicia sativa*, FAC). Much of the agricultural land had been cleared for planting spring and summer crops at the time of the survey, but where vegetation was present, the community was dominated by wild oats, Italian ryegrass, black mustard (*Brassica nigra*, UPL), and jointed charlock (UPL. Dirt roads and driveways were considered annual grassland and agricultural land, and were contiguous with the surrounding habitats. Plant species composition in these areas was similar, and in many cases identical, to that of the adjacent habitats because these roads experience little traffic, and are primarily used for maintenance activities. The overstory of ornamental woodland habitat at SCC57 was dominated by Northern California black walnut (*Juglans hindsii*), camphora, and coast live oak (*Quercus agrifolia*). Dominant shrubs included Carolina laurel cherry (*Prunus caroliniana*) and Sierra plum (*Prunus subcordata*). The overstory of the California sycamore alluvial woodland at PC2 was dominated by California sycamore, and the shrub layer was dominated by mulefat and coyote brush (*Baccharis pilularis*, UPL). Hardscape, such as paved roads and driveways, and landscaped areas were considered urban-suburban habitat. Uplands across the BSA were generally underlain by clay and clay loam soil, with the exception of the sycamore alluvial woodland at PC2, which was underlain by cobble, with a small proportion of loam within the top 6 inches of the soil profile. No hydric soil or hydrology indicators were observed in these areas.

During the 2018 surveys, mixed woodland riparian habitat was mapped within the proposed access road to SCC56, adjacent to the vault at SCC43, along the ephemeral stream (ES57) near SCC57, and within the

proposed access road between SCC21 and SCC22 (Figures 6a, 6b, 6q, and 6m). Trees observed included camphora, black elderberry (*Sambucus nigra*), buckeye (*Aesculus californica*), Northern California black walnut (*Juglans hindsii*), red willow (*Salix laevigata*), and coyote brush (*Baccharis pilularis*). The total area of riparian habitat mapped was 0.029 ac.

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[USACE] U.S. Army Corps of Engineers. 2016. Updated Map and Drawing Standards for the South Pacific Division Regulatory Program.

Appendix A. Plants Observed

Family	Scientific name	Synonyms	Common name	Indicator Status
Adoxaceae	*Sambucus nigra*		black elderberry	FACU
Apiaceae	*Anthriscus caucalis*		bur chervil	UPL
	Conium maculatum		poison hemlock	FACW
	Foeniculum vulgare		fennel	UPL
Apocynanceae	*Vinca major*		bigleaf periwinkle	UPL
Asteraceae	*Artemisia douglasiana*		mugwort	FAC
	Baccharis pilularis ssp. *consanguinea*		coyote brush	UPL
	Baccharis salicifolia ssp. *salicifolia*		mule fat	FAC
	Carduus pycnocephalus ssp. *pycnocephalus*		Italian thistle	UPL
	Centaurea solstitialis		yellow star thistle	UPL
	Centaurea stoebe ssp. *micranthos*		spotted knapweed	UPL
	Cichorium intybus		chicory	UPL
	Cirsium vulgare		bull thistle	FACU
	Cotula coronopifolia		brass buttons	OBL
	Dittrichia graveolens		stinkwort	UPL
	Grindelia camporum		common gumplant	FACU
	Helminthotheca echioides	*Picris echioides*	bristly ox-tongue	FACU
	Lactuca serriola		wild lettuce	FACU
	Matricaria discoidea		pineapple weed	FACU
	Silybum marianum		milkthistle	UPL
	Sonchus asper ssp. asper		prickly sow thistle	FAC
	Taraxacum officinale		common dandelion	FACU
	Tragopogon porrifolius		purple salsify	UPL
	Xanthium strumarium		rough cocklebur	FAC
Azollaceae	*Azolla* sp.		mosquito fern	OBL
Boraginaceae	*Amsinckia intermedia*		common fiddleneck	UPL
	Pholistoma membranaceum		white fiesta flower	UPL
Brassicaceae	*Brassica nigra*		black mustard	UPL
	Brassica rapa		field mustard	UPL
	Cardamine californica		California toothwort	UPL
	Hirschfeldia incana		Mediterranean hoary mustard	UPL
	Lepidium chalepense		Lens-podded hoary cress	NI

Family	Scientific name	Synonyms	Common name	Indicator Status
	Lepidium draba	*Cardaria draba*	whitetop	UPL
	Raphanus sativus		jointed charlock	UPL
Caryophyllaceae	*Stellaria media*		common chickweed	FACU
Chenopodiaceae	*Arthrocnemum subterminale*	*Salicornia subterminale*	'Parish's glasswort	FACW
	Atriplex prostrata		fat-hen	FACW
	Chenopodium album		lamb's quarters	FACU
Convolvulaceae	*Convolvulus arvensis*		field bindweed	UPL
	Cressa truxillensis		alkali weed	FACW
Cyperaceae	*Carex nudata*		naked sedge	FACW
	Cyperus eragrostis		tall flatsedge	FACW
	Eleocharis sp.		spikerush	OBL
	Schoenoplectus acutus		hardstem bulrush	OBL
Fagaceae	*Quercus agrifolia*		coast live oak	UPL
	Quercus lobata		valley oak	FACU
Fabaceae	*Lotus corniculatus*		bird's foot trefoil	FAC
	Lupinus bicolor		miniature lupine	UPL
	Lupinus succulentus		arroyo lupine	UPL
	Medicago polymorpha		bur medic	FACU
	Melilotus indicus		annual yellow sweet clover	FACU
	Vicia sativa		spring vetch	FACU
	Trifolium hirtum		rose clover	UPL
	Trifolium repens		white clover	FACU
Geraniaceae	*Erodium cicutarium*		redstem filaree	UPL
	Geranium dissectum		cutleaf geranium	UPL
	Geranium molle		woodland geranium	UPL
Juglandaceae	*Juglans hindsii*		Northern California black walnut	FAC
Juncaceae	*Eleocharis macrostachya*	*Eleocharis palustris*	common spikerush	OBL
	Juncus bufoniusvar. Bufonius		toadrush	FACW
	Juncus mexicanus		Mexican rush	FACW
	Juncus xiphioides		iris-leaved rush	OBL
Lamiaceae	*Mentha spicata*		spearmint	OBL
	Lamium amplexicaule		giraffe head	UPL
	Marrubium vulgare		white horehound	FACU
Lauraceae	*Cinnamomum camphora*		camphor tree	UPL
Lythraceae	*Lythrum hyssopifolia*		Hyssop loosestrife	OBL
Malvaceae	*Malva nicaeensis*		bull mallow	UPL
	Malvella leprosa		alkali mallow	FACU
Montiaceae	*Claytonia perfoliata*		miner's lettuce	FAC

Family	Scientific name	Synonyms	Common name	Indicator Status
Myrsinaceae	*Anagallis arvensis*		scarlet pimpernel	UPL
Oleaceae	*Olea europaea*		olive	UPL
Onagraceae	*Epilobium brachycarpum*		tall willowherb	UPL
Papaveraceae	*Eschscholzia californica*		California poppy	UPL
Plantaginaceae	*Plantago lanceolata*		ribgrass	FAC
	Plantago coronopus		buckhorn plantain	FACW
	Veronica catanata		chain speedwell	NI
	Veronica persica		birdeye speedwell	UPL
Platanaceae	*Platanus racemosa*		California sycamore	FAC
Poaceae	*Agrostis stolonifera*		creeping bentgrass	FACW
	Avena barbata		slender wildoats	UPL
	Avena fatua		common wildoats	UPL
	Briza minor		little quaking grass	FAC
	Bromus catharticus		rescue grass	UPL
	Bromus diandrus		ripgut brome	UPL
	Bromus hordeaceus		soft chess	FACU
	Bromus madritensis		3o asp3 brome	UPL
	Cynodon dactylon		3o asp3 grass	FACU
	Distichilis spicata		saltgrass	FAC
	Elymus triticoides	*Leymus triticoides*	beardless wildrye	FAC
	Festuca perennis	*Lolium perenne*	Italian ryegrass	UPL
	Hordeum marinum		seaside barley	FAC
	Hordeum murinum		meadow barley	FACU
	Phalaris aquatica		harding grass	FACU
	3o asp.			-
	Polypogon monspeliensis		annual rabbitsfoot grass	FACW
	Triticum aestivum		common wheat	UPL
Polygonaceae	*Persicaria* sp.	*Polygonum* sp.	smartweed	FACW/ OBL
	Polygonum aviculare ssp. *depressum*		prostrate knotweed	FACW
	Rumex conglomeratus		clustered dock	FACW
	Rumex crispus		curly dock	FAC
Ranunculaceae	*Ranunculus californicus* var. *californicus*		California buttercup	FACU
Rosaceae	*Prunus caroliniana*		Carolina laurelcherry	FACU
	Prunus subcordata		Sierra plum	UPL
Rubiaceae	*Galium aparine*		stickywilly	FACU
	Galium sp.		bedstraw	-
Salicaceae	*Salix laevigata*		red willow	FACW
Sapindaceae	*Aesculus californica*		buckeye	NI
Typhaceae	*Sparganium eurycarpum*		broadfruit bur reed	OBL

Family	Scientific name	Synonyms	Common name	Indicator Status
	Typha latifolia		broadleaf cattail	OBL
	Typha sp.		cattail	OBL
Verbenaceae	*Phyla nodiflora*		turkey tangle fogfruit	FACW

The species are arranged alphabetically by family name for all vascular plants encountered during the plant survey. Plants are also listed alphabetically within each family. Species nomenclature is from Baldwin (2012). Former names have also been included for species where the nomenclature has not been updated on the National Wetland Inventory.

Wetland Indicator Status Key:

OBL = Obligate wetland species, occur almost always in wetlands.

FACW = Facultative Wetland species, usually occur in wetlands, but may also occur in non-wetlands.

FAC = Facultative species, occur in wetlands and non-wetlands.

FACU = Facultative Upland species, usually occur in non-wetlands, but may occur in wetlands.

UPL = Upland species, almost never occur in wetlands.

NI = Non-indicator, not present on list.

Appendix B. Soils of Eastern Santa Clara County, CA and San Benito County, CA

SOIL SURVEY OF

Eastern Santa Clara Area, California

United States Department of Agriculture
Soil Conservation Service
In cooperation with
University of California
Agricultural Experiment Station

Issued September 1974

Ben Lomond Series

The Ben Lomond series consists of well-drained fine sandy loams that are underlain by soft sandstone at a depth of 33 to 60 inches. These soils have slopes of 50 to 75 percent and are on uplands. Vegetation is coniferous forest consisting mainly of redwood and Douglas-fir but including associated hardwoods. Elevation ranges from 500 to 2,200 feet. Average annual rainfall is 35 to 50 inches, and average annual temperature is 55° to 56° F. The growing season is 200 to 250 days. Ben Lomond soils are associated with the Felton and Madonna soils.

In a representative profile, a 2-inch litter of fresh and decomposed needles and leaves overlies a mineral surface layer of dark grayish-brown, slightly acid fine sandy loam about 6 inches thick. The subsoil is dark-brown, brown, and light-brown, medium acid to strongly acid fine sandy loam and very fine sandy loam. It is underlain at a depth of 43 inches by very pale brown, strongly acid, soft sandstone.

Ben Lomond soils are used for recreation, wildlife, and watershed. A few areas are used for timber production.

Ben Lomond fine sandy loam, 50 to 75 percent slopes (BeG).—This soil is very steep.

Representative profile (on east-facing slope 800 feet northeast of old Watsonville Road, 0.8 mile northeast of intersection with Loop Road; NE¼NE¼ sec. 35, T. 10 S., R. 2 E.):

O—2 inches to 0, fresh and partly decomposed redwood needles and other forest litter; abrupt, smooth boundary. (1 to 4 inches thick.)

A1—0 to 6 inches, dark grayish-brown (10YR 4/2) fine sandy loam, very dark grayish brown (10YR 3/2) moist; strong, medium and fine, granular structure; slightly hard, very friable, nonsticky and nonplastic; many very fine roots, and few medium roots; many very fine interstitial pores; slightly acid (pH 6.5); clear, smooth boundary. (4 to 10 inches thick.)

B1—6 to 15 inches, dark-brown (7.5YR 4/2) fine sandy loam, very dark brown (10YR 2/2) moist; weak, medium and fine, subangular blocky structure; soft, very friable, nonsticky and nonplastic; many fine, medium, and coarse roots; many very fine interstitial pores and common fine and medium tubular pores; medium acid (pH 6.0); clear, wavy boundary. (8 to 10 inches thick.)

B2—15 to 27 inches, brown (7.5YR 5/4) very fine sandy loam, dark brown (7.5YR 3/2) moist; weak, medium and fine, subangular blocky structure; soft, very friable, nonsticky and nonplastic; common fine roots and few medium and coarse roots; many very fine interstitial pores and common fine and medium tubular pores; medium acid (pH 6.0); clear, wavy boundary. (11 to 20 inches thick.)

B3—27 to 43 inches, light-brown (7.5YR 6/4) very fine sandy loam, dark brown (7.5YR 4/4) moist; weak, medium, subangular blocky structure; soft, very friable, nonsticky and nonplastic; few fine and coarse roots and many medium roots; many very fine interstitial pores and fine tubular pores and few medium and coarse tubular pores; strongly acid (pH 5.5); clear, wavy boundary. (10 to 20 inches thick.)

C—43 to 60 inches, very pale brown (10YR 7/4) soft sandstone that is easily cut by hand tools, yellowish brown (10YR 5/4) moist; massive; strongly acid (pH 5.5).

The A horizon is commonly dark grayish brown or grayish brown, but in places it is dark brown. Texture is generally fine sandy loam to light loam. Depth to soft sandstone ranges from 33 to 60 inches.

Included with this soil in mapping are small areas of Felton, Los Gatos, and Maymen soils.

The available water holding capacity is 5 to 9 inches. Natural fertility is moderate. Permeability in the subsoil is moderately rapid. Runoff is very rapid, and the hazard of erosion is very high. Effective rooting depth is deep to soft sandstone.

This soil is used mainly for recreation, wildlife, and watershed. A few areas are used for timber production. The very steep slopes create a hazard of erosion where areas are logged. This soil is moderately productive, and the average site index is 120 (*3*). Hazard of windthrow is slight. Plant competition and seedling mortality are moderate. Capability unit VIIe-1 (4).

Campbell Series

The Campbell series consists of somewhat poorly drained, silty clay loams that have developed in alluvium from material derived from sedimentary rock. These soils have slopes of less than 2 percent and are on low valley bottoms and alluvial plains. The vegetation, where these soils are not cultivated, is chiefly annual grasses, perennial grasses, and forbs. Elevation ranges from 130 to 300 feet. Average annual rainfall is 16 to 20 inches, and average annual temperature is about 58° to 60° F. The growing season is about 250 to 275 days. Campbell soils are associated with the Yolo and Clear Lake soils.

In a representative profile, the surface layer is dark-gray, mildly alkaline and moderately alkaline silty clay loam about 40 inches thick. It is mottled, slightly calcareous, and moderately alkaline below 27 inches. The substratum is light olive-brown, mottled, calcareous, moderately alkaline silty clay loam and extends to a depth of 60 inches or more. In some places the substratum is clay or muck. In other places the surface layer is silty clay.

The Campbell soils are used for irrigated row crops, sugar beets, orchards, and hay.

Campbell silty clay loam (Ca).—This soil is nearly level and has less than 1 percent slope.

Representative profile (in first row of trees on south side of road, in orchard 0.5 mile west on Laguna Avenue from Southern Pacific Railroad tracks; NW¼SW¼ sec. 35, T. 8 S., R. 2 E.):

Ap—0 to 8 inches, dark-gray (10YR 4/1) silty clay loam, very dark gray (10YR 3/1) moist; massive; hard, friable, slightly sticky and plastic; common fine and very fine roots; many fine and very fine interstitial pores and few fine and very fine tubular pores; mildly alkaline (pH 7.5); abrupt, smooth boundary. (6 to 8 inches thick.)

A11—8 to 27 inches, dark-gray (10YR 4/1) silty clay loam, very dark gray (10YR 3/1) moist; massive; hard, friable, slightly sticky and plastic; few fine roots and common medium roots; many very fine and fine interstitial pores, many very fine and fine tubular pores, and a few medium tubular pores; mildly alkaline (pH 7.5); gradual, smooth boundary. (16 to 20 inches thick.)

A12—27 to 40 inches, dark-gray (5Y 4/1) silty clay loam, very dark gray (5Y 3/1) moist; common, fine, distinct, light olive-brown (2.5Y 5/4) mottles, olive brown (2.5Y 4/4) moist; weak, medium and fine, subangular blocky structure; hard, friable, slightly sticky and plastic; few, very fine, fine, and medium roots; many very fine and fine tubular pores and few medium tubular pores; slightly calcareous, moderately alkaline (pH 8.0); diffuse, smooth boundary. (12 to 15 inches thick.)

C—40 to 68 inches, light olive-brown (2.5Y 5/4) silty clay loam, olive brown (2.5Y 4/4) moist; common, fine,

faint, light yellowish-brown (10YR 6/4) mottles, dark yellowish brown (10YR 4/4) moist, and few very thin bands of light gray (10YR 6/1), gray (10YR 5/1) moist; massive; hard, friable, slightly sticky and plastic; few, very fine, fine, and medium roots; many very fine and fine tubular pores and few medium tubular pores; slightly calcareous, moderately alkaline (pH 8.0).

The A horizon color is commonly dark gray but in places is dark grayish brown or grayish brown. Texture is silty clay loam or clay loam. The C horizon in places is light olive brown, light brownish gray, or grayish brown and contains common to many, fine to medium, light yellowish-brown to light-gray mottles. Texture is dominantly silty clay loam but in places is stratified silty clay. Secondary lime accumulations lies at an average depth of 30 inches but occasionally are below a depth of 60 inches.

Included with this soil in mapping are some areas of Clear Lake clay and Yolo silty clay loam.

Drainage of these soils has been improved as the water table has been lowered by pumping and by the natural deepening of drainageways. Available water holding capacity is 11 to 12 inches. Permeability is moderately slow. Runoff is very slow, and the hazard of erosion is none to slight. Natural fertility is high. Effective rooting depth is very deep.

This soil is used for irrigated row crops, sugar beets, prunes, walnuts, apricots, and pears. Capability unit I–1 (14).

Campbell silty clay loam, clay substratum (Cc).—This soil is in small to medium-sized areas south of Pacheco Pass Highway, just east of Miller Slough, and it may be flooded about once every 10 years. The surface layer is silty clay loam, clay loam, or silty clay. The color ranges from dark gray to dark grayish brown, and mottling occurs just below a depth of 18 inches. The substratum at an average depth of 36 inches is dark gray clay. The water table is at a depth of 36 to 60 inches.

Included with this soil in mapping are areas of gravelly clay loam and areas where depth to very dark gray clay is only 20 inches.

Available water holding capacity is 10 to 11 inches. Permeability is slow. Effective rooting depth is restricted by the seasonal water table.

This soil is used for irrigated row crops and sugar beets. Capability unit IIIw-5 (14).

Campbell silty clay (Cd).—The upper 8 inches of this soil is a silty clay, but otherwise it has a profile similar to that of Campbell silty clay loam. Areas of this soil are flooded about once every 5 years.

Included with this soil in mapping are small areas of Clear Lake clay and areas of soils that have a calcareous surface layer. Also included are some areas that have about 6 percent medium and fine gravel in the surface layer.

This soil is used for irrigated row crops, sugar beets, prunes, walunts, apricots, and pears. Capability unit IIs–5 (14).

Campbell silty clay, muck substratum (Ce).—The surface layer of this soil consists mainly of silty clay but is clay loam in places. Color is dark gray, dark grayish brown, or grayish brown. Mottling occurs below a depth of 18 inches. The substratum, at an average depth of 38 inches, consists of about 70 percent mucky material and 30 percent gleyed clay. When the levees along Llagas Creek break, resultant flooding may cause deposition.

Included with this soil in mapping are areas of a grayish-brown clay loam that is 3 to 15 inches thick over dark-gray silty clay loam, areas of soils that are calcareous in the surface layer, and areas of soils that contain slight concentrations of neutral salts.

Permeability is slow. The available water holding capacity is 12 to 13 inches. Effective rooting depth is restricted by a seasonal water table at a depth of 30 to 40 inches.

This soil is used for irrigated row crops and sugar beets. Capability unit IIIw–5 (14).

Clear Lake Series

The Clear Lake series consists of poorly drained clays that have developed in alluvium from material derived from sedimentary sources. These soils have slopes of less than 2 percent and lie on low alluvial plains. The vegetation, where these soils are not cultivated, is chiefly annual grasses, perennial grasses, and forbs. Elevation ranges from 130 to 300 feet. Average annual rainfall is 16 to 20 inches, and average annual temperature is about 58° to 60° F. The growing season is about 250 to 275 days. Clear Lake soils are associated with Campbell and Yolo soils.

In a representative profile, the surface layer is dark-gray, neutral clay about 26 inches thick. The substratum is mottled, grayish-brown, calcareous, moderately alkaline clay to a depth of 60 inches or more. Some areas are drained, and in a few places there are slight concentrations of salts.

Clear Lake soils are used for irrigated row crops, orchards, and dryland grain hay.

Clear Lake clay, drained (Ch).—This soil has slopes of less than 2 percent and lies on low alluvial plains.

Representative profile (400 feet southwest of Hale and Palm Avenue intersection, north of Morgan Hill):

Ap—0 to 6 inches, dark-gray (10YR 4/1) clay, very dark gray (10YR 3/1) moist; strong, fine, granular structure; hard, friable, sticky and plastic; many very fine roots; many very fine interstitial and tubular pores; neutral (pH 7.0); clear, smooth boundary (4 to 7 inches thick.)

A1—6 to 26 inches, dark-gray (10YR 4/1) clay, very dark gray (10YR 3/1) moist; moderate, coarse and medium, prismatic structure; very hard, firm, sticky and plastic; common very fine roots; many very fine interstitial and tubular pores; common slickensides on prism faces, and common vertical cracks ¼ to ½ inch wide when dry; neutral (pH 7.0); clear, wavy boundary. (18 to 22 inches thick.)

C1—26 to 36 inches, grayish-brown (2.5Y 5/2) clay, dark grayish brown (2.5Y 4/2) moist; many, fine, faint, light olive-brown (2.5Y 5/4) mottles, olive brown (2.5Y 4/4) moist; strong, coarse, prismatic structure; extremely hard, firm, sticky and plastic; few very fine roots; many very fine interstitial and tubular pores; common slickensides on prism faces, and common vertical cracks ¼ to ½ inch wide when dry; slightly calcereous, moderately alkaline (pH 8.0); clear, wavy boundary. (10 to 20 inches thick.)

C2ca—36 to 60 inches, grayish-brown (2.5Y 5/2) clay, dark grayish brown (2.5Y 4/2) moist; many, fine, distinct yellowish-brown (10YR 5/4) mottles, dark yellowish-brown (10 YR 4/4) moist; massive; very hard, firm, sticky and plastic; many very fine interstitial and tubular pores; moderately calcareous, moderately alkaline (pH 8.0).

The A horizon is dark gray or very dark gray. Reaction ranges from neutral to moderately alkaline. The C horizon in places is grayish brown, olive brown, or olive mixed with many, fine,

faint, light olive-brown to distinct yellowish-brown mottles. Lime accumulations generally occur within the C horizon, but the lower part of the horizon is not calcareous in all places. When this soil is dry, deep cracks develop in the A horizon and the upper part of the C horizon that average from ¼ to 1½ inches in width.

Included with this soil in mapping are areas of grayish-brown clay loam that is 10 to 20 inches deep over the original dark-gray clay surface layer as a result of land leveling or deposition of overwash material. There are also small areas of Campbell silty clay loam and Sunnyvale silty clay.

Available water holding capacity is 8 to 10 inches. Permeability is slow. Runoff is very slow, and the hazard of erosion is none to slight. Depth to water table is more than 60 inches because of the general lowering of the ground water level in the valley as a result of pumping and stream cutting. Effective rooting depth is very deep. Natural fertility is high.

This soil is used for irrigated row crops, prunes, walnuts, apricots, pears, and dryland grain hay. Capability unit IIs–5 (14).

Clear Lake clay (Cg).—This soil has a profile that is similar to that of Clear Lake clay, drained, but it has a seasonal water table at a depth of 30 to 48 inches. It is more difficult to drain, and drainage systems are more difficult to maintain. Elevations are lower, and drainage outlets are not practical. Flooding occurs about once every 5 years along Llagas Creek, Pajaro River, and Fisher Creek.

Included with this soil in mapping are a few areas that are slightly calcareous in the surface layer. About 50 percent of this soil has a buried horizon of very dark gray clay. In a few places, at a depth of more than 40 inches, the substratum is loamy sand.

Available water holding capacity is 8 to 10 inches. Effective rooting depth is restricted by the seasonal water table.

This soil is used for irrigated row crops and pears. Capability unit IIIw–5 (14).

Clear Lake clay, saline (Ck).—This soil has a profile that is similar to that of Clear Lake clay, drained, but the surface layer contains slight concentrations of salts. Drainage is more difficult to provide and maintain because the soil is at elevations lower than the drainage channels. Flooding occurs about once every 5 years.

Included with this soil in mapping are small areas of Willows clay and areas that are calcareous in the surface layer.

Because of the salts in this soil, available water holding capacity is about 6 to 8 inches. Effective rooting depth is restricted by a seasonal water table at a depth ranging from 30 to 48 inches. Fertility is moderate.

This soil is used mainly for dryland pasture. A few areas are used for irrigated row crops. Capability unit IIIw–5 (14).

Climara Series

The Climara series consists of well-drained stony clays that are underlain by metamorphosed basic igneous rock at a depth of 20 to 40 inches. These soils are on the uplands and have slopes of 9 to 50 percent. Vegetation is mainly annual grasses and a few scattered oaks. Elevation ranges from 500 to 2,000 feet. Average annual rainfall is 16 to 20 inches, and average annual temperature is 58° to 60° F. The growing season is about 200 to 250 days. Climara soils are associated with the Azule and Montara soils.

In a representative profile, the surface layer is a dark-gray, neutral stony clay and clay about 19 inches thick. In some places there are no stones on the surface. The substratum is dark grayish-brown, calcareous, moderately alkaline clay underlain at a depth of 27 inches by calcareous, hard metamorphosed basic igneous rock.

Climara soils are used for dryland pasture and range.

Climara stony clay, 15 to 50 percent slopes (CmE).—This soil has slopes that average about 30 percent.

Representative profile (on Roop Road 0.5 mile from the intersection with New Avenue; NW¼NW¼ sec. 22, T. 10 S., R. 4 E.):

A11—0 to 5 inches, dark-gray (10YR 4/1) stony clay, very dark gray (10YR 3/1) moist; strong, medium and fine, granular structure; hard, friable, sticky and plastic; many very fine roots; many very fine interstitial and tubular pores; neutral (pH 7.0); clear, smooth boundary. (5 to 12 inches thick.)

A12—5 to 19 inches, dark-gray (10YR 4/1) clay, very dark gray (10YR 3/1) moist; moderate, coarse, angular blocky structure; very hard, firm, sticky and plastic; few very fine roots; many very fine interstitial and tubular pores; few slickensides on ped surfaces, and few vertical cracks ¼ to ½ inch wide when dry; neutral (pH 7.0); clear, irregular boundary. (8 to 18 inches thick.)

Cca—19 to 27 inches, dark grayish-brown (10YR 4/2) clay, very dark grayish brown (2.5Y 3/2) moist; strong, coarse, prismatic structure; extremely hard, firm, sticky and plastic; few fine roots; many very fine interstitial and tubular pores; many slickensides on prism faces, and many vertical cracks ¼ to ½ inch wide when dry; slightly calcareous, moderately alkaline (pH 8.0); clear, wavy boundary. (7 to 10 inches thick.)

R—27 inches, calcareous, hard, metamorphosed basic igneous rock.

The A horizon is dark gray or gray. Texture is typically clay but ranges to heavy clay loam. Reaction is neutral to moderately alkaline. The C horizon is grayish brown or dark grayish brown. Depth to bedrock is typically 27 inches but ranges from 20 to 40 inches. About 0.01 to 0.1 percent of the surface area is covered by stones.

Included with this soil in mapping are small areas of Montara rocky clay loam along the ridge crests and fault lines, a few areas of soils that are calcareous in the surface layer, a few eroded areas that have numerous gullies, and areas of rock outcrops.

This soil has an available water holding capacity of 3 to 7 inches. Permeability is slow. Runoff is medium to rapid, and the hazard of erosion is moderate to high. Natural fertility is moderate. Effective rooting depth is moderately deep.

This soil is used for range. Capability unit VIe–5 (15); range site, Clayey.

Climara clay, 9 to 30 percent slopes (ClD).—This soil has a profile that is similar to that of Climara stony clay, 15 to 50 percent slopes, but it has less than 0.01 percent stones on the surface. It is on rounded ridgetops or in small, less sloping areas near the steeper Climara soils. The average slope is about 15 percent.

Included with this soil in mapping are small areas of Montara rocky clay loam, severely eroded areas, small landslips, and gullied land.

Runoff is medium, and the hazard of erosion is moderate.

This soil is used for dryland pasture and range. Capability unit IVe–5 (15); range site, Clayey.

Cortina Series

The Cortina series consists of somewhat excessively drained, very gravelly loams that are underlain by alluvium from mixed sources. These soils are on stream benches along major drainageways and have slopes of 0 to 5 percent. Vegetation, where these soils are not cultivated, is grasses, forbs, brush, and scattered sycamore and oak trees. Elevation ranges from 100 to 2,400 feet. Average annual rainfall is 16 to 25 inches, and average annual temperature is 58° to 60° F. The growing season is about 250 to 275 days. Cortina soils are associated with the Esparto and Yolo soils.

In a representative profile, the surface layer is pale-brown and brown, slightly acid very gravelly loam and very gravelly fine sandy loam about 28 inches thick. The substratum is pale-brown, slightly acid very gravelly sandy loam to a depth of 60 inches or more.

Cortina soils are used mainly for dryland pasture. A few areas are used for irrigated prunes.

Cortina very gravelly loam, 0 to 5 percent slopes (CoB).—This nearly level to gently sloping soil is on stream benches along major drainageways. It is subject to overflow from adjacent streams.

Representative profile (100 yards south of Isabel Valley Ranch gate on road to China Grade; SW¼SE¼ sec. 14, T. 7 S., R. 4 E.):

A1—0 to 8 inches, pale-brown (10YR 6/3) very gravelly loam containing 60 percent (by volume) medium and fine gravel, dark brown (10YR 4/3) moist; massive; hard, very friable, nonsticky and nonplastic; common very fine roots; many very fine interstitial pores; slightly acid (pH 6.5); clear, smooth boundary. (8 to 12 inches thick.)

IIAb—8 to 28 inches, brown (10YR 5/3) very gravelly fine sandy loam containing 80 percent (by volume) medium and fine gravel, dark brown (10YR 3/3) moist; massive; slightly hard, very friable, nonsticky and nonplastic; many very fine interstitial pores and common fine and few medium tubular pores; slightly acid (pH 6.5); abrupt, smooth boundary. (20 to 30 inches thick.)

IIC—28 to 60 inches, pale-brown (10YR 6/3) very gravelly sandy loam containing 90 percent (by volume) medium and fine gravel, dark brown (10YR 4/3) moist; massive; slightly hard, very friable, nonsticky and nonplastic; many very fine interstitial pores, common fine tubular pores, and few medium tubular pores; slightly acid (pH 6.5).

The A horizon ranges from brown to grayish brown, pale brown, or light brownish gray. Reaction is slightly acid to neutral in both the A and C horizons. Texture is sandy loam, fine sandy loam, or loam, and these horizons are gravelly or very gravelly. At a depth of 12 to 40 inches, both the A and C horizons are very gravelly sandy loam to very gravelly loam. These soils are subject to flooding, washout, or channeling about three times every 10 years.

Included with this soil in mapping are small areas of Riverwash and Garretson gravelly loam, and small areas that have no gravel in the upper few inches of the surface layer.

This soil has low natural fertility, and available water holding capacity is 2.5 to 4 inches. Permeability is rapid. Runoff is very slow. Effective rooting depth is very deep, but root density is limited by the droughty, very gravelly substratum.

This soil is used mostly for dryland pasture, wildlife, and recreation. A few areas are used for irrigated prunes. Capability units IVw–4 (14) and VIw–4 (15).

Cropley Series

The Cropley series consists of well-drained clays that are underlain by alluvium from mixed sources. These soils lie on fans and terraces and have slopes of 0 to 9 percent. Vegetation, where these soils are not cultivated, is annual grasses, perennial grasses, and forbs. Elevation ranges from 130 to 1,000 feet. Average annual rainfall is 16 to 20 inches, and average annual temperature is about 58° to 60° F. The growing season is about 260 to 275 days. Cropley soils are associated with the Clear Lake and Pleasanton soils.

In a representative profile, the surface layer is very dark gray, neutral to mildly alkaline clay about 36 inches thick. The substratum is a dark grayish-brown, calcareous, moderately alkaline clay to a depth of 60 inches or more. When these soils are dry, deep cracks develop. Slickensides that intersect are present in the surface layer and in the upper part of the substratum.

Cropley soils are used for irrigated row crops, orchards, dryland grain hay, and pasture.

Cropley clay, 0 to 2 percent slopes (CrA).—This soil averages about 1 percent slope and occupies alluvial fans.

Representative profile (in a field 0.2 mile south of Foothill Road from Tennant Avenue intersection and 0.1 mile east):

Ap—0 to 7 inches, very dark gray (10YR 3/1) clay, black (10YR 2/1) moist; weak, medium, subangular blocky structure and strong, medium and fine, granular structure; very hard, very firm, very sticky and very plastic; many very fine roots; many fine and very fine interstitial pores and few medium tubular pores; neutral (pH 7.0); clear, smooth boundary. (5 to 10 inches thick.)

A11—7 to 14 inches, very dark gray (10YR 3/1) clay, black (10YR 2/1) moist; strong, coarse, prismatic structure; very hard, very firm, very sticky and very plastic; few very fine roots and few coarse woody roots; common very fine interstitial pores and few fine tubular pores; small, numerous slickensides on ped surfaces; neutral (pH 7.0); gradual, wavy boundary. (7 to 12 inches thick.)

A12—14 to 36 inches, very dark gray (10YR 3/1) to dark-gray (10YR 4/1) clay, black (10YR 2/1) and very dark gray (10YR 3/1) moist; coarse, strong, prismatic structure; very hard, very firm, very sticky and very plastic; few fine interstitial pores and fine tubular pores; numerous slickensides and pressure cutans on ped surfaces; mildly alkaline (pH 7.5); gradual, wavy boundary. (15 to 30 inches thick.)

Cca—36 to 60 inches, dark grayish-brown (2.5Y 4/2) clay, very dark grayish brown (2.5Y 3/2) moist; massive; hard, firm, sticky and plastic; many, very fine, interstitial pores and common, very fine, tubular pores; calcareous, moderately alkaline (pH 8.0).

The A horizon ranges from dark gray to very dark gray and nearly black. Texture is typically clay but in places is heavy clay loam. Segregated lime is at a depth ranging from 20 to 60 inches but commonly is at about 36 inches. The C horizon is dark grayish brown, grayish brown, or brown. Texture is stratified clay and silty clay loam that averages clay to a depth of more than 40 inches. When this soil is dry, deep cracks develop that range from ½ to 1½ inches in width and extend to an average depth of 36 inches.

Included with this soil in mapping are small areas of Clear Lake clay in low depressions and areas of gravelly

clay loam overwash that ranges from 12 to 30 inches in thickness.

The available water holding capacity is 8.5 to 10 inches. Permeability is slow. Runoff is very slow, and the erosion hazard is none to slight. Fertility is high. Effective rooting depth is very deep.

This soil is used for irrigated prunes, apricots, pears, walnuts, row crops, sugar beets, dryland hay, and pasture. Capability unit IIs-5 (14).

Cropley clay, 2 to 9 percent slopes (CrC).—This soil has a profile that is similar to that of Cropley clay, 0 to 2 percent slopes, but slopes average 6 percent.

Included with this soil in mapping are soils that have a gravelly heavy clay loam or gravelly clay texture in the surface layer.

Runoff is slow to medium, and the hazard of erosion is slight to moderate.

This soil is used for irrigated prunes, pears, apricots, walnuts, row crops, dryland hay, and pasture. Capability unit IIe-5 (14).

Diablo Series

The Diablo series consists of well-drained clays that are underlain by fine-grained sandstone at a depth of 26 to 56 inches. These soils are on the uplands and have slopes of 9 to 50 percent. The vegetation, where these soils are not cultivated, is annual grasses and a few scattered oak trees. Elevation ranges from 400 to 2,000 feet. Average annual rainfall is 16 to 20 inches, and average annual temperature is 58° to 60° F. The growing season is about 250 to 275 days. Diablo soils are associated with the Azule and Los Osos soils.

In a representative profile (fig. 3), the surface layer is very dark gray and dark gray, mildly alkaline and moderately alkaline clay about 30 inches thick. The substratum is olive-gray, calcareous, moderately alkaline clay that is underlain at a depth of 40 inches by light olive-gray, soft, calcareous, moderately alkaline, fine-grained sandsoft, calcareous, moderately alkaline, fine-grained sandstone.

Diablo soils are used for dryland grain hay, pasture, and range.

Diablo clay, 9 to 15 percent slopes (DaD).—This soil is on uplands. Average slope is about 12 percent.

Representative profile (1,400 feet up jeep trail off East Fork Coyote Creek toward Rock House Ridge; SW¼NE¼ sec. 31, T. 8 S., R. 5 E.):

A11—0 to 2 inches, very dark gray (10YR 3/1) clay, black (10YR 2/1) moist; strong, medium and fine, subangular blocky structure; very hard, very firm, sticky and very plastic; common fine roots; many very fine interstitial and tubular pores; mildy alkaline (pH 7.6); clear, smooth boundary. (1 to 3 inches thick.)

A12—2 to 20 inches, very dark gray (10YR 3/1) clay, black (10YR 2/1) moist; strong, coarse, angular blocky structure; very hard, very firm, sticky and very plastic; few fine and medium roots; many very fine interstitial pores and few medium tubular pores; common slickensides on ped surfaces, and vertical cracks ¼ to ½ inch wide when dry; mildly alkaline (pH 7.6); clear, wavy boundary. (5 to 20 inches thick.)

A13ca—20 to 30 inches, dark-gray (5Y 4/1) clay, very dark gray (5Y 3/1) moist; strong, coarse, prismatic structure; very hard, very firm, sticky and very plastic; few medium roots; many very fine interstitial and tubular pores and few medium tubular pores; common slickensides on prism surfaces, and vertical cracks ¼ to ½ inch wide when dry; calcareous, moderately alkaline (pH 8.0); diffuse, wavy boundary. (10 to 13 inches thick.)

C—30 to 40 inches, olive-gray (5Y 5/2) clay, dark olive gray (5Y 3/2) moist; moderate, coarse, prismatic structure; very hard, very firm, sticky and very plastic; few medium and coarse roots; many very fine interstitial and tubular pores and few medium tubular pores; calcareous, moderately alkaline (pH 8.4); diffuse, wavy boundary. (10 to 20 inches thick.)

R—40 inches, light olive-gray, soft, calcareous, fine-grained sandstone.

The A horizon typically is clay but is heavy clay loam or silty clay in places. The C horizon in places is grayish brown, olive gray, or light olive gray. It is moderately calcareous to strongly calcareous and contains lime in soft masses and in seams. Lime is typically present in the lower part of the A horizon or the upper part of the C horizon, but in some places lime occurs at a depth of 10 to 50 inches. When this soil is dry, cracks averaging ¼ to 1½ inches in width develop and extend to an average depth of about 40 inches. Depth to bedrock ranges from 26 to 56 inches and averages about 40 inches.

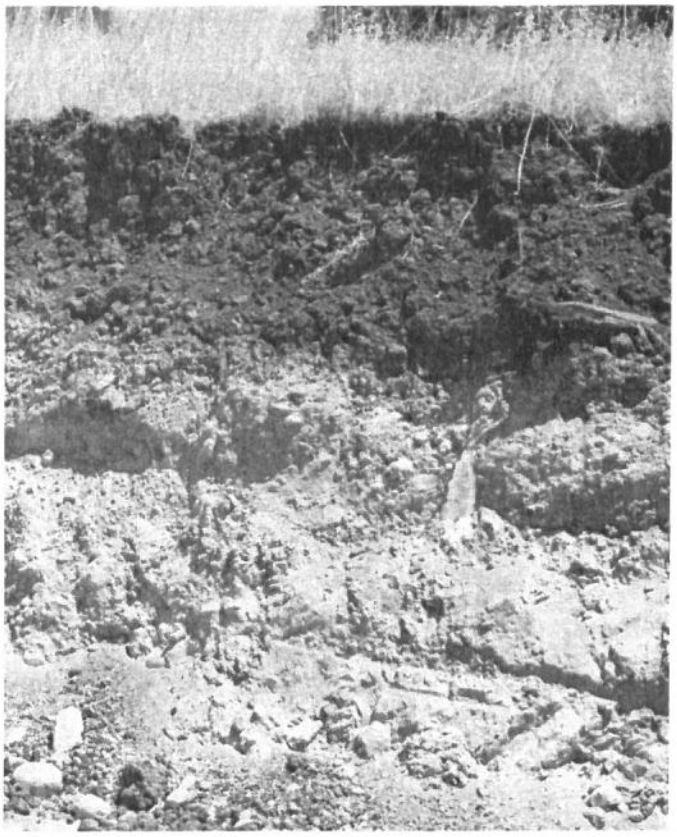

Figure 3.—Profile of Diablo clay, 9 to 15 percent slopes.

Included with this soil in mapping are small areas of Climara clay, Los Osos clay loam, areas where lime is absent and the soils have a slightly acid surface layer, a few small areas of severely gullied land, and a few small landslips.

The available water holding capacity of this soil is 3 to 7 inches. Permeability is slow. Runoff is medium to rapid, and the hazard of erosion is moderate to high. Fertility is high. Effective rooting depth is moderately deep to deep.

B1t—2 to 10 inches, brown (7.5YR 5/2) clay loam, dark brown (7.5YR 3/2) moist; moderate, medium, subangular blocky structure; hard, friable, sticky and plastic; common fine roots and few medium roots; many very fine interstitial and tubular pores; common thin clay films on ped surfaces and in pores; medium acid (pH 6.0); clear, wavy boundary. (4 to 9 inches thick.)

B2t—10 to 23 inches, light-brown (7.5YR 6/4) clay loam, brown (7.5YR 5/4) moist; moderate, medium, subangular blocky structure; hard, firm, sticky and plastic; few fine roots and many medium and coarse roots; many very fine interstitial and tubular pores and few, fine, medium, and coarse tubular pores; many thin clay films lining pores and on ped surfaces; medium acid (pH 6.0); clear, wavy boundary. (10 to 14 inches thick.)

B3t—23 to 39 inches, light yellowish-brown (10YR 6/4) clay loam, yellowish brown (10YR 5/6) moist; moderate, medium, subangular blocky structure; hard, firm, sticky and plastic; few medium and coarse roots; many very fine interstitial and tubular pores and few medium and coarse tubular pores; common, thin clay films lining pores and on ped surfaces; strongly acid (pH 5.5); gradual, wavy boundary. (10 to 18 inches thick.)

C1—39 to 48 inches, light yellowish-brown (10YR 6/4) shaly clay loam, about 25 percent (by volume) shale fragments ½ to 1 inch in diameter, yellowish brown (10YR 5/6) moist; weak, medium, subangular blocky structure; hard, firm, sticky and plastic; few medium and coarse roots; many very fine and fine tubular pores and few medium and coarse tubular pores; few thin clay films in pores and on ped surfaces; strongly acid (pH 5.5); gradual, wavy boundary. (9 to 12 inches thick.)

C2—48 inches, interbedded shale and sandstone mixed with yellowish-brown (10YR 5/6) clay loam, dark yellowish brown (10YR 4/4) moist; massive; strongly acid (pH 5.5).

The A horizon commonly is brown or grayish brown, but on concave slopes it is very dark grayish brown in the upper few inches. Texture is silt loam or light silty clay loam. Reaction is slightly acid to medium acid in the A horizon. The B horizon is brown or light brown in the upper part and ranges to very pale brown, light brown, light yellowish brown, and, in a few places, pinkish gray in the lower part. Texture is clay loam or silty clay loam. Depth to the C2 horizon of soft, fine-grained sandstone and shale ranges from 35 to 59 inches.

Included with this soil in mapping are small areas of Ben Lomond sandy loam and, along ridge crests, Madonna loam.

The available water holding capacity of this soil is 6 to 10 inches, depending on the depth of the soil. Permeability in the subsoil is moderately slow. Runoff is very rapid, and the hazard of erosion is very high. Natural fertility is moderate. Effective rooting depth is moderately deep to deep.

This soil is used mainly for timber production, recreation, and watershed. It is moderately productive; site index averages about 130 (*3*). Plant competition is moderate, equipment limitation is severe, seedling mortality is moderate, and windthrow hazard is slight. Capability unit VIIe–1 (4).

Felton silt loam, 15 to 30 percent slopes (FaE).—This soil is on the crests of broad ridges and on footslopes along drainageways. Depth to the substratum is 20 to 36 inches.

Included with this soil in mapping are small areas of Maymen rocky fine sandy loam and areas of moderately eroded and severely eroded soils.

Runoff is medium, and hazard of erosion is moderate. The available water holding capacity is 4 to 7 inches. The effective rooting depth of this soil is moderately deep to sandstone.

Most areas of this soil have been cleared and are used for dryland pasture or grain hay. It is well suited to Christmas tree production. Capability unit IVe–1 (4); range site, Fine Loamy.

Felton silt loam, 30 to 50 percent slopes (FaF).—This soil has an average slope of 40 percent.

Included with this soil in mapping are a few areas of Madonna loam and areas that have been subject to moderate sheet erosion.

This soil is used mainly for the production of timber. A few areas have been cleared and used for range. This soil is moderately productive. Site index averages about 130 (*3*). Seedling mortality is moderate, and windthrow hazard is slight. Because of steep slopes, runoff is rapid and the hazard of erosion is high after areas of this soil have been logged. Capability unit VIe–1 (4); range site, Fine Loamy.

Garretson Series

The Garretson series consists of well-drained loams that are underlain by alluvium from material derived from sedimentary rock. These soils lie on stream benches and fans along drainageways and have slopes of 0 to 5 percent. The vegetation, where these soils are not cultivated, is annual grasses and forbs, and there are a few scattered oak trees. Elevation ranges from 200 to 2,000 feet. Average annual rainfall is 16 to 25 inches, and average annual temperature is 58° to 60° F. The growing season is about 250 to 275 days. Garretson soils are associated with the Esparto, Yolo, and Zamora soils.

In a representative profile, the surface layer is a grayish-brown, neutral loam about 19 inches thick. The substratum is a brown, neutral very fine sandy loam that is underlain at a depth of 40 inches by stratified sand and gravel. In some places the surface layer and substratum are gravelly loam to a depth of 60 inches or more.

Garretson soils are used for irrigated grapes, row crops, orchards, dryland grain hay, and pasture.

Garretson loam, gravel substratum, 0 to 2 percent slopes (GcA).—This soil is on stream benches along the larger drainageways.

Representative profile (in walnut grove, 0.6 mile south of Coyote, 50 feet north off farm road, and 0.2 mile east, off U.S. Highway 101):

Ap—0 to 6 inches, grayish-brown (10YR 5/2) loam containing about 3 to 5 percent (by volume) gravel, very dark grayish brown (10YR 3/2) moist; massive; hard, friable, nonsticky and nonplastic; neutral (pH 7.0); clear, smooth boundary. (4 to 10 inches thick.)

A1—6 to 19 inches, grayish-brown (10YR 5/2) loam containing about 2 to 3 percent medium and fine gravel (by volume), very dark grayish brown (10YR 3/2) moist; massive; hard, friable, nonsticky and nonplastic; many very fine tubular pores and few medium tubular pores; neutral (pH 7.0); clear, smooth boundary. (12 to 18 inches thick.)

C1—19 to 40 inches, brown (10YR 5/3) very fine sandy loam, dark brown (10YR 4/3) moist; massive; hard, friable, nonsticky and nonplastic; neutral (pH 7.0); clear, smooth boundary. (20 to 32 inches thick.)

IIC2—40 to 60 inches, stratified sands and gravels.

The A horizon is brown or grayish brown. Texture typically is loam but in some places is clay loam. Reaction in the A and C horizons is slightly acid or neutral to moderately alkaline. The C1 horizon is brown, pale brown, or yellowish brown. Texture is dominantly very fine sandy loam or loam but in places is gravelly loam, loam, or gravelly clay loam. Clay

Included with this soil in mapping are areas that have been subject to severe rill and sheet erosion and small areas of shallow soils. Tillage has mixed the soft, weathered bedrock with the surface layer and subsoil in a few areas.

Runoff is medium to rapid, and the hazard of erosion is moderate to high.

Most of the acreage of this soil in the past was planted to grapes or was used for dryland grain hay, but now most of it is used for pasture or range. Capability unit IVe–1 (15); range site, Loamy.

Gilroy clay loam, 50 to 75 percent slopes (GoG).—This soil has a profile that is similar to that of Gilroy clay loam, 30 to 50 percent slopes, but it is steeper. The surface layer is dark brown or dark reddish brown on the north slopes.

Included with this soil in mapping are a few areas of Los Gatos gravelly loam and Maymen rocky fine sandy loam, areas of rock outcrops, and some places where depth to bedrock is 40 to 50 inches.

Runoff on this soil is very rapid, and the hazard of erosion is very high.

This soil is used for range, wildlife, recreation, and watershed. Capability unit VIIe–1 (15); range site, Loamy.

Henneke Series

The Henneke series consists of somewhat excessively drained gravelly clay loams that are underlain by serpentine bedrock at a depth of 11 to 18 inches. These soils are on uplands and have slopes of 30 to 75 percent. The vegetation is brush and some Digger pines. Elevation ranges from 1,600 to 2,500 feet. Average annual rainfall is 16 to 20 inches, and average annual temperature is about 58° to 60° F. The growing season is about 200 to 250 days. Henneke soils are associated with the Gaviota, Los Gatos, and Vallecitos soils.

In a representative profile, the surface layer is reddish-brown, neutral gravelly clay loam about 1 inch thick. The subsoil is dark reddish brown, neutral very gravelly clay that is underlain at a depth of 15 inches by serpentine bedrock. Rock outcrops are on 2 to 10 percent of the surface.

Henneke soils are used mainly for watershed, recreation, and wildlife.

Henneke rocky clay loam, 30 to 75 percent slopes, severely eroded (HeG3).—This soil lies on uplands and has slopes that average 60 percent.

Representative profile (from intersection of Mines and Blackbird Valley roads, up hillside about 200 yards from "S" turn on Mines road, in northwest corner of SE¼ sec. 11, T. 6 S., R. 4 E.):

A1—0 to 1 inch, reddish-brown (5YR 4/3) gravelly clay loam, dark reddish brown (5YR 2/2) moist; strong, fine, granular structure; slightly hard, very friable, sticky and plastic; few very fine, fine, medium, and coarse roots; many very fine interstitial pores; neutral (pH 7.0); clear, smooth boundary. (1 to 4 inches thick.)

B2t—1 to 15 inches, dark reddish-brown (5YR 3/3) very gravelly clay containing 55 percent (by volume) medium and fine gravel, dark reddish brown (5YR 2/2) moist; strong, fine and medium, subangular blocky structure; hard, friable, sticky and plastic; few, very fine, medium, and coarse roots; many very fine interstitial and tubular pores and few medium and coarse tubular pores; many moderately thick clay films on ped surfaces and in pores; neutral (pH 7.0); clear, smooth boundary.

R—15 inches, serpentine rock.

The A horizon is strong brown or reddish brown. Reaction is slightly acid to neutral. Texture is clay loam, gravelly clay loam, or loam. The B horizon is slightly acid to neutral. Depth to bedrock ranges from 11 to 18 inches. This soil is severely eroded. Rock outcrops cover about 2 to 10 percent of the surface.

Included with this soil in mapping are small areas of Gaviota loam, Vallecitos rocky loam, and Rock land. Also included are areas that have less than 30 percent gravel throughout the profile.

The available water holding capacity of this soil is 1 to 2 inches. Permeability is slow. Runoff is rapid to very rapid, and the hazard of erosion is high to very high. Natural fertility is low. Effective rooting depth is shallow.

This soil is used for range, wildlife, recreation, and watershed. Capability unit VIIe–9 (15); range site, Serpentine.

Hillgate Series

The Hillgate series consists of well-drained silt loams that have developed in alluvial materials from mixed sources. These soils are on terraces and have slopes of 2 to 50 percent. The vegetation, where these soils are not cultivated, is annual grasses, forbs, and scattered oak trees. Elevation ranges from 200 to 2,000 feet. Average annual rainfall is 16 to 25 inches, and average annual temperature is about 58° to 60° F. The growing season is about 260 to 275 days. Hillgate soils are associated with the Azule, Pleasanton, and San Ysidro soils.

In a representative profile, the surface layer is pale-brown and brown, medium acid silt loam about 10 inches thick. The subsoil is strong-brown and brownish-yellow, medium acid clay and clay loam that are underlain at a depth of 40 inches by brownish-yellow, medium acid gravelly clay loam.

Hillgate soils are used for irrigated apricots, vineyards, prunes, and dryland hay, pasture, and range.

Hillgate silt loam, 9 to 15 percent slopes, eroded (HfD2).—This soil is on terraces.

Representative profile (from intersection of Church and New Avenues, 200 yards east and 200 yards south in field; SW¼NW¼ sec. 8, T. 10 S., R. 4 E.):

Ap—0 to 5 inches, pale-brown (10YR 6/3) silt loam, dark brown (10YR 4/3) moist; massive; hard, friable, nonsticky and nonplastic; many fine and very fine roots; many very fine interstitial pores and few very fine and fine tubular pores; medium acid (pH 5.8); abrupt, smooth boundary. (4 to 7 inches thick.)

A1—5 to 10 inches, brown (10YR 5/3) silt loam, dark brown (10YR 4/3) moist; massive; very hard, friable, nonsticky and nonplastic; few very fine roots; many very fine interstitial pores, many very fine tubular pores, and few medium tubular pores; medium acid (pH 5.8); abrupt, smooth boundary. (4 to 19 inches thick.)

B2t—10 to 26 inches, strong-brown (7.5YR 5/6) clay, dark brown (7.5YR 4/4) moist; moderate, coarse, prismatic structure parting to strong, coarse and medium, angular blocky structure; extremely hard, very firm, sticky and very plastic; few very fine roots; many very fine interstitial pores, common very fine tubular pores, and few fine tubular pores; many, moderately thick, reddish-brown (5YR 5/4) moist clay films on ped surfaces and in pores; medium acid (pH 5.8); gradual, wavy boundary. (14 to 24 inches thick.)

B3t—26 to 40 inches, brownish-yellow (10YR 6/6) clay loam, yellowish brown (10YR 5/4) moist; moderate, coarse, angular blocky structure; very hard, firm, sticky and very plastic; many very fine interstitial pores, common very fine tubular pores, and a few fine tubular pores; common, thin, reddish-yellow (7.5YR 6/6), strong-brown (7.5YR 5/6), moist clay films on ped surfaces and in pores; medium acid (pH 5.8); clear, smooth boundary. (12 to 20 inches thick.)

IIC—40 to 60 inches, brownish-yellow (10YR 6/6) gravelly clay loam, yellowish brown (10YR 5/4) moist; weak, medium, subangular blocky structure; hard, friable, sticky and plastic; many very fine interstitial pores and a few very fine and fine tubular pores; few, thin, reddish-yellow (7.5YR 6/6), strong-brown (7.5YR 5/6) moist clay films on ped surfaces and in pores; medium acid (pH 5.8).

The A horizon ranges from pale brown to brown, or grayish brown. Reaction is neutral to medium acid. Texture is silt loam or fine sandy loam. The B horizon is brown, strong brown, or brownish yellow. Texture is clay or gravelly clay and ranges to clay loam in the lower part of the B horizon. Depth to the clay B2t horizon averages 10 inches but it ranges from 8 to 20 inches.

Included with this soil in mapping are 40 acres of soils along Little Arthur Creek that are underlain by sandstone bedrock at a depth of 20 to 40 inches. Also included are small areas of Pleasanton gravelly loam and San Ysidro loam. Other included areas have a yellowish-red and reddish-brown B horizon or a calcareous substratum.

The available water holding capacity of this soil is 4 to 7 inches. Permeability is very slow. Runoff is medium, and the hazard of erosion is moderate. Natural fertility is low. Effective rooting depth is very deep.

This soil is used for dryland hay, pasture, and range. Capability unit VIe–3 (15); range site, Claypan.

Hillgate silt loam, 2 to 9 percent slopes (HfC).—This soil is on terraces. It has a profile that is similar to that of Hillgate silt loam, 9 to 15 percent slopes, eroded, but the surface layer is 20 to 26 inches thick. Erosion is none to slight.

Included with this soil in mapping are small areas of Pleasanton gravelly loam and San Ysidro loam.

Natural fertility of this soil is moderate. Effective rooting depth is very deep.

This soil is used for irrigated prunes, apricots, and grapes, and for dryland hay and pasture. Capability unit IIIe–3 (14).

Hillgate silt loam, 15 to 30 percent slopes, eroded (HfE2).—This soil has a profile that is similar to that of Hillgate silt loam, 9 to 15 percent slopes, eroded, but has a surface layer 10 to 20 inches thick.

Included with this soil in mapping are small areas of Azule clay loam and areas that have been subject to severe sheet and gully erosion. Also included in the San Antonio Valley are areas of a soil that is moderately alkaline and is calcareous in the substratum.

Runoff is medium to rapid, and the hazard of erosion is moderate to high.

This soil is used for range. Capability unit VIe–3 (15); range site, Claypan.

Hillgate silt loam, 30 to 50 percent slopes, eroded (HfF2).—This soil has a profile that is similar to that of Hillgate silt loam, 9 to 15 percent slopes, eroded, but it is more sloping and depth to the clay subsoil is 10 to 20 inches. Texture of the subsoil ranges from heavy clay loam to clay, and in some places it is gravelly.

Included with this soil in mapping are areas of Azule clay loam and small areas that have been subject to severe sheet and gully erosion.

The available water holding capacity is 2 to 4 inches for the 10- to 20-inch rooting depth. Runoff is rapid, and the hazard of erosion is high.

This soil is used for range. Capability unit VIIe–1 (15); range site, Claypan.

Inks Series

The Inks series consists of somewhat excessively drained gravelly clay loams that are underlain by metamorphosed basic igneous bedrock at a depth of 11 to 19 inches. They are on uplands and have slopes of 30 to 75 percent. The vegetation mainly is brush, but there are a few open areas of annual grasses and forbs. Elevation ranges from 200 to 2,000 feet. Average annual rainfall is 20 to 25 inches, and average annual temperature is about 58° to 60° F. The growing season is about 200 to 250 days. Inks soils are associated with the Los Gatos and Montara soils.

In a representative profile, the surface layer is brown, slightly acid gravelly clay loam about 1 inch thick. In some places it is stony clay loam. The subsoil is dark reddish-brown, slightly acid gravelly clay loam that is underlain at a depth of 15 inches by hard, shattered metamorphosed basalt.

Inks soils are used for range, wildlife, recreation, and watershed.

Inks rocky clay loam, 50 to 75 percent slopes, eroded (InG2).—This soil is on uplands.

Representative profile (near Morgan Hill, about 1 mile north of Pigeon Point on road along ridge):

A1—0 to 1 inch, brown (7.5YR 5/4) gravelly clay loam, 20 percent (by volume) gravel, ¼ to 1 inch in diameter, dark brown (7.5YR 3/2) moist; weak, medium, subangular blocky structure parting to moderate, fine, granular structure; slightly hard, friable, slightly sticky and slightly plastic; many very fine roots; many very fine interstitial and tubular pores; slightly acid (pH 6.5); abrupt, smooth boundary. (1 to 4 inches thick.)

B2t—1 to 15 inches, dark reddish-brown (5YR 3/3) gravelly clay loam, dark reddish brown (5YR 3/2) moist; moderate, medium, subangular blocky structure; hard, friable, sticky and plastic; few very fine roots; many very fine interstitial and tubular pores; continuous thin clay films on ped surfaces and in pores; slightly acid (pH 6.5); clear, irregular boundary. (11 to 15 inches thick.)

R—15 inches, hard metamorphosed basalt.

The A horizon is brown or dark brown. Reaction is slightly acid to neutral and changes little with depth. Texture is gravelly loam or gravelly clay loam. Percentage of gravel by volume generally is between 20 and 40 percent. The B horizon is typically dark reddish brown but in places is brown or dark brown. Texture is gravelly clay loam that contains 30 to 40 percent rock fragments 1 to 6 inches in diameter. Depth to hard bedrock ranges from 11 to 19 inches. About 2 to 10 percent of the surface is covered by rock outcrops, and variable amounts of stones are on the surface.

Included with this soil in mapping are some areas of Montara rocky clay loam and Henneke rocky clay loam, small areas of Rock land, and areas of soils that have steep and moderately steep slopes.

The available water holding capacity of this soil is 1 to 2 inches. Permeability in the subsoil is moderately slow. Runoff is very rapid, and the hazard of erosion is very high.

The available water holding capacity of this soil is 1 to 3 inches. Runoff is medium to rapid, and the hazard of erosion is high. Effective rooting depth is 13 to 19 inches.

This soil is used mainly for limited range, wildlife, and watershed. A few acres on the lesser slopes have been cultivated to grain hay. A number of summer cabins and mountain homes have been built on this soil. Capability unit VIIe–8 (15); range site, Shallow Gravelly Loam.

Montara Series

The Montara series consists of somewhat excessively drained clay loams that are underlain by serpentine bedrock at a depth of 10 to 16 inches. These soils are on uplands and have slopes of 15 to 50 percent. Vegetation is annual grasses, forbs, and scattered dwarf oaks and Digger pines. Elevation ranges from 800 to 3,000 feet. Average annual rainfall is 16 to 25 inches, and average annual temperature is 58° to 60° F. The growing season is 200 to 275 days. Montara soils are associated with the Azule, Climara, and Inks soils.

In a representative profile, the soil is dark gray and very dark gray, moderately alkaline clay loam about 13 inches thick that is underlain by greenish gray serpentine bedrock. Rock outcrops cover 5 to 10 percent of the surface.

Montara soils are used mainly for range, wildlife, recreation, and watershed.

Montara rocky clay loam, 15 to 50 percent slopes, eroded (MwF2).—This soil is on broad, well-rounded ridges of the uplands. Average slope is about 30 percent.

Representative profile (in road cut 0.5 mile north of Pigeon Point; T. 8 S., R. 3 E.):

A11—0 to 2 inches, dark-gray (10YR 4/1) clay loam, black (10YR 2/1) moist; moderate, fine and medium, granular structure; hard, friable, sticky and plastic; few fine roots; many fine and very fine tubular pores; moderately alkaline (pH 8.0); clear, wavy boundary. (0 to 2 inches thick.)

A12—2 to 6 inches, very dark gray (10YR 3/1) clay loam, black (10YR 2/1) moist; moderate, medium, subangular blocky structure; hard, very friable, sticky and plastic; common, very fine roots; many very fine and fine tubular pores; moderately alkaline (pH 8.0); clear, wavy boundary. (4 to 6 inches thick.)

A13—6 to 13 inches, very dark gray (10YR 3/1) clay loam, black (10YR 2/1) moist; moderate, fine, subangular blocky structure; hard, friable, sticky and plastic; few very fine roots; common fine and very fine tubular pores; moderately alkaline (pH 8.0); abrupt, irregular boundary. (6 to 8 inches thick.)

R—13 inches, greenish-gray serpentine rock.

The A horizon is dark gray to very dark gray. Five to 10 percent of the surface is covered by rock outcrops. Depth to rock is 10 to 16 inches. Reaction is neutral to moderately alkaline and changes little with increasing depth.

Included with this soil in mapping are areas of Inks rocky clay loam and Rock land and areas of soils that are clay throughout the profile.

Available water holding capacity is 2 to 3 inches. Permeability is moderately slow. Runoff is medium to rapid, and the hazard of erosion is moderate to high. Fertility is low because of an unfavorable calcium-magnesium ratio. Effective rooting depth is shallow to bedrock.

This soil is used for range, wildlife, recreation, and watershed. Capability unit VIIe–9 (15); range site, Serpentine.

Pacheco Series

The Pacheco series consists of poorly drained clay loams that are underlain by sedimentary alluvium. These soils are on low alluvial plains and have slopes of less than 2 percent. The vegetation, where these soils are not cultivated, is annual grasses and forbs. Elevation ranges from 150 to 300 feet. Average annual rainfall is 16 to 20 inches, and average annual temperature is 58° to 60° F. The growing season is 250 to 275 days. Pacheco soils are associated with the Clear Lake, Yolo, and Willows soils.

In a representative profile, the surface layer is grayish-brown, moderately alkaline clay loam about 16 inches thick. In some places the surface layer is fine sandy loam or silt loam. The surface layer is underlain by mottled, light-gray, moderately alkaline loam and very fine sandy loam to a depth of more than 60 inches. In places the substratum is gravelly. The profile is calcareous in the lower part.

Pacheco soils are used for irrigated sugar beets, row crops, orchards, pasture, and hay.

Pacheco clay loam (Pd).—This soil is level and is in low positions on the alluvial plains. Average slope is less than 2 percent.

Representative profile (in a field 0.1 mile west of pump number 1 on Taix Company ranch):

Ap—0 to 7 inches, grayish-brown (10YR 5/2) clay loam, very dark grayish brown (10YR 3/2) moist; moderate, fine, granular structure; hard, friable, sticky and plastic; many fine interstitial pores and many fine tubular pores; moderately alkaline (pH 8.0); clear, smooth boundary. (6 to 8 inches thick.)

A1—7 to 16 inches, grayish-brown (10YR 5/2) clay loam, very dark grayish brown (10YR 3/2) moist; moderate, medium, subangular blocky structure; hard, friable, sticky and plastic; many fine interstitial and tubular pores; moderately alkaline (pH 8.0); clear, smooth boundary. (8 to 10 inches thick.)

C1g—16 to 35 inches, light-gray (10YR 6/1) loam, gray (10YR 5/1) moist; many, fine, distinct, brown (10YR 5/3) mottles, dark brown (10YR 4/3) moist; massive; hard, friable, nonsticky and nonplastic; moderately alkaline (pH 8.3); clear, smooth boundary. (18 to 25 inches thick.

C2g—35 to 60 inches, light-gray (10YR 6/1) very fine sandy loam, gray (10YR 5/1) moist; many, coarse, distinct, brown (10YR 5/3) mottles, dark brown (10YR 3/3) moist; massive; hard, friable, nonsticky and nonplastic; slightly calcareous, moderately alkaline (pH 8.0).

The A horizon is grayish brown to dark gray. Reaction is mildly alkaline to moderately alkaline. Texture is clay loam or silty clay loam. Structure is fine or medium granular or subangular blocky. The C horizon is light brownish gray, light gray, or gray and contains common to many mottles. It is stratified sandy loam to silty clay loam that averages between 10 and 40 percent clay and more than 15 percent sand. Mottling is generally present at an average depth of slightly more than 16 inches.

Included with this soil in mapping are small areas of Clear Lake clay and of soils similar to the Pacheco soils that are calcareous in the surface layer.

The available water holding capacity is 9 to 11 inches. Permeability is moderate. Runoff is very slow, and this soil is flooded about twice every 10 years. The hazard of erosion is none to slight. Fertility is moderate. Effective rooting depth is restricted to a depth of 36 to 50 inches by a seasonal water table.

This soil is used for irrigated row crops, pears, and sugar beets. Capability unit IIw–2 (14).

Pacheco fine sandy loam (Pc).—This soil is in low positions southeast of Gilroy. The surface layer is grayish brown and in places is sandy loam or silt loam.

Included with this soil in mapping are small areas of Clear Lake clay and small spots where neutral salts have accumulated. Along Carnadero Creek, east of Miller railroad siding, about 100 acres of this soil has a muck substratum.

Available water holding capacity is about 9 to 11 inches. This soil is subject to flooding about twice every 10 years.

This soil is used for irrigated row crops, pears, and sugar beets. Capability unit IIw–2 (14).

Pacheco silt loam, drained (Pb).—This soil has a profile that is similar to that of Pacheco clay loam, but the surface layer is silt loam.

Included with this soil in mapping are small areas of Yolo loam and Garretson gravelly loam.

Available water holding capacity is 9 to 11 inches. The effective rooting depth is more than 60 inches, because the water table that existed during soil development has been lowered by irrigation pumping. This soil is flooded about once every 25 years.

This soil is used for irrigated row crops, sugar beets, cherries, prunes, walnuts, hay, and pasture. Capability unit I–1 (14).

Pacheco clay loam, gravelly substratum (Pe).—This soil occurs as gravelly stringers that are intermingled with Pacheco and Campbell soils. The surface layer commonly is grayish brown or dark gray but in places is loam, clay loam, or gravelly clay loam. The water table generally is below a depth of 5 feet as a result of pumping for irrigation. The substratum, below a depth of 36 to 40 inches, is stratified sand and gravel.

Included with this soil in mapping are small areas that have sand and gravel within 20 inches of the surface, and a few areas of pale brown loam overwash 10 to 15 inches thick. A few of these areas have a seasonal water table within 3 feet of the surface that restricts rooting depth.

The available water holding capacity is 7.5 to 9.5 inches. This soil is moderately permeable and has a rapidly permeable substratum. The effective rooting depth is very deep.

This soil is used for irrigated row crops, prunes, and pasture. Capability unit I–1 (14).

Parrish Series

The Parrish series consists of well-drained gravelly clay loams that are underlain by shale at a depth of 24 to 42 inches. These soils are on uplands and have slopes of 9 to 75 percent. The vegetation is grasses, forbs, oak trees, and a few scattered stands of ponderosa pine. Elevation ranges from 1,000 to 3,000 feet. Average annual rainfall is 20 to 30 inches, and average annual temperature is about 54° to 56° F. The growing season is about 200 to 250 days. Parrish soils are associated with the Gaviota and Los Gatos soils.

In a representative profile, the surface layer is reddish-brown, medium acid gravelly light clay loam about 8 inches thick. The subsoil is reddish-brown, strongly acid gravelly clay loam and gravelly clay that are underlain at a depth of 38 inches by weathered, acid, metamorphosed shale.

Parrish soils are used for dryland pasture and range.

Parrish gravelly clay loam, 9 to 30 percent slopes (PfE).—This soil is on uplands and has slopes that average about 20 percent.

Representative profile (in road cut 2.4 miles above Coe Park gate, Pine Ridge; sec. 31, T. 8 S., R. 4 E.):

A1—0 to 8 inches, reddish-brown (5YR 5/3) gravelly light clay loam containing about 15 percent (by volume) medium and fine gravel, dark reddish brown (5YR 3/3) moist; massive; hard, friable, slightly sticky and slightly plastic; many very fine roots; many very fine interstitial and tubular pores and few medium and fine tubular pores; medium acid (pH 6.0); clear, smooth boundary. (4 to 10 inches thick.)

B1t—8 to 19 inches, reddish-brown (5YR 4/3) gravelly clay loam containing 30 percent (by volume) medium and fine gravel, dark reddish brown (5YR 3/4) moist; weak, medium, subangular blocky structure; hard, friable, sticky and plastic; few very fine roots; many very fine interstitial and tubular pores and few medium and fine tubular pores; common thin clay films on ped surfaces and in pores; strongly acid (pH 5.1); gradual, smooth boundary. (8 to 12 inches thick.)

B2t—19 to 38 inches, reddish-brown (2.5YR 5/4) gravelly clay containing 35 percent (by volume) medium and fine gravel, dark reddish brown (5YR 3/4) moist; weak, medium, subangular blocky structure; very hard, friable, sticky and plastic; many very fine interstitial and tubular pores; continuous, moderately thick clay films on ped surfaces and in pores; strongly acid (pH 5.1); gradual, irregular boundary. (12 to 20 inches thick.)

R—38 inches, weathered, acid metamorphosed shale with reddish-brown, moderately thick clay films along some cleavage planes.

The A horizon commonly is brown or reddish-brown but in places is pale brown. Texture is gravelly clay loam or gravelly loam that contains about 15 to 20 percent (by volume) medium and fine gravel. Reaction is slightly acid to medium acid. The B horizon is reddish brown or yellowish red. Texture is gravelly clay loam or gravelly clay that contains 30 to 40 percent gravel. Reaction is generally strongly acid but ranges to medium acid. Depth to shale ranges from 24 to 42 inches.

Included with this soil in mapping are small areas of Los Gatos gravelly loam along drainageways and of Gaviota loam on the ridges and south slopes.

The available water holding capacity of this soil is about 4 to 6 inches. Permeability in the subsoil is slow. Runoff is slow to medium, and the hazard of erosion is slight to moderate. This soil is moderately fertile. Effective rooting depth is moderately deep.

This soil is used for dryland pasture and range. Capability unit IVe–3 (15); range site, Loamy.

Parrish gravelly clay loam, 30 to 50 percent slopes (PfF).—This soil is on uplands and has slopes that average about 35 percent.

Included with this soil in mapping are areas of Gaviota loam and Los Gatos gravelly loam.

Runoff is rapid, and the hazard of erosion is high. Effective rooting depth is 24 to 38 inches.

This soil is used for range. Capability unit VIe–3 (15); range site, Loamy.

Parrish gravelly clay loam, 50 to 75 percent slopes (PfG).—This soil has slopes that average about 50 percent. Depth to bedrock ranges from 24 to 38 inches.

Included with this soil in mapping are areas of Gaviota loam and areas of Rock land.

Runoff is very rapid, and the hazard of erosion is very high.

This soil is used for range. Capability unit VIIe–1 (15); range site, Loamy.

Pleasanton Series

The Pleasanton series consists of well-drained loams that are underlain by old gravelly sedimentary alluvium. These soils are on fans and terraces and have slopes of 0 to 15 percent. The vegetation, where these soils are not cultivated, is chiefly annual grasses and forbs, and there are scattered oak trees. Elevation ranges from 200 to 1,000 feet. Average annual rainfall is 16 to 20 inches, and average annual temperature is 58° to 60° F. The growing season is about 260 to 275 days. Pleasanton soils are associated with the Arbuckle and Hillgate soils.

In a representative profile, the surface layer is grayish-brown, slightly acid loam about 18 inches thick. In some places the surface layer is gravelly loam. The subsoil is dark grayish-brown, brown, and yellowish-brown, neutral clay loam, gravelly heavy clay loam, and gravelly sandy clay loam.

Pleasanton soils are used mainly for irrigated row crops, orchards, vineyards, dryland hay, pasture, and range. They are also used for housing and commercial development.

Pleasanton loam, 0 to 2 percent slopes (PoA).—This soil is on broad, old fans.

Representative profile (about 10 feet off north side of road on Dryden Avenue, 700 feet east of New Avenue):

Ap—0 to 5 inches, grayish-brown (10YR 5/2) loam, very dark grayish brown (10YR 3/2) moist; massive; hard, friable, slightly sticky and slightly plastic; few very fine roots; many very fine interstitial pores and common very fine tubular pores; slightly acid (pH 6.5); abrupt, smooth boundary. (0 to 6 inches thick.)

A1—5 to 18 inches, grayish-brown (10YR 5/2) loam, very dark grayish brown (10YR 3/2) moist; massive; hard, friable, slightly sticky and slightly plastic; few very fine and medium roots; many very fine interstitial pores, common fine tubular pores, and few medium tubular pores; slightly acid (pH 6.5); clear, wavy boundary. (12 to 14 inches thick.)

B1t—18 to 23 inches, dark grayish-brown (10YR 4/2) clay loam, very dark grayish brown (10YR 3/2) moist; massive; hard, friable, slightly sticky and slightly plastic; few medium roots; many very fine interstitial and tubular pores; common thin clay films line pores; neutral (pH 7.0); clear, smooth boundary. (4 to 6 inches thick.)

B2t—23 to 44 inches, brown (10YR 5/3) gravelly heavy clay loam, dark brown (10YR 3/3) moist; moderate, medium, subangular blocky structure; very hard, friable, sticky and plastic; few very fine roots; many very fine and fine tubular pores and few medium tubular pores; many moderately thick clay films on ped surfaces and in pores; neutral (pH 7.0); clear, smooth boundary. (20 to 24 inches thick.)

B3t—44 to 66 inches, yellowish-brown (10YR 5/4) gravelly sandy clay loam, dark yellowish brown (10YR 4/4) moist; massive; hard, friable, sticky and plastic; few medium roots; many very fine and fine interstitial and tubular pores and few medium tubular pores; common thin clay films in pores; neutral (pH 7.0).

The A horizon ranges from brown or grayish brown to dark grayish brown. Texture is typically loam but ranges to a light clay loam that contains 3 to 5 percent (by volume) medium and fine gravel. Reaction is slightly acid to neutral and changes little with depth. The B horizon is brown, grayish brown, dark grayish brown, or yellowish brown. Texture is clay loam, gravelly clay loam, or gravelly sandy clay loam. The C horizon, where present, is lighter and more yellowish than the B horizon. Lime is present in places in the substratum.

Included with this soil in mapping are small areas of Hillgate silt loam and San Ysidro loam and a few areas of soils that are similar to Pleasanton loam and have a medium acid subsoil.

The available water holding capacity of this soil is 9 to 11 inches. Permeability in the subsoil is moderately slow. Runoff is very slow, and the hazard of erosion is none to slight. This soil is moderately fertile. Effective rooting depth is very deep.

This soil is used mainly for irrigated row crops, apricots, prunes, walnuts, and grapes, and for dryland hay and pasture. Large areas are also used for housing and commercial developments. Capability unit I–3 (14).

Pleasanton loam, 2 to 9 percent slopes (PoC).—This soil is on fans. Slope ranges from 3 to 5 percent but is dominantly 2 to 9 percent.

Included with this soil in mapping are areas that have been subject to moderate sheet erosion.

Runoff is slow to medium, and the hazard of erosion is slight to moderate.

This soil is used mainly for irrigated row crops, prunes, apricots, grapes, walnuts, dryland hay, and pasture. Large areas of this soil are also used for housing and commercial development. Capability unit IIe–1 (14).

Pleasanton gravelly loam, 0 to 2 percent slopes (PpA).—This soil has a profile similar to that of Pleasanton loam, 0 to 2 percent slopes, except that it has a gravelly loam surface layer. The content of gravel averages between 15 to 20 percent by volume.

Included with this soil in mapping are small areas of Cropley clay and San Ysidro loam.

The available water holding capacity of this soil is about 8 to 9 inches.

This soil is used mainly for irrigated row crops, apricots, prunes, walnuts, grapes, dryland hay, and pasture. It is also used for housing and commercial development. Capability unit IIs–4 (14).

Pleasanton gravelly loam, 2 to 9 percent slopes (PpC).—This soil is in small to medium-sized areas on the upper parts of older alluvial fans. Average slope is 3 to 5 percent. Content of gravel averages between 15 to 25 percent by volume.

Included with this soil in mapping are small areas of Cropley clay, Hillgate silt loam, and Garretson gravelly loam.

The available water holding capacity of this soil is 8 to 9 inches. Runoff is slow to medium, and the hazard of erosion is slight to moderate.

Except for areas in small upland valleys, most of this soil is cultivated. It is used for row crops, irrigated prunes, apricots, grapes, walnuts, dryland hay, and pasture. Capability unit IIe–1 (14).

Pleasanton gravelly loam, 9 to 15 percent slopes, eroded (PpD2).—This soil is on terraces on uplands. Average slope is 12 percent. Content of gravel is 15 to 25 percent by volume.

Included with this soil in mapping are small areas of Hillgate silt loam, and areas that have been subject to severe sheet erosion.

The available water holding capacity is 6 to 7 inches. Runoff is medium, and the hazard of erosion is moderate.

This soil is used for dryland hay, pasture, and range. Capability unit IVe–1 (15); range site, Loamy.

Rincon Series

The Rincon series consists of well-drained clay loams that are underlain by sedimentary alluvium. These soils are on fans and have slopes of 0 to 9 percent. Vegetation, where these soils are not cultivated, is chiefly annual grasses and forbs, and there are scattered large oak trees. Elevation ranges from 200 to 1,000 feet. Average annual rainfall is 16 to 20 inches, and average annual temperature is about 58° to 60° F. The growing season is 250 to 275 days. The Rincon soils are associated with the Cropley and Pleasanton soils.

In a representative profile, the surface and subsurface layers are dark-gray, neutral and mildly alkaline clay loam about 19 inches thick. The subsoil is grayish-brown, mildly alkaline and moderately alkaline gravelly clay and clay and is underlain at a depth of 50 inches by light yellowish-brown, moderately alkaline, calcareous clay loam.

Rincon soils are used for irrigated row crops, apricots, prunes, walnuts, grapes, dryland hay, and pasture.

Rincon clay loam, 0 to 2 percent slopes (RcA).—This soil is on broad fans.

Representative profile (about 126 feet south on Ferguson Road from the intersection with Godfrey Road):

Ap—0 to 6 inches, dark-gray (10YR 4/1) clay loam, very dark gray (10YR 3/1) moist; massive; hard, friable, sticky and plastic; many very fine roots; many very fine interstitial and tubular pores; neutral (pH 7.0); clear, smooth boundary. (6 to 7 inches thick.)

A1—6 to 12 inches, dark-gray (10YR 4/1) clay loam, very dark gray (10YR 3/1) moist; massive; very hard, friable, sticky and plastic; few very fine and fine roots; many fine and very fine interstitial pores and many fine tubular pores; neutral (pH 7.0); clear, wavy boundary. (6 to 7 inches thick.)

A3—12 to 19 inches, dark-gray (10YR 4/1) clay loam, very dark gray (10YR 3/1) moist; massive; hard, friable, sticky and plastic; few fine and medium roots; many fine and very fine interstitial pores and many fine tubular pores; many thin clay bridges between sand grains; mildly alkaline (pH 7.5); clear, wavy boundary. (7 to 8 inches thick.)

B2t—19 to 37 inches, grayish-brown (2.5Y 5/2) gravelly clay, dark grayish brown (2.5Y 4/2) moist; strong, coarse, prismatic structure; very hard, firm, sticky and plastic; few fine roots; many very fine interstitial and tubular pores and many fine interstitial pores; continuous thin and moderately thick clay films on ped surfaces and in pores; mildly alkaline (pH 7.5); clear, wavy boundary. (16 to 20 inches thick.)

B3t—37 to 50 inches, grayish-brown (2.5Y 5/2) clay, dark grayish brown (2.5Y 4/2) moist; strong, medium, subangular blocky structure; very hard, firm, sticky and plastic; many very fine interstitial and tubular pores; many thin and moderately thick clay films on ped surfaces and in pores; slightly calcareous; moderately alkaline (pH 8.0); clear, wavy boundary. (12 to 16 inches thick.)

Cca—50 to 72 inches, light yellowish-brown (2.5Y 6/4) clay loam, light olive brown (2.5Y 5/4) moist; massive; hard, friable, sticky and plastic; many very fine and fine interstitial and tubular pores; calcareous; moderately alkaline (pH 8.0).

The A horizon is typically dark gray but ranges to dark grayish brown and grayish brown. Texture is clay loam or silty clay loam, and the reaction is slightly acid to mildly alkaline. The B horizon is dark grayish brown or grayish brown. Texture is clay, gravelly clay, or gravelly heavy clay loam, and the reaction is mildly alkaline to moderately alkaline. The C horizon is yellowish-brown or light yellowish-brown gravelly clay loam or clay loam.

Included with this soil in mapping are a few areas of Pleasanton gravelly loam and Hillgate silt loam, and a few small areas of brown clay loams that are similar to the Rincon soils.

The available water holding capacity is about 9 to 11 inches. Permeability in the subsoil is slow. Runoff is very slow, and erosion is not a hazard. Fertility is high. Effective rooting depth is very deep but is somewhat restricted by the clay subsoil.

This soil is used for irrigated row crops, grapes, apricots, prunes, walnuts, dryland hay, and pasture. Capability unit IIs–3 (14).

Rincon clay loam, 2 to 9 percent slopes, eroded (RcC2).—This soil is on fans and has dominantly 3 to 6 percent slopes. The surface layer is grayish brown.

Included with this soil in mapping are a few areas of Rincon soils that have a gravelly clay loam surface layer, Cropley clay, and Hillgate silt loam.

Runoff is slow to medium, and the hazard of erosion is slight to moderate.

This soil is used for irrigated row crops, prunes, apricots, walnuts, grapes, dryland hay, and pasture. Capability unit IIe–3 (14).

Riverwash

Riverwash (Rg) is a mixture of sand, gravel, and cobblestones that contains little or no silt and clay. It is the loose mass of material that occupies stream channels and is exposed at low water. Riverwash is subject to movement in spring during periods of runoff and during stream flooding. The vegetation consists of willows, sycamore trees, oak trees, herbs, and clumps of perennial and annual grasses.

Included with this land type along the major drainageways are fine-textured to medium-textured materials of very steep to vertical streambanks that are actively eroding and sloughing.

Riverwash has little value for farming; however, a few areas may have limited use as wildlife habitat. A few areas along the larger streams are used as a source of sand and gravel. Capability unit VIIIw–4 (14, 15).

Rock Land

Rock land (RnG) consists of areas in which outcroppings of sedimentary or igneous rock cover 25 percent or more of the surface. Thickness and texture of the soil material between the rock outcroppings is variable. Slopes are 50 to 75 percent. Vegetation is mainly brush.

Included with this land type are areas of Vallecitos rocky loam, Gaviota loam, and Montara rocky clay loam.

This land type is used mainly for wildlife, recreation, and watershed. Capability unit VIIIs–1 (15).

San Andreas Series

The San Andreas series consists of well-drained fine sandy loams that are underlain by sandstone bedrock at a depth of 22 to 30 inches. These soils lie on uplands and have slopes of 15 to 75 percent. The vegetation, where these soils are not cultivated, is annual grasses and forbs, scattered live oak trees, and patches of coastal sage. Eleva-

San Ysidro Series

The San Ysidro series consists of moderately well drained loams that are underlain by old alluvium from material derived from sedimentary rock. These soils are on fans and terraces and have slopes of 0 to 5 percent. The vegetation, where these soils are not cultivated, is chiefly annual grasses and forbs, and there are scattered oak trees. Elevation ranges from 200 to 1,000 feet. Average annual rainfall is 16 to 20 inches, and average annual temperature is 58° to 60° F. The growing season is 250 to 275 days. San Ysidro soils are associated with the Pleasanton and Hillgate soils.

In a representative profile, the surface layer is light brownish-gray, medium acid loam that is about 18 inches thick and is underlain by 2 inches of light-gray, slightly acid, mottled loam. The subsoil is mottled, brown and yellowish-brown, slightly acid and neutral clay that is 16 inches thick over light yellowish-brown, calcareous, moderately alkaline clay loam. At a depth of 50 inches, the substratum is mottled, light yellowish-brown, calcareous, moderately alkaline sandy clay loam.

San Ysidro soils are used for irrigated row crops, apricots, prunes, vineyards, dryland hay, and pasture.

San Ysidro loam, 0 to 2 percent slopes (SdA).—This soil is in depressional areas and has smooth slopes.

Representative profile (two tree rows west and nine tree rows south of shop in prune orchard on Alfred Angelino ranch, about 1,500 feet east on Godfrey Avenue from intersection with Furlong Avenue):

Ap—1 to 5 inches, light brownish-gray (10YR 6/2) loam, dark grayish brown (10YR 4/2) moist; massive; hard, friable, nonsticky and slightly plastic; many very fine roots; many very fine interstitial pores; medium acid (pH 6.0); abrupt, smooth boundary. (5 to 10 inches thick.)

A1—5 to 18 inches, light brownish-gray (10YR 6/2) loam, dark grayish brown (10YR 4/2) moist; massive; hard, friable, nonsticky and slightly plastic; few very fine and fine roots; many very fine interstitial and tubular pores and few medium tubular pores; medium acid (pH 6.0); clear, wavy boundary. (12 to 14 inches thick.)

A2—18 to 20 inches, light-gray (10YR 7/2) loam, light brownish gray (10YR 6/2) moist; common, fine, distinct, pale brown (10YR 6/3) mottles, dark brown (10YR 4/3) moist; massive; hard, friable, nonsticky and nonplastic; few very fine and fine roots; many very fine interstitial and tubular pores and few medium tubular pores; slightly acid (pH 6.5); abrupt, wavy boundary (1 to 6 inches thick.)

B21t—20 to 28 inches, brown (10YR 5/3) clay, dark brown (10YR 4/3) moist; few, medium, faint, yellowish-brown (10YR 5/4) mottles, dark grayish brown (10YR 4/2) moist; moderate, coarse, prismatic structure; very hard, firm, sticky and plastic; many very fine interstitial and tubular pores and few medium tubular pores; many moderately thick clay films on ped surfaces and in pores; slightly acid (pH 6.5); clear, wavy boundary. (8 to 10 inches thick.)

B22t—28 to 36 inches, yellowish-brown (10YR 5/4) clay, dark yellowish brown (10YR 4/4) moist; moderate, coarse, prismatic structure; very hard, very firm, sticky and plastic; many fine tubular pores; continuous, moderately thick and thick clay films on ped surfaces and in pores; neutral (pH 7.0); clear, wavy boundary. (8 to 10 inches thick.)

B3t—36 to 50 inches, light yellowish-brown (10YR 6/4) clay loam, yellowish brown (10YR 5/6) moist; weak, medium, subangular blocky structure; very hard, firm, sticky and plastic; many very fine and fine tubular pores and few medium tubular pores; common thin clay films in pores and on ped surfaces; slightly calcareous, moderately alkaline (pH 8.0); gradual, wavy boundary. (12 to 16 inches thick.)

C—50 to 60 inches, light yellowish-brown (10YR 6/4) sandy clay loam, yellowish brown (10YR 5/6) moist; massive; hard, friable, sticky and plastic; many very fine interstitial and tubular pores and few medium tubular pores; slightly calcareous, moderately alkaline (pH 8.0).

The A1 horizon is light brownish gray or pale brown. Texture is loam or very fine sandy loam. Reaction is medium acid to strongly acid and increases with depth. The A2 horizon ranges from 1 to 6 inches in thickness. The B2t horizon is heavy clay loam or clay. Reaction is slightly acid to mildly alkaline. The C horizon is stratified but is commonly sandy clay loam or gravelly clay loam. It is slightly calcareous in places.

Included with this soil in mapping are small areas of Arbuckle gravelly loam and Pleasanton loam, and about 90 acres, south of Highland Avenue along the west branch of Llagas Creek, that is covered by grayish-brown clay loam overwash.

The available water holding capacity of this soil is 7 to 8 inches. It has a very slowly permeable clay subsoil. During the winter months it becomes ponded. The hazard of erosion is none to slight. Fertility is low. Effective rooting depth generally is very deep.

This soil is used for irrigated row crops, apricots, prunes, and grapes. A few acres are used for dryland grain hay and pasture. Because of the clay subsoil, this soil is best suited to shallow-rooted crops. Capability unit IIIs–3 (14).

San Ysidro loam, 2 to 5 percent slopes, eroded (SdB2).—This soil is on fans and has an average slope of about 4 percent.

Included with this soil in mapping are small areas of Arbuckle gravelly loam and Pleasanton loam.

Runoff is slow, and the hazard of erosion is slight.

This soil is used for dryland grain hay and pasture. Capability unit IIIe–3 (14).

San Ysidro Series, Acid Variant

The San Ysidro series, acid variant, consists of moderately well drained loams formed in old alluvium from sedimentary rock. These soils are on fans and terraces and have slopes of 0 to 9 percent. The vegetation, where these soils are not cultivated, consists chiefly of annual grasses and forbs, and there are scattered oak trees. Elevation ranges from 200 to 2,000 feet. Average annual rainfall is 16 to 25 inches, and average annual temperature is 58° to 60° F. The growing season is 260 to 275 days. These soils are associated with the Hillgate and Pleasanton soils.

In a representative profile, the surface layer is light brownish-gray, medium acid loam about 15 inches thick. It is underlain by a subsurface layer of light-gray, mottled, medium acid loam. At a depth of about 20 inches is a band of mottled and mixed yellowish-brown, pale-brown, and light-gray, medium acid clay loam 9 inches thick. The subsoil is light yellowish-brown and strong-brown, strongly acid clay and gravelly clay loam to a depth of more than 60 inches.

The San Ysidro variant is used for irrigated row crops, apricots, prunes, grapes, and dryland hay and pasture.

San Ysidro loam, acid variant, 0 to 2 percent slopes (SfA).—This soil is on old fans. It is similar to San Ysidro loam, 0 to 2 percent slopes, but has a strongly acid subsoil.

Representative profile (250 feet west of Center Road,

C2gca—34 to 42 inches, gray (5Y 5/1) silty clay, dark gray (5Y 4/1) moist; many, fine, distinct, light yellowish-brown (2.5Y 6/4) mottles, light olive brown (2.5Y 5/4) moist; strong, medium, subangular blocky structure; hard, friable, sticky and plastic; few fine roots; many very fine interstitial and tubular pores; strongly calcareous, with many large, irregularly shaped, soft lime masses; moderately alkaline (pH 8.0); clear, smooth boundary. (8 to 10 inches thick.)

C3g—42 to 60 inches, light-gray (5Y 7/1) silty clay, gray (5Y 5/1) moist; many, fine, distinct, light yellowish-brown (2.5Y 6/4) mottles, light olive brown (2.5Y 5/4) moist; massive; hard, friable, sticky and plastic; many very fine interstitial and tubular pores; weakly calcareous; moderately alkaline (pH 8.0).

The A horizon is silty clay or heavy silty clay loam. The C horizon is typically gray to white, and texture is silty clay or silty clay loam. Lime is disseminated, but there are few to many lime masses and few to common hard lime concretions.

Included with this soil in mapping are some areas of Clear Lake clay and a few small areas that are strongly calcareous in the surface layer.

Available water holding capacity of this soil is 9 to 10 inches. Drainage has been improved because of the general lowering of the water table in the valley. Permeability is slow, and water sometimes is ponded during winter months. Runoff is very slow, and the hazard of erosion is none to slight. Fertility is high. Effective rooting depth is very deep.

This soil is used for irrigated row crops, sugar beets, prunes, and pears. Where orchard crops are grown, definite symptoms of chlorosis are present because of the lime content of the soil. Capability unit IIs–5 (14).

Sunnyvale silty clay (Su).—This nearly level soil has a profile similar to that of Sunnyvale silty clay, drained, but it has a seasonal water table at a depth of 30 to 60 inches. Near Tulare Hill this soil has been flooded twice in about 10 years.

Included with this soil in mapping are a few small areas that are highly calcareous, a few areas that are salty in the surface layer, about 5 acres of Pacheco silt loam, just south of Tulare Hill, and a few acres of Willows clay. About 20 acres of this soil has buried black clay at a depth of 2 to 3 feet.

Effective rooting depth of this soil is very deep but is restricted by the seasonal water table. Available water holding capacity is 9 to 10 inches where this soil is drained. Natural fertility is moderate.

This soil is used for irrigated row crops and pasture. Capability unit IIIw–5 (14).

Terrace Escarpments

Terrace escarpments (TeF) consists of areas of steep, old terraces and generally has slopes of 30 to 50 percent. This land type is associated with the Hillgate, Keefers, and Pleasanton soils. It has not developed distinct horizons, but it generally consists of material of gravelly loam or clay loam texture. Vegetation is mostly annual grasses, forbs, and scattered oak trees.

Runoff is rapid, and the hazard of erosion is high.

This land type is used for limited range, wildlife, and watershed Capability unit VIIe–1 (15); range site, Loamy.

Vallecitos Series

The Vallecitos series consists of well-drained loams that are underlain by sedimentary and metasedimentary bedrock at depths of 13 to 30 inches. These soils are on uplands and have slopes of 15 to 75 percent. Vegetation is annual grasses, forbs, and oak trees. Elevation ranges from 300 to 3,500 feet. Average annual rainfall is about 16 to 25 inches, and average annual temperature is about 58° to 60° F. The growing season is about 200 to 250 days. Vallecitos soils are associated with the Gaviota and Los Gatos soils.

In a representative profile, the surface layer is brown, slightly acid and medium acid loam about 10 inches thick. The subsoil is dark-brown and reddish brown, medium acid clay loam and clay. It is underlain at a depth of 19 inches by bluish-gray metamorphosed shale. Rock outcrops cover 2 to 10 percent of the surface.

Vallecitos soils are used for range, wildlife, recreation, and watershed.

Vallecitos rocky loam, 15 to 30 percent slopes, eroded (VaE2).—This soil is in large areas of steeper soils on hills that have broad, rounded ridges. Slopes average slightly less than 30 percent.

Representative profile (175 feet west from intersection of the county line road from Pacheco Pass Highway):

A11—0 to 2 inches, brown (10YR 5/3) loam, dark brown (10YR 3/3) moist; massive; hard, friable, nonsticky and nonplastic; many very fine roots; many very fine interstitial and tubular pores; slightly acid (pH 6.5); clear, smooth boundary. (1 to 2 inches thick.)

A12—2 to 10 inches, brown (7.5YR 5/4) loam, dark brown (7.5YR 3/2) moist; massive; hard, friable, nonsticky and nonplastic; few very fine roots; many very fine interstitial and tubular pores and few fine and medium tubular pores; medium acid (pH 6.0); abrupt, smooth boundary. (7 to 8 inches thick.)

B1t—10 to 16 inches, dark-brown (7.5YR 4/4) clay loam, dark reddish brown (5YR 3/4) moist; massive; hard, friable, slightly sticky and slightly plastic; few fine roots; many very fine interstitial and tubular pores and few fine and medium tubular pores; common thin clay films on bridges between sand grains and clay films in pores; medium acid (pH 6.0); abrupt, broken boundary. (0 to 8 inches thick.)

B2t—16 to 19 inches, reddish-brown (5YR 5/3) clay, dark reddish brown (5YR 3/3) moist; moderate, medium, subangular blocky structure; very hard, firm, sticky and plastic; many very fine and fine tubular pores; continuous, moderately thick clay films on ped surfaces and in pores; medium acid (pH 6.0); abrupt, broken boundary. (0 to 12 inches thick.)

R—19 inches, bluish-gray, metamorphosed shale.

The A horizon is brown or grayish brown. Reaction is medium acid to neutral. The texture is loam or light clay loam. Rock outcroppings cover 2 to 10 percent of the surface. The B2t horizon is typically reddish brown but ranges to dark brown or dark reddish brown. Reaction is medium acid to neutral. The texture is clay loam or clay. The Bt horizon is missing in places or is only in fracture planes of the bedrock. Depth to bedrock is 16 to 30 inches.

Included with this soil in mapping are similar soils that have a brown subsoil, small areas of Rock land, areas that have been subject to severe sheet and rill erosion, and small areas of Montara rocky clay loam and Gaviota rocky loam. Also included are areas along drainageways where slopes range up to 45 percent, a few areas of a gray, moderately alkaline soil, and areas that have soft serpentine shale at a depth of 4 feet or more.

The available water holding capacity is 3 to 6 inches, depending on depth to bedrock. Permeability in the subsoil is slow. Runoff is medium to rapid, and the hazard of erosion is moderate to high. Natural fertility is moderate. Effective rooting depth is shallow to moderately deep to bedrock.

This soil is used for range. Natural vegetation is mostly grasses, forbs, and scattered oak trees. The surface over much of the area is crusted from being trampled by livestock. Capability unit VIe–7 (15); range site, Shallow Loamy.

Vallecitos rocky loam, 50 to 75 percent slopes, eroded (VaG2).—This soil is on uplands that have narrow, somewhat angular to rounded, winding ridgetops. Slopes generally range from 50 to 60 percent. This soil has a profile similar to that of Vallecitos rocky loam, 15 to 30 percent slopes, eroded, but it is more shallow. It averages about 16 inches to bedrock but ranges from 13 to 24 inches.

Included with this soil in mapping are some areas of Gaviota rocky loam and, on the north slopes, Los Osos clay loam.

The available water holding capacity is 2 to 5 inches. Runoff is very rapid, and the hazard of erosion is very high.

This soil is used for range, wildlife, recreation, and watershed. Natural vegetation is generally grasses, forbs, and scattered oak and Digger pine trees, but some of the more eroded areas have a thin brush cover. Capability unit VIIe–7 (15); range site, Shallow Loamy.

Willows Series

The Willows series consists of poorly drained clays that are underlain by alluvium from material derived from sedimentary rock. These soils are in low positions on the alluvial plains and have slopes of less than 2 percent. The vegetation, where these soils are not cultivated, consists of saline-alkali tolerant grasses and forbs. Elevation ranges from 100 to 400 feet. Average annual rainfall is 16 to 20 inches, and average annual temperature is 58° to 60° F. The growing season is about 250 to 275 days. Willows soils are associated with the Clear Lake and Pacheco soils.

In a representative profile, the surface layer is dark-gray, moderately alkaline, calcareous clay about 12 inches thick. The substratum is mottled, olive-gray and light olive-gray, strongly alkaline, calcareous clay to a depth of 60 inches or more. Deep cracks develop in the surface layer and upper part of the substratum when these soils are dry. The soils contain slight to moderate concentrations of soluble salts and alkali salts.

Willows soils are used for irrigated row crops and pasture.

Willows clay (Wa).—This soil is in low positions on alluvial plains. It has no well-defined drainage channels. Slopes are less than 2 percent.

Representative profile (south on Frazer Lake Road, ⅜ of a mile from Bloomfield Avenue intersection and ⅜ of a mile north into field, toward the Pajaro River):

Ap—0 to 6 inches, dark-gray (5Y 4/1) clay, very dark gray (5Y 3/1) moist; moderate, medium and fine, granular structure; very hard, firm, sticky and very plastic; few very fine and medium roots; many very fine interstitial and tubular pores and few medium tubular pores; slightly calcareous, moderately alkaline (pH 8.0); abrupt, smooth boundary. (4 to 7 inches thick.)

A1—6 to 12 inches, dark-gray (5Y 4/1) clay, very dark gray (5Y 3/1) moist; few, fine, distinct, light brownish-gray (2.5Y 6/2) mottles, light olive brown (2.5Y 5/4) moist; strong, coarse, angular, blocky structure; extremely hard, very firm, sticky and very plastic; many very fine roots and few medium roots; many very fine interstitial and tubular pores and few medium tubular pores; many intersecting slickensides; slightly calcareous, moderately alkaline (pH 8.0); clear, smooth boundary. (6 to 8 inches thick.)

C1ca—12 to 31 inches, olive-gray (5Y 5/2) clay, dark olive gray (5Y 3/2) moist; many, fine, distinct, brown (10YR 5/3) mottles, dark brown (10YR 4/3) moist; strong, coarse, prismatic structure; extremely hard, very firm, sticky and very plastic; common very fine and medium roots; many very fine interstitial and tubular pores and few medium tubular pores; many intersecting slickensides; strongly effervescent, with lime in seams and soft masses; few medium-sized gypsum crystals lining some pores; strongly alkaline (pH 8.5); clear, smooth boundary. (18 to 25 inches thick.)

C2—31 to 60 inches, light olive-gray (5Y 6/2) clay, olive gray (5Y 5/2) moist; common, fine, distinct, brown (10YR 5/3) mottles, dark brown (10YR 4/3) moist, and few, medium, distinct, gray (5Y 5/1) mottles; massive; very hard, firm, sticky and plastic; many very fine interstitial and tubular pores and few medium tubular pores; many intersecting slickensides in the upper 10 inches; strongly effervescent; strongly alkaline (pH 8.5).

The A horizon is commonly dark gray or dark grayish brown. Lime is generally present. Few to many medium-sized salt crystals commonly are in the A and C horizons. When this soil is dry, deep cracks develop that ordinarily are ½ to 1½ inches in width. The C horizon is olive gray, light olive gray, or light yellowish brown. Distinct mottles start at an average depth of 12 inches and are light brownish gray, brown, or gray.

Included with this soil in mapping are some areas of Clear Lake clay and a few areas of a soil that has 2 to 5 percent slopes. About 20 percent of this acreage is covered by overwash material, 10 to 20 inches thick, of sandy clay loam texture.

The natural fertility of this soil is affected by moderate concentrations of soluble salts. Effective rooting depth is restricted by a water table that fluctuates seasonally between depths of 20 and 40 inches. The soil generally is ponded during winter. The available water holding capacity is 6 to 7.5 inches. Permeability is slow, and erosion is not a problem.

This soil is used mostly for pasture. A few areas are used for irrigated row crops. Capability unit IVw–6 (14).

Yolo Series

The Yolo series consists of well-drained loams that are underlain by alluvium from sedimentary rock. These soils are on alluvial plains and fans and have slopes of 0 to 9 percent. The vegetation, where these soils are not cultivated, is mainly annual grasses and forbs, and there are a few scattered oak trees. Elevation ranges from 400 to 2,400 feet. Average annual rainfall is 15 to 25 inches, and average annual temperature is 58° to 60° F. The growing season is about 250 to 275 days. Yolo soils are associated with the Campbell, Esparto, and Zamora soils.

In a representative profile, the surface layer is grayish-brown, neutral and mildly alkaline loam about 29 inches thick. The substratum is brown, mildly alkaline silt loam to a depth of 60 inches or more. In some places the surface layer is silty clay loam.

Yolo soils are used mainly for irrigated row crops, orchards, vineyards, dryland hay, and pasture. Large areas are also used for housing and commercial development. These are the most productive soils in the Santa Clara Valley.

Yolo loam, 0 to 2 percent slopes (YoA).—This soil is on alluvial plains and fans. Representative profile (in field 20 feet east of San Antonio Creek, 0.25 mile north of Harney School, in San Antonio Valley in northwest corner of NW¼NE¼ sec. 1, T. 7 S., R. 4 E.) :

Ap—0 to 7 inches, grayish-brown (10YR 5/2) loam, very dark grayish brown (10YR 3/2) moist; massive; hard, friable, nonsticky and nonplastic; many very fine roots; many very fine interstitial pores; neutral (pH 6.6) ; clear, smooth boundary. (6 to 8 inches thick.)

A1—7 to 29 inches, grayish-brown (10YR 5/2) loam, very dark grayish brown (10YR 3/2) moist; massive; hard, friable, nonsticky and nonplastic; common very fine roots; many very fine interstitial and tubular pores and few fine and medium tubular pores; mildly alkaline (pH 7.5); clear, smooth boundary. (20 to 24 inches thick.)

C—29 to 60 inches, brown (10YR 5/3) silt loam, dark brown (10YR 4/3) moist; massive; hard, friable, nonsticky and nonplastic; few very fine roots; many very fine interstitial and tubular pores and few medium and fine tubular pores; mildly alkaline (pH 7.5).

The A horizon is grayish brown or brown. Texture is commonly loam but in places is silt loam or light clay loam. Reaction is mildly alkaline to slightly acid. The C horizon is brown, yellowish brown, or light yellowish brown. Reaction is neutral to mildly alkaline. The C horizon is stratified and is silt loam, silty clay loam, clay loam, or loam in texture. This horizon has an average texture of silt loam or loam and is 10 to 40 inches deep. Lime is present in the C horizon below a depth of 40 inches in places.

Included with this soil in mapping are areas of Yolo silty clay loam, areas of a soil that is pale brown in the surface layer, areas of Zamora clay loam, and areas of Garretson soils.

Available water capacity is about 10 to 11 inches. Permeability is moderate. Runoff is very slow, and the hazard of erosion is none to slight. Fertility is high. The effective rooting depth is very deep.

This soil is used partly for irrigated row crops, prunes, apricots, walnuts, pears, dryland hay, and pasture. About 50 percent of the acreage of this soil is used for housing and commercial development. Capability unit I–1 (14) and IIIc–1 (15).

Yolo loam, 2 to 5 percent slopes (YoB).—This soil is on small to medium-sized fans. It has a profile similar to that of Yolo loam, 0 to 2 percent slopes, except that the texture of the surface layer is loam or light clay loam.

Included with this soil in mapping are areas of Garretson gravelly loam and Yolo loam that have slopes that range to 9 percent.

Runoff is slow, and the hazard of erosion is slight.

This soil is used for irrigated row crops, prunes, apricots, walnuts, dryland hay, and pasture. Capability unit IIe–1 (14) and IIIe–1 (15).

Yolo silty clay loam, 0 to 2 percent slopes (YeA).—This soil is on alluvial plains. Texture of the surface layer and substratum is silty clay loam or clay loam.

Included with this soil in mapping are small areas of Garretson gravelly loam, narrow areas of slope breaks, and areas of Campbell silty clay loam.

Available water holding capacity is 11 to 12 inches. Permeability is moderately slow. Runoff is very slow, and erosion is not a problem.

This soil is used partly for irrigated row crops, prunes, apricots, walnuts, pears, grapes, and dryland hay and pasture. About 50 percent of the acreage of this soil is used for housing and commercial development. Capability unit I–1 (14).

Yolo silty clay loam, 2 to 9 percent slopes (YeC).—This soil is on alluvial fans and has slopes that average 5 percent. It has a profile similar to that of Yolo loam, 0 to 2 percent slopes, but the surface layer and substratum are silty clay loam or clay loam.

Included with this soil in mapping are some areas of Garretson gravelly loam and Pleasanton gravelly loam.

Available water holding capacity is 11 to 12 inches. Permeability is moderately slow. Runoff is slow to medium, and the hazard of erosion is slight to moderate.

This soil is used for irrigated row crops, prunes, apricots, walnuts, pears, grapes, and dryland pasture. Capability unit IIe–1 (14).

Zamora Series

The Zamora series consists of well-drained clay loams that are underlain by alluvium of mixed origin. These soils have slopes of 0 to 9 percent and are on alluvial fans. The vegetation, where these soils are not cultivated, is chiefly annual grasses and forbs, and there are scattered oak trees. Elevation ranges from 200 to 1,000 feet. Average annual rainfall is 16 to 20 inches, and average annual temperature is 58° to 60° F. The growing season is about 250 to 275 days. Zamora soils are associated with the Pleasanton and Yolo soils.

In a representative profile, the surface layer is dark grayish-brown, neutral clay loam about 15 inches thick. In some places the surface layer is loam. The subsoil is dark-brown and brown, neutral clay loam that is underlain at a depth of 35 inches by brown and pale-brown, neutral sandy clay loam and gravelly sandy clay loam that extend to a depth of 60 inches or more.

Zamora soils are used mainly for irrigated row crops, orchards, vineyards, and dryland hay and pasture. A few areas are used for housing and commercial development.

Zamora clay loam, 0 to 2 percent slopes (ZbA).—This soil is on alluvial fans in the Paradise Valley area and in smaller areas throughout the survey area.

Representative profile (in prune orchard about 30 feet southwest of intersection of Bowden Avenue and Watsonville Road) :

Ap—0 to 7 inches, dark grayish-brown (10YR 4/2) clay loam, very dark grayish brown (10YR 3/2) moist; massive; hard, friable, sticky and plastic; few very fine roots; many very fine interstitial pores; neutral (pH 7.0); abrupt, smooth boundary. (6 to 8 inches thick.)

A1—7 to 15 inches, dark grayish-brown (10YR 4/2) clay loam, very dark grayish brown (10YR 3/2) moist; massive; hard, friable, sticky and plastic; few very fine and medium roots; neutral (pH 7.0) ; clear, smooth boundary. (6 to 12 inches thick.)

B21t—15 to 26 inches, dark-brown (10YR 4/3) clay loam, dark brown (10YR 3/3) moist; moderate, medium, subangular blocky structure; hard, friable, sticky and plastic; few very fine and medium roots; many very fine interstitial and tubular pores and few medium tubular pores; continuous, thick clay film on ped sur-

faces and in pores; neutral (pH 7.0); clear, wavy boundary. (11 to 14 inches thick.)

B22t—26 to 35 inches, brown (10YR 5/3) clay loam, dark brown (10YR 4/3) moist; few, fine, faint, yellowish-brown (10YR 5/4) mottles, dark yellowish brown (10YR 4/4) moist; moderate, medium, subangular blocky structure; hard, friable, sticky and plastic; many very fine interstitial and tubular pores and few medium tubular pores; many thin clay films on ped surfaces and in pores; neutral (pH 7.0); clear, smooth boundary. (9 to 16 inches thick.)

C1—35 to 58 inches, brown (10YR 5/3) sandy clay loam, dark brown (10YR 4/3) moist; massive; slightly hard, very friable, sticky and plastic; many very fine interstitial and tubular pores; neutral (pH 7.0); clear, smooth boundary. (20 to 30 inches thick.)

C2—58 to 70 inches, pale-brown (10YR 6/3) gravelly sandy clay loam containing about 30 percent (by volume) gravel, brown (10YR 5/3) moist; massive; slightly hard, very friable, nonsticky and nonplastic; many fine and very fine interstitial pores; neutral (pH 7.0).

The A horizon is commonly dark grayish brown but in places is grayish brown or dark brown. Texture of the A and B horizons is clay loam or silty clay loam. There is a slight increase in the content of clay from the A horizon to the B horizon. Reaction is neutral to slightly acid and changes little with depth.

Included with this soil in mapping are some areas of Pleasanton loam and small bodies of Yolo loam.

Available water holding capacity is 11 to 12 inches. Runoff is very slow, and the hazard of erosion is none to slight. Permeability in the subsoil is moderately slow. Fertility is high. Effective rooting depth is very deep.

This soil is used for irrigated row crops, prunes, apricots, walnuts, grapes, and dryland hay and pasture. Capability unit I–3 (14).

Zamora loam, 0 to 2 percent slopes (ZaA).—This soil is on small fans throughout the survey area. The surface layer is grayish brown, and the texture is loam or light clay loam that contains about 3 to 8 percent (by volume) medium and fine gravel.

Included with this soil in mapping are areas of Pleasanton loam and Yolo loam.

This soil is used mainly for irrigated row crops, apricots, prunes, walnuts, grapes, and dryland hay and pasture. A few acres are used for housing and commercial development. Capability unit I–3 (14).

Zamora loam, 2 to 9 percent slopes (ZaC).—This soil has an average slope between 3 to 6 percent. The surface layer is grayish brown. Texture is loam or light clay loam that contains about 3 to 8 percent (by volume) medium and fine gravel.

Included with this soil in mapping are areas of Hillgate silt loam and Pleasanton loam.

Runoff is slow to medium, and the hazard of erosion is slight to moderate.

This soil is used for irrigated row crops, apricots, prunes, walnuts, grapes, and dryland hay and pasture. Capability unit IIe–1 (14).

Zamora clay loam, 2 to 9 percent slopes (ZbC).—This soil is in small to medium-sized areas on fans. Average slope is 3 to 5 percent. Texture is silty clay loam, clay loam, or gravelly clay loam.

Included with this soil in mapping are areas of gravelly clay loam and gravelly loam.

Runoff is slow to medium, and the hazard of erosion is slight to moderate.

This soil is used for irrigated row crops, prunes, apricots, walnuts, grapes, and dryland pasture and hay. Capability unit IIe–1 (14).

Zamora and Cropley soils, 2 to 9 percent slopes, severely eroded (ZeC3).—These soils are on fans and toe slopes. Slopes are mostly short and run toward deeply cut channels. These soils have been damaged by severe gully and sheet erosion.

The Zamora clay loam has a profile similar to that of Zamora clay loam, 0 to 2 percent slopes, and the Cropley clay has a profile similar to that of Cropley clay, 0 to 2 percent slopes.

Included with this mapping unit are areas of Azule clay loam, Diablo clay, and Los Osos clay loam.

Zamora and Cropley soils are used for dryland pasture. Uneven surfaces, gullies, and deposition make cultivation of these soils difficult. Capability unit IVe–5 (15).

Use and Management of the Soils

Soil productivity depends on the characteristics of the soils, the climate of the area in which they occur, and the management they receive. The characteristics of the soils and the climate generally cannot be changed. Management, however, can be controlled, and changes in the systems of management can cause the productivity and quality of crops or livestock products to vary greatly. Changes in management systems are made by varying one or more of many practices, including crop rotation, irrigation, land leveling, fertilization, tillage, erosion control, and drainage.

In this section the system of capability grouping used by the Soil Conservation Service is explained and suggestions for managing soils in each capability group are given. Following this, the Storie Index rating is discussed and the yields of the soils for the more important crops in the survey area are given. This is followed by subsections on range, wildlife, and engineering uses of the soils.

Capability Groups of Soils

Capability classification is the grouping of soils to show, in a general way, their suitability for most kinds of farming. It is a practical classification based on limitations of the soils, the risk of damage when they are used, and the way they respond to treatment. The classification does not apply to rice and other crops having special requirements. The soils are classified according to degree and kind of permanent limitation, but without consideration of major and generally expensive landforming that would change the slope, depth, or other characteristics of the soils; and without consideration of possible but unlikely major reclamation projects.

In the capability system, all kinds of soils are grouped at three levels, the capability class, subclass, and unit. These are discussed in the following paragraphs.

Capability Classes, the broadest grouping, are designated by Roman numerals I through VIII. The numerals indicate progressively greater limitations and narrower choices for practical use. Classes are defined as follows:

Class I. Soils that have few limitations that restrict their use.

Issued November 1969

SOIL SURVEY
SAN BENITO COUNTY
California

UNITED STATES DEPARTMENT OF AGRICULTURE
Soil Conservation Service
In cooperation with
UNIVERSITY OF CALIFORNIA
AGRICULTURAL EXPERIMENT STATION

Cieneba gravelly sandy loam, 30 to 75 percent slopes, eroded (CgG2).—This soil is similar to Cieneba gravelly sandy loam, 15 to 75 percent slopes, severely eroded, but it is only moderately eroded and is 10 to 18 inches deep to weathered granite. It occupies narrow, pointed, winding ridges or very steep side slopes in areas of Sheridan soils. Slopes are dominantly 30 to 65 percent. Included with this soil are some slightly deeper soils that have slopes of 15 to 30 percent. Also included are a few small areas of limestone or marble in the mountains to the west of Cienega Road.

Available water holding capacity is 2 to 3 inches. Runoff is rapid to very rapid, and the hazard of erosion is severe to very severe.

This soil is used mostly for watershed, wildlife and recreation, but some areas provide limited grazing. Capability unit VIIe–4 (15); pasture and range site 3.

Clear Lake Series

The Clear Lake series consists of poorly drained soils that are clayey in most places and formed in alluvium that washed from sedimentary rocks. These soils are nearly level and occupy low-lying flood plains and valley bottoms. The vegetation is annual grasses and forbs. Clear Lake soils are 130 to 1,500 feet above sea level. Annual rainfall ranges from 12 to 16 inches, average annual temperature is about 60° F., and the frost-free period is about 250 days. The main associated soils are the Cropley, Pacheco, Sorrento, and Willows.

The surface layer is very dark gray to dark-gray clay or silty clay loam 24 to 40 inches thick. The next layer is light brownish-gray clay 10 to 20 inches thick. Below this is gray clay that is underlain by stratified calcareous alluvium in some places. The alluvium extends to depths greater than 5 feet. Most areas of Clear Lake soils show some degree of stratification in the underlying material. Many areas have one or more buried horizons at depths greater than 50 inches.

Clear Lake soils are used for irrigated vegetables, sugar beets, tomatoes, apricots, prunes, walnuts, and alfalfa and for dryland grain and pasture.

Clear Lake clay (0 to 2 percent slopes) (Ch).—This soil lies on valley bottoms on slopes of 1 percent or less.

Representative profile: On Vierra Ranch, 3 miles east of the junction of San Felipe Road and State Route 156; by fence in alfalfa field.

Ap—0 to 12 inches, very dark gray (2.5Y 3/0) clay, black (2.5Y 2/0) when moist; strong, fine, granular structure; very hard when dry, very firm when moist, very sticky and very plastic when wet; abundant very fine and fine roots, few medium roots; common, very fine and fine, interstitial pores; mildly alkaline; clear, smooth boundary.

A1—12 to 30 inches, dark-gray (10YR 4/1) clay, black (10YR 2/1) when moist; strong, medium, angular blocky structure; very hard when dry, very firm when moist, very sticky and very plastic when wet; plentiful very fine and fine roots; common, very fine and fine, tubular pores; many fine and medium slickensides; common, coarse, black (2.5Y 2/0) organic stainings on ped surfaces; moderately alkaline, slightly effervescent; clear, smooth boundary.

C1—30 to 40 inches, light brownish-gray (2.5Y 6/2) clay, dark grayish brown (2.5Y 4/2) when moist; moderate, coarse, subangular blocky structure; very hard when dry, firm when moist, very sticky and very plastic when wet; many, very fine and fine, tubular pores; common, medium, very dark gray (2.5Y 3/0) organic stains on surfaces of peds and larger pores; moderately alkaline, slightly effervescent; clear, smooth boundary.

C2g—40 to 70 inches, gray (5Y 6/1) clay, gray (5Y 5/1) when moist; many, fine, distinct, light yellowish-brown (2.5Y 6/4) mottles, light olive brown (2.5Y 5/4) when moist; moderate, coarse, subangular blocky structure; very hard when dry, firm when moist, sticky and plastic when wet; many, very fine and fine, tubular pores; few, medium, very dark gray (2.5Y 3/0) organic stains on surfaces of peds and larger pores; moderately alkaline, strongly effervescent; clear, smooth boundary.

This soil is highly fertile. Available water holding capacity is about 8 to 10 inches. Permeability is slow, runoff is ponded to very slow, and the hazard of erosion is none to slight. The root zone is deep.

Most areas of this soil have been drained and are used for irrigated row crops and apricots. Dryland barley is grown in some areas. Capability unit IIs–5 (14).

Clear Lake clay, saline (0 to 2 percent slopes) (Ck).—This soil is similar to Clear Lake clay, but it contains slight to moderate amounts of salts and alkali. This soil occurs in low-lying valley bottoms. Included with this soil are some areas that have a dark-gray to dark grayish-brown heavy clay loam surface layer.

This soil is used for irrigated sugar beets and alfalfa and for dryland grain and pasture. Capability unit IIIw–5 (14); pasture and range site 11.

Clear Lake silty clay loam (0 to 2 percent slopes) (Cl).—This soil occurs in small valleys in the uplands or in small areas in the larger valleys. It has a calcareous silty clay loam surface layer and a seasonally high or continuously high water table. Included with this soil are soils that have a clay surface layer, soils that are somewhat poorly drained, and soils that have a grayish-brown surface layer.

The soil is used for dryland barley and incidental pasture. Capability unit IIIw–5 (15).

Climara Series

The Climara series consists of well-drained clayey soils underlain by serpentine or serpentinized rocks at a depth of about 3 to 4 feet. These soils are strongly sloping to steep and are on uplands. The vegetation is chiefly annual grasses and forbs, but the steeper slopes are covered by thin to moderately thick stands of oaks and Digger pines. Many eroded areas are covered with brush. Elevations range from 500 to 3,000 feet above sea level. Annual rainfall is 10 to 16 inches, average annual temperature is about 60° F., and the frost-free period is about 250 days. The main associated soils are the Vallecitos, Gazos, Henneke, and Montara.

The surface layer is gray clay 21 to 31 inches thick. The next layer is light yellowish-brown gravelly clay 7 to 12 inches thick. In most places weathered rock occurs at a depth of 28 and 43 inches.

Climara soils are used for dryland grain and pasture.

Climara clay, 9 to 15 percent slopes (CmD).—This soil occurs on rounded ridgetops within areas of steeper soils or in other small areas.

Representative profile: On Tully Ranch, 10 yards south of ranch road, three-quarter mile east of State Route 25.

Figure 5.—Road cut through Cotati loam, 9 to 15 percent slopes, eroded. This soil has a dark-colored surface layer, a leached layer, and a sandy clay subsoil. The sandy clay subsoil severely limits the growth of roots and the penetration of water. The entrenching tool is about 20 inches long.

Cropley Series

The Cropley series consists of well-drained clayey soils that are underlain by coarser textured material at depths greater than 40 inches. These soils are nearly level to sloping and occupy fans and terraces. The vegetation consists of annual grasses and forbs and scattered oaks. Elevations range from 130 to 1,500 feet above sea level. Annual rainfall is 12 to 14 inches, average annual temperature is about 59° F., and the frost-free period is about 260 days. The main associated soils are the Clear Lake, Sorrento, and Willows.

The surface layer is very dark gray to dark grayish-brown clay or silty clay loam that is about 32 inches thick. The next layer is grayish-brown clay that ranges from 10 to 15 inches in thickness. Below this is grayish-brown sandy clay loam that is underlain by stratified sand, gravel, and clay in some places. These stratified materials extend to depths greater than 5 feet. The content of lime below the surface layer varies.

The Cropley soils are used for irrigated fruit and nuts, vegetables, grapes, sugar beets, tomatoes, and alfalfa and for dryland grain and incidental pasture.

Cropley clay, 2 to 9 percent slopes (CwC).—This soil is on long gently sloping fans or is in gently rolling areas.

Representative profile: On O'Connell Ranch, one-half mile northwest of house and 1 mile southwest of railroad.

Ap—0 to 6 inches, very dark gray (10YR 3/1) clay, black (10YR 2/1) when moist; strong, fine, granular structure; hard when dry, firm when moist, very sticky and very plastic when wet; abundant very fine and fine roots; few, very fine and fine, tubular pores; few, medium and coarse, interstitial pores; neutral; clear, smooth boundary.

A11—6 to 20 inches, very dark gray (10YR 3/1) clay, black (10YR 2/1) when moist; moderate, fine, angular blocky structure; very hard when dry, very firm when moist, very sticky and very plastic when wet; abundant very fine and fine roots; few, very fine and fine, tubular pores; few small pebbles; common fine and medium slickensides; moderately alkaline; gradual, smooth boundary.

A12—20 to 32 inches, dark grayish-brown (10YR 4/2) clay, very dark grayish brown (10YR 3/2) when moist; moderate, medium, angular blocky structure; very hard when dry, very firm when moist, very sticky and very plastic when wet; few very fine and fine roots; few, very fine and fine, tubular pores, few, fine and medium, interstitial pores; few small pebbles; common fine and medium slickensides; moderately alkaline, slightly effervescent; gradual, smooth boundary.

C1—32 to 42 inches, grayish-brown (2.5Y 5/2) clay, dark grayish brown (2.5Y 4/2) when moist; weak, medium, subangular blocky structure; slightly hard when dry, firm when moist, very sticky and very plastic when wet; few very fine and fine roots; few, fine and medium, tubular pores, few, medium, interstitial pores; few small pebbles; moderately alkaline, strongly effervescent; gradual, smooth boundary.

C2—42 to 65 inches, grayish-brown (2.5Y 5/2) sandy clay loam, dark grayish brown (2.5Y 4/2) when moist; weak, medium, subangular blocky structure; slightly hard when dry, firm when moist, slightly sticky and slightly plastic when wet; few very fine and fine roots; common, fine and medium, tubular pores, common, fine and medium, interstitial pores; moderately alkaline, slightly effervescent.

Included with this soil are small areas of Clear Lake and Willows soils.

This soil is fertile. Available water holding capacity is 8 to 10 inches. Permeability is slow, runoff is slow to medium, and the hazard of erosion is slight to moderate. In a few included areas, water from surrounding hills has cut gullies. The root zone is very deep.

The soil is used for irrigated fruits, nuts, sugar beets, tomatoes, grapes, and vegetables, for dryfarmed grain, and for incidental pasture. Capability units IIe–5 (14) and IIIe–5 (15).

Cropley clay, 0 to 2 percent slopes (CwA).—This nearly level soil is similar to Cropley clay, 2 to 9 percent slopes, but the surface layer contains coarse gravel in some areas. Also, the underlying material is somewhat stratified and contains strata of fine to medium gravel in some places. Included with this soil are small areas of somewhat poorly drained soils.

Runoff is very slow and is ponded in small areas during winter. The hazard of erosion is slight to none.

This soil is used for watersheds, wildlife, and recreation. Capability unit VIIIe–1 (15).

Pacheco Series

The Pacheco series consists of somewhat poorly drained, loamy soils that are underlain by stratified alluvium at depths greater than 50 inches. These soils are nearly level and occupy low flood plains or fans. Areas along the major drainageways are subject to occasional flooding and deposition. The vegetation consists mainly of annual grasses and forbs, but some cottonwoods and willows grow along drainageways. Elevations range from 150 to 400 feet above sea level. Annual rainfall is 12 to 14 inches. Average annual temperature is about 60° F., and the frost-free period is about 260 days. The main associated soils are the Clear Lake, Sorrento, and Willows.

The surface layer is dark-gray to grayish-brown silt loam, loam, clay loam, or silty clay 20 to 24 inches thick. The subsoil is grayish-brown to light brownish-gray clay loam that ranges from 12 to 20 inches in thickness. In places the subsoil and the substratum are mottled. The substratum is brown to yellowish-brown clay loam that is generally stratified below a depth of 50 inches. It ranges from clay loam to silt loam and contains lenses of loamy sand and gravel in some places. Most areas have a water table that is seasonally high and is within a depth of 36 to more than 60 inches. Some areas are moderately to severely affected by alkali.

Pacheco soils are used for irrigated walnuts, prunes, pears, sugar beets, tomatoes, vegetables, and alfalfa and for dryland grain and pasture.

Pacheco silt loam (0 to 2 percent slopes) (Pc).—This soil occurs on nearly level flood plains.

Representative profile: On Sabbatini Ranch, in alfalfa field, 60 yards to the rear (north) of Pacheco School, on the northwest corner of Shore Road and Lovers Lane.

Ap—0 to 9 inches, dark-gray (10YR 4/1) silt loam, very dark gray (10YR 3/1) when moist; moderate, fine, granular structure; hard when dry, very friable when moist, slightly sticky and slightly plastic when wet; abundant very fine and fine roots; common, very fine and fine, tubular pores, common, fine, interstitial pores; moderately alkaline; clear, smooth boundary.

A1—9 to 20 inches, dark-gray (10YR 4/1) silt loam, very dark gray (10YR 3/1) when moist; moderate, medium, subangular blocky structure; hard when dry, friable when moist, slightly sticky and slightly plastic when wet; abundant very fine and fine roots; common, very fine and fine and few, medium, tubular pores, common, very fine and fine, interstitial pores; moderately alkaline; slightly effervescent; gradual, smooth boundary.

IIB2—20 to 32 inches, grayish-brown (10YR 5/2) clay loam, dark grayish brown (10YR 4/2) when moist; moderate, medium, subangular blocky structure; hard when dry, firm when moist, slightly sticky and slightly plastic when wet; plentiful very fine and fine roots; many, very fine and fine, tubular pores; intermittent films of material from the A horizon on ped surfaces; ped surfaces gray and dark gray (10YR 5/1 when dry, 10YR 4/1 when moist); moderately alkaline, strongly effervescent; gradual, smooth boundary.

IIC1—32 to 64 inches, brown (10YR 5/3) clay loam, dark brown (10YR 4/3) when moist; weak, medium, subangular blocky structure; hard when dry, firm when moist, slightly sticky and slightly plastic when wet; few very fine and fine roots; many, very fine, fine, medium, tubular pores; thick gleyed layers (N 6/0 when dry, N 4/0 when moist) on ped and pore surfaces; moderately alkaline, strongly effervescent; gradual, smooth boundary.

IIC2—64 to 105 inches, yellowish-brown (10YR 5/4) clay loam, dark yellowish brown (10YR 4/4) when moist, with coarse distinct mottles of gray and dark gray (N 6/0 when dry, N 4/0 when moist); weak, medium, subangular blocky structure; hard when dry, firm when moist, slightly sticky and slightly plastic when wet; few very fine and fine roots; common, very fine, fine, and medium, tubular pores; stratified with thin layers of loamy sand; moderately alkaline, slightly effervescent.

Included with this soil are small areas that have slopes up to 4 percent and small areas of Willows and Clear Lake soils. Also included are some areas of soils that lie at higher elevations than Pacheco soils and that formed mainly in alluvium washed from soils on granite bedrock.

This soil is moderately fertile. Available water holding capacity is about 10 to 12 inches. Permeability is moderately slow, runoff is very slow to ponded, and erosion is not a hazard. Small areas are moderately to severely affected by alkali. In most places the water table has been lowered to a depth below 60 inches by pumping and artificial drainage, but in a few areas the water table is within a depth of 36 to 60 inches. The root zone is very deep.

The soil is used for irrigated alfalfa, and sugar beets, and dryland pasture. Capability unit IIw–2 (14); pasture and range site 11.

Pacheco loam (0 to 2 percent slopes) (Pc).—This soil is similar to Pacheco silt loam, but its texture is loam throughout. It has a grayish-brown to dark-gray loam surface layer and a loam subsoil. The substratum is generally stratified loam to clay loam and contains lenses of loamy sand and gravel. Some areas have fine gravel throughout the solum.

Included with this soil are small areas of soils that have a pale-brown surface layer and of some soils that have a loamy sand overwash on the surface. Also included are some small areas of soil at higher elevations than this Pacheco soil and that formed in alluvium washed mainly from soils on granitic bedrock. This included soil overlies buried soils that are at a depth of about 30 inches or more.

Available water holding capacity is about 8 to 10 inches. Permeability is moderate.

This soil is used for irrigated walnuts, apricots, sugar beets, tomatoes, and alfalfa and for dryland grain and incidental pasture. Capability unit IIw–2 (14).

Pacheco clay loam over clay (0 to 2 percent slopes) (Pd).—This soil consists of 20 to 36 inches of grayish-brown clay loam over dark gray clay. The surface layer is mildly alkaline to moderately alkaline and is slightly calcareous in a few areas. It has a few fine to medium pebbles in some areas. It occurs in San Juan and Hollister Valleys, generally to the north of Hollister.

This soil is moderately fertile. Available water holding capacity is 8 to 10 inches.

This soil is used for irrigated fruits and nuts, sugar beets, and vegetables and for dryland grain and incidental pasture. Capability unit IIw–2 (14).

Pacheco Silty clay (0 to 2 percent slopes) (Pe).—This soil is similar to Pacheco silt loam, but it has a silty clay surface layer about 15 inches thick over a clay loam subsoil. It occurs in small areas close to drainageways or in

sloping areas around and in depressions. In places this soil is stratified with lenses of silt loam to loamy sand at depths greater than 50 inches. The water table is generally below a depth of 60 inches, but in small areas it is within a depth of 36 inches.

This soil has been drained, and the water table has been lowered. Available water holding capacity is 10 to 12 inches.

This soil is used for irrigated fruit and nut trees, field and row crops, and alfalfa (fig. 10). Capability unit IIs–5 (14).

Panhill Series

The Panhill series consists of well-drained loamy soils that are underlain by stratified, gravelly, calcareous alluvium at a depth of 4 to 5 feet. These soils are gently sloping and lie in the Panoche and Vallecitos Valleys. They occupy fans and terraces below Kettleman soils, depressions in the uplands, and the floors of small valleys in the uplands. The vegetation consists of annual grasses and forbs and some desert shrubs. Elevations range from 1,200 to 2,000 feet above sea level. Annual rainfall is 5 to 10 inches. Average annual temperature is about 63° F., and the frost-free period is about 260 days The main associated soils are the Kettleman and Panoche.

The surface layer is pale-brown to light yellowish-brown loam 12 to 18 inches thick. The subsoil is light yellowish-brown loam 11 to 16 inches thick. The substratum consists of 20 to 30 inches of light yellowish-brown loam over strata of gravel and fine-textured material. The gravelly alluvium is calcareous and extends to an undetermined depth. Fine and medium gravel generally occurs throughout the profile.

Panhill soils are used for range.

Panhill loam, 2 to 9 percent slopes (PhC).—This soil occurs on fans with gilgai microrelief. Slopes are dominantly 4 to 8 percent. In some areas deep gullies or drainageways have been cut by water from surrounding hills.

Representative profile: On fan at base of hills one-third mile west of Little Panoche Road, 2 miles north of junction with Panoche Road.

Figure 10.—Contour basin irrigation (a form of flood irrigation) in an apricot orchard on Pacheco silty clay.

to 26 inches thick. The hardpan consists of 24 to 38 inches of reddish-brown weakly cemented sandy loam that is underlain by brown to yellowish-brown, slightly hard, medium-grained, acid terrace material.

Pinto soils are used for dryland pasture.

Pinto sandy loam, 15 to 30 percent slopes, eroded (PsE2).—This soil occurs on moderately steep ridgetops in areas of other soils.

Representative profile: On hillside, three-quarter mile northeast of auction farm on north side of U.S. Highway No. 101.

A—0 to 8 inches, brown (7.5YR 5/2) sandy loam, dark brown (7.5YR 3/2) when moist; weak, fine, granular structure; hard when dry, very friable when moist, slightly sticky and slightly plastic when wet; plentiful very fine and fine roots; common, very fine and fine, interstitial pores; strongly acid; clear, smooth boundary.

B21t—8 to 16 inches, reddish-brown (5YR 5/4) heavy sandy loam, dark reddish brown (5YR 3/4) when moist; weak, coarse, subangular blocky structure; hard when dry, friable when moist, slightly sticky and slightly plastic when wet; plentiful very fine and fine roots; common, very fine and fine, interstitial pores; thin patchy clay films on ped surfaces and in pores; strongly acid; gradual, smooth boundary.

B22t—16 to 29 inches, reddish-brown (5YR 5/3) heavy sandy loam, dark reddish brown (5YR 3/3) when moist; weak, medium, subangular blocky structure; hard when dry, friable when moist, slightly sticky and slightly plastic when wet; few very fine and fine roots; many, very fine, and few, fine and medium, interstitial pores; thin patchy clay films on ped surfaces and in pores; strongly acid; gradual, wavy boundary.

C1—29 to 63 inches, reddish-brown (5YR 5/4) sandy loam, weakly cemented with silica, dark reddish brown (5YR 3/4) when moist; common, medium, distinct mottles of pink (7.5YR 7/4) and brown (7.5YR 5/4) when moist; massive; few very fine and fine roots; few, fine and medium, iron and manganese concretions; strongly acid; diffuse, smooth boundary.

C2—63 inches, brown to yellowish-brown, (10YR 5/3 to 5/4) slightly hard, medium-grained, acid terrace material.

Included with this soil are some small areas of Arnold soils. This soil is low in fertility. Available water holding capacity is about 3 to 5 inches. Permeability is slow. Runoff is rapid, and the hazard of erosion is severe. Hardpan is at a moderate depth, and it limits the penetration of roots and water.

This soil is used for dryland pasture. Capability unit VIe–1 (15); pasture and range site 3.

Pleasanton Series

The Pleasanton series consists of well-drained loamy and gravelly loamy soils that are underlain by stratified alluvium at a depth of more than 48 inches. These soils are gently sloping to moderately sloping, and they occupy terraces or fans of alluvium derived from sandstone and shale. The vegetation consists of annual grasses and forbs and scattered oaks. Elevations are less than 1,000 feet above sea level. Annual rainfall is 12 to 14 inches. The average annual temperature is about 59° F., and the frost-free period is about 250 days. The main associated soils are the Antioch, Rincon, and Soper.

The surface layer is brown to grayish-brown loam or gravelly loam about 16 to 24 inches thick. The subsoil is brown clay loam 20 to 24 inches thick. It contains some gravel and generally is more gravelly as depth increases. The substratum is light yellowish-brown clay loam that is underlain by stratified alluvium below a depth of 48 inches. The stratified material consists of lenses of sand, gravel, and clay that are intermittently calcareous.

Pleasanton soils are used mainly for dryland grain and pasture. In a few areas irrigated grapes are grown.

Pleasanton loam, 2 to 5 percent slopes (PtB).—This soil is adjacent to drainageways.

Representative profile: East of Panoche Valley Road; road cut 200 yards southeast of the junction of Panoche Valley Road and Browns Valley Road.

Ap—0 to 9 inches, brown (10YR 5/3) loam, dark brown (10YR 3/3) when moist; moderate, fine, granular structure; hard when dry, very friable when moist, slightly sticky and slightly plastic when wet; abundant very fine and fine roots; common, very fine and fine, interstitial pores; slightly acid; clear, smooth boundary.

A1—9 to 21 inches, brown (10YR 5/3) loam, dark brown (10YR 3/3) when moist; weak, medium, subangular blocky structure; hard when dry, very friable when moist, slightly sticky and slightly plastic when wet; abundant very fine and fine roots; many, very fine and fine, tubular pores; neutral; clear, smooth boundary.

B21t—21 to 33 inches, brown (10YR 5/3) clay loam, dark brown (10YR 3/3) when moist; moderate, fine, angular blocky structure; hard when dry, firm when moist, sticky and plastic when wet; plentiful very fine and fine roots; common, very fine and fine, tubular pores; thin patchy clay films on the surfaces of peds and larger pores; neutral; clear, smooth boundary.

IIB22t—33 to 45 inches, brown (10YR 5/3) very gravelly clay loam, dark brown (10YR 3/3) when moist; weak, fine, subangular blocky structure; hard when dry, firm when moist, sticky and plastic when wet; few very fine and fine roots; common, very fine and fine, tubular pores; few, thin, patchy clay films on ped surfaces; mildly alkaline; clear, smooth boundary.

IIIC1—45 to 55 inches, light yellowish-brown (10YR 6/4) clay loam, dark yellowish brown (10YR 4/4) when moist; weak, medium, subangular blocky structure; hard when dry, friable when moist, slightly sticky and slightly plastic when wet; few, very fine and fine, tubular pores; mildly alkaline; clear, smooth boundary.

IVC2—55 inches, stratified yellowish-brown (10YR 5/6) and gray, (10YR 5/1) mildly alkaline sand, gravel, and clay.

Included with this soil are small areas of Antioch, Rincon, and Soper soils. Also included are some small areas of nearly level soils.

This well-drained soil is moderately fertile. Available water holding capacity is about 8 to 10 inches. Permeability is moderately slow, runoff is slow, and the hazard of erosion is slight. The root zone is very deep.

This soil is used for irrigated grapes and for dryland grain and incidental pasture. Capability units IIe–1 (14) and IIIe–3 (15); pasture and range site 4.

Pleasanton gravelly loam, 5 to 9 percent slopes, eroded (PvC2).—This soil is similar to Pleasanton loam, 2 to 5 percent slopes, but it is more sloping and is gravelly throughout. It occurs in small to medium-sized areas along larger drainageways. In most places it is brown, but color ranges to grayish brown.

Available water holding capacity is about 7 to 9 inches. Runoff is medium, and the hazard of erosion is moderate.

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This soil is used for dryland grain and pasture. Capability units IIIe–1 (14) and IIIe–3 (15); pasture and range site 4.

Reiff Series

The Reiff series consists of well-drained loamy soils formed in alluvium derived mainly from sedimentary uplands. These soils are nearly level to moderately sloping, and they are on flood plains and fans. The vegetation consists of annual grasses and forbs and scattered oaks. Elevations range from 120 to 1,500 feet above sea level. Annual rainfall is 12 to 16 inches. The average annual temperature is about 60° F., and the frost-free period is about 260 days. The main associated soils are the Clear Lake, Metz, Mocho, and Pacheco.

The surface layer is grayish-brown sandy loam 18 to 24 inches thick. The next layer is pale-brown to light brownish-gray sandy loam to loam that averages 30 to 36 inches in thickness. This layer is gravelly or is stratified with gravel and finer textured material. In some places the content of gravel throughout the profile is as much as 10 percent, by volume. Below this layer is a buried soil or stratified alluvium.

Reiff soils are used for irrigated fruits, nuts, alfalfa, field crops, and row crops and for dryland grain and incidental pasture.

Reiff sandy loam, 0 to 2 percent slopes (ReA).—This soil occurs on fans along the larger drainageways. Some areas are occasionally flooded.

Representative profile: 30 yards south of Fairview Road, 300 yards east of a seed company; in walnut orchard.

Ap—0 to 8 inches, grayish-brown (10YR 5/2) sandy loam, very dark grayish brown (10YR 3/2) when moist; moderate, fine, granular structure; slightly hard when dry, very friable when moist, slightly sticky and slightly plastic when wet; plentiful very fine roots; common, very fine, interstitial pores; neutral; clear, smooth boundary.

A1—8 to 24 inches, grayish-brown (10YR 5/2) sandy loam, very dark grayish brown (10YR 3/2) when moist; weak, coarse, subangular blocky structure; slightly hard when dry, very friable when moist, slightly sticky and slightly plastic when wet; plentiful very fine roots, few medium roots; common, very fine, tubular pores, few, fine, interstitial pores; mildly alkaline; clear, smooth boundary.

C1—24 to 42 inches, pale-brown (10YR 6/3) sandy loam, brown (10YR 4/3) when moist; weak, coarse, subangular blocky structure; slightly hard when dry, very friable when moist, slightly sticky and nonplastic when wet; few medium and coarse roots; few, very fine, tubular pores; 1 to 2 percent very fine gravel; mildly alkaline, slightly effervescent; clear, smooth boundary.

11C2—42 to 60 inches, light brownish-gray (10YR 6/2) loam, dark grayish brown (10YR 4/2) when moist; weak, medium, subangular blocky structure; slightly hard when dry, very friable when moist, slightly sticky and slightly plastic when wet; few coarse roots; few, very fine and medium, tubular pores; moderately alkaline, strongly effervescent; clear, smooth boundary.

Included with this soil are small areas of Mocho and Metz soils and of soils that have a gravelly or loamy sand surface layer.

This soil is moderately fertile. Available water holding capacity is about 8 inches. Permeability is moderately rapid, runoff is very slow, and the hazard of erosion is slight to none. The root zone is very deep.

This soil is used for irrigated fruits and nuts, sugar beets, tomatoes, and other vegetables and alfalfa. Dryland crops include grain and incidental pasture. Capability units I–1 (14) and IIIc–1 (15).

Reiff sandy loam, 2 to 9 percent slopes (ReC).—This soil is similar to Reiff sandy loam, 0 to 2 percent slopes, but is more sloping. It occurs on small to medium-sized fans along the major drainageways. The areas closest to the streams are occasionally flooded. Slopes dominantly range from 3 to 6 percent. In some areas as much as 10 percent, by volume, of the profile is fine to medium gravel.

Included with this soil are a few very small areas of soils that have a gravelly or loamy sand surface layer and a few small areas of Metz and Mocho soils.

Runoff is slow to medium, and the hazard of erosion is slight to moderate.

This soil is used for irrigated fruits and nuts, sugar beets, vegetables, and alfalfa and for dryland grain, and incidental pasture. Capability units IIe–1 (14) and IIIe–1 (15).

Rincon Series

The Rincon series consists of well-drained soils that formed in alluvium derived from sandstone and shale. These soils have a loamy surface layer and a clayey subsoil. They occur on benches, terraces, or fans and are nearly level to strongly sloping. They are around the edge of Hollister Valley and along the flood plains and in the valleys bordering the larger drainageways. Vegetation consists of annual grasses and forbs and scattered oaks. Rincon soils are 200 to 1,500 feet above sea level. Annual rainfall ranges from 12 to 16 inches. The average annual temperature is about 60° F., and the frost-free period is about 260 days. The main associated soils are the Antioch, Cropley, Pleasanton, and Sorrento.

The surface layer is dark-gray to grayish-brown silty clay loam or loam 20 to 24 inches thick. The subsoil is brown clay 20 to 30 inches thick. The substratum is light yellowish-brown clay loam 20 to 40 inches thick. At depths of more than 60 inches, the underlying alluvium is calcareous sand, gravel, and clay in strata that extend to an undetermined depth. Some small areas are gravelly throughout the profile. A few areas along Lone Tree Road are gravelly in the surface layer and have a very gravelly substratum.

Rincon soils are used for irrigated apricots, prunes, grapes, walnuts, alfalfa, sugar beets, tomatoes, and other vegetables, and for dryland grain, and pasture.

Rincon silty clay loam, 0 to 2 percent slopes (RsA).—This nearly level soil occurs on broad terraces.

Representative profile: On Young Ranch, 600 yards east of house and 200 yards north of stream; at edge of young prune orchard.

Ap—0 to 12 inches, dark grayish-brown (10YR 4/2) silty clay loam, very dark brown (10YR 2/2) when moist; moderate, fine, granular structure; hard when dry, firm when moist, sticky and plastic when wet; plentiful very fine and fine roots; common, very fine and fine, interstitial pores; mildly alkaline; gradual, smooth boundary.

A1—12 to 23 inches, dark grayish-brown (10YR 4/2) silty clay loam, very dark brown (10YR 2/2) when moist; moderate, medium, subangular blocky structure; hard when dry, firm when moist, sticky and plastic when wet; plentiful very fine and fine roots; common, very fine and fine, tubular pores; few, fine and medium, interstitial pores; mildly alkaline; gradual, smooth boundary.

B21t—23 to 33 inches, brown (10YR 5/3) clay, dark brown (10YR 4/3) when moist; moderate, medium, angular blocky structure; very hard when dry, very firm when moist, very sticky and very plastic when wet; few very fine and fine roots; common, very fine and fine, tubular pores; few, thin, patchy clay films; few small slickensides; material from the A horizon in fine seams and on ped surfaces; mildly alkaline; gradual, smooth boundary.

B22t—33 to 45 inches, brown (10YR 5/3) clay, dark brown (10YR 4/3) when moist; strong, medium, angular blocky structure; very hard when dry, very firm when moist, very sticky and very plastic when wet; few very fine and fine roots; common, very fine and fine, tubular pores; many fine and medium slickensides; thin, patchy clay films on ped faces and on pores; lime in seams and soft masses; moderately alkaline; slightly effervescent; gradual, smooth boundary.

Cca—45 to 80 inches, light yellowish-brown (10YR 6/4) clay loam, dark brown (10YR 4/3) when moist; strong, medium, angular blocky structure; very hard when dry, firm when moist, sticky and plastic when wet; common, very fine and fine, tubular pores; brittle and compact in place; lime in seams and soft masses; moderately alkaline; strongly effervescent; gradual, smooth boundary.

Included in mapping were small areas of Cropley, Antioch, and Pleasanton soils.

This soil is moderately fertile. The available water holding capacity is 8 to 10 inches. Permeability is slow, runoff is very slow, and the erosion hazard is slight to none. A few areas may be ponded for short periods during the winter. The rooting depth is very deep.

This soil is used for irrigated fruit and nut trees, irrigated alfalfa, grapes, and dryland grain and incidental pasture. Capability unit IIs–5 (14).

Rincon silty clay loam, 2 to 9 percent slopes (RsC).—This soil is similar to Rincon silty clay loam, 0 to 2 percent slopes, but is gently sloping to moderately sloping. It occurs in small to medium-sized areas that generally have slopes of 3 to 6 percent. In a few areas fine to medium gravel is in all parts of the profile, but it generally makes up less than 10 percent of the soil mass by volume. Runoff is slow to medium, and the hazard of erosion is slight to moderate.

This soil is used for irrigated alfalfa, apricots, grapes, walnuts, and prunes, and for dryland grain and incidental pasture. Capability units IIe–5 (14) and IIIe–5 (15).

Rincon silty clay loam, 9 to 15 percent slopes, eroded (RsD2).—This soil is similar to Rincon silty clay loam, 0 to 2 percent slopes, but has a thinner profile and is strongly sloping, and is more eroded. Areas are small to moderate in size, and slopes generally range from 12 to 15 percent. In some areas fine to medium-sized gravel is in all parts of the profile.

Included in mapping were some small areas where there is less clay than normal in the subsoil and areas where the substratum is very firm. Also included were areas where erosion is only slight.

Runoff is medium to rapid, and the hazard of erosion is moderate to high.

The soil is used for dryland pasture and grain. Capability unit IIIe–5 (15); pasture and range site 4.

Rincon loam, 0 to 2 percent slopes (RnA).—This soil is similar to Rincon silty clay loam, 0 to 2 percent slopes, but has a loam surface layer. It is nearly level and occurs in small areas on large terraces near the Comstock-Las Viboras Road and in a few other small areas. In most places the subsoil and substratum are gravelly. In some areas the surface layer contains fine gravel that generally makes up less than 5 percent of the soil mass by volume. Available water holding capacity is about 8 inches.

This soil is used for irrigated alfalfa, apricots, grapes, walnuts, and prunes, and for dryland grain and incidental pasture. Capability unit IIs–5 (14).

Rincon loam, 2 to 9 percent slopes (RnC).—This soil is similar to Rincon silty clay loam, 0 to 2 percent slopes, but is gently sloping to moderately sloping and has a loam surface layer. It occurs on small to medium-sized fans, generally along the larger drainageways. In some places fine to medium-sized gravel is in the profile. Dominant slopes are 3 to 6 percent. Available water holding capacity is about 8 inches. Runoff is slow to medium, and the erosion hazard is slight to moderate.

This soil is used for irrigated apricots, grapes, walnuts, and prunes, and for dryland grain and incidental pasture. Capability units IIIe–1 (14) and IIIe–3 (15).

Rincon loam, 9 to 15 percent slopes, eroded (RnD2).—This soil is similar to Rincon silty clay loam, 0 to 2 percent slopes, but is slightly thinner, has a loam surface layer, and is moderately eroded. It occurs throughout the survey area generally on small to medium-sized fans where slopes range from 12 to 15 percent. In some areas fine and medium-sized gravel occurs throughout the profile and makes up as much as 10 percent of the profile by volume. Available water holding capacity is about 8 inches. Runoff is medium to rapid, and the hazard of erosion is moderate to severe.

This soil is used mostly for dryland grain and pasture. Capability unit IVe–1 (15); pasture and range site 4.

Riverwash

Riverwash (Rw) consists of the coarse-textured materials—sands and gravels—that occur in the beds of the larger streams. The materials are generally covered by flowing water during the rainy season, which results in scouring and deposition. Many areas have little or no vegetation but some of the sandier, less gravelly areas are covered by grass, forbs, brush, willows, and cottonwoods. In general, these areas have little or no use for farming, though at times a few areas furnish limited grazing. A few areas on the larger streams are used for commercial production of sand and gravel. Capability unit VIIIw–4 (14).

Salinas Series

The Salinas series consists of well-drained, loamy soils that formed in alluvium derived from sandstone and shale. These nearly level to moderately sloping soils lie on flood plains and fans. The vegetation consists of annual grasses and forbs and a few scattered oaks. Elevations range from 150 to 2,000 feet above sea level. Annual rainfall is 12 to 14 inches. The average annual temperature

Terrace Escarpments

Terrace escarpments (TeF) consists of even fronts of terraces and long narrow streambanks that have slopes of 20 to 50 percent. These areas range from gravelly loam to clay loam in texture. They are generally slightly to moderately eroded but are severely eroded in some areas. Most areas are covered by annual grasses and forbs and scattered oaks, but severely eroded areas support little or no vegetation.

Included with this mapping unit are nearly vertical streambanks and small areas that have slopes of as much as 75 percent. Also included are some areas where the streambanks slough into streams.

Terrace escarpments have low to moderate fertility. Runoff is rapid to very rapid, and the hazard of erosion is severe to very severe.

This land is used for pasture. Capability unit VIe–1 (15); pasture and range site 4.

Vallecitos Series

The Vallecitos series consists of well-drained loamy soils that are underlain by metamorphosed sandstone and shale. These soils have a loamy surface layer and a clayey subsoil. They are strongly sloping to steep and lie on mountainous uplands. The vegetation consists of annual grasses and forbs and some scattered oaks, Digger pine, and brush. Elevations range from 1,000 to 3,800 feet above sea level. Annual rainfall is 14 to 20 inches. Average annual temperature is about 60° F., and the frost-free period is about 240 days. The main associated soils are the Climara, Gaviota, and Montara.

The surface layer is brown loam 6 to 10 inches thick. The subsoil is reddish-brown to yellowish-red gravelly clay 6 to 26 inches thick. The underlying bedrock is interbedded, metamorphosed sandstone and shale. Depth to bedrock ranges from 12 to 36 inches.

Vallecitos soils are used for dryland pasture and for range, watersheds, wildlife, and recreation.

Vallecitos loam, 30 to 50 percent slopes, eroded (VaF2).—This soil is steep and occurs on side slopes or in areas that have rounded ridgetops.

Representative profile: In NE¼SW¼ section 26, T. 11 S., R. 3 E., about 20 yards up the hillside north of ranch road, one-half mile north of ranch house, 2 miles past the end of Comstock Road.

A—0 to 8 inches, brown (10YR 5/3) loam, dark brown (10YR 4/3) when moist; massive; hard when dry, friable when moist, slightly sticky and slightly plastic when wet; abundant very fine roots; many, very fine, and, few, medium, tubular pores; slightly acid; clear, smooth boundary.

B21t—8 to 14 inches, reddish-brown (5YR 4/3) gravelly clay, dark reddish brown (5YR 3/3) when moist; moderate, medium, subangular blocky structure; very hard when dry, firm when moist, sticky and plastic when wet; many, very fine, interstitial pores, few, medium, tubular pores; moderately thick continuous clay films lining pores and on ped surfaces; slightly acid; clear, smooth boundary.

B22t—14 to 18 inches, yellowish-red (5YR 5/6) gravelly clay, yellowish red (5YR 4/6) when moist; moderate, medium, subangular blocky structure; very hard when dry, firm when moist, plastic and sticky when wet; many, very fine, interstitial and tubular pores; moderately thick continuous clay films lining pores and on ped surfaces; slightly acid; abrupt, broken boundary.

R—18 inches, metamorphosed, yellowish-brown (10YR 5/6) fine-grained sandstone; clay films along cleavage planes.

Included with this soil are common outcrops of metamorphosed and ultrabasic rocks and areas of Climara and Montara soils. Also included are small areas of Gaviota soils, and a few small severely eroded areas that have a clay surface layer. Generally, the soils are darker and deeper on the north-facing slopes and have more trees and brush in the cover.

This soil has low fertility. Available water holding capacity is 2 to 5 inches. Permeability is slow, runoff is rapid to very rapid, and the hazard of erosion is severe to very severe. The root zone is shallow to moderately deep.

This soil is used for range and for watersheds, wildlife, and recreation. Capability unit VIIe–1 (15); pasture and range site 6.

Vallecitos loam, 9 to 15 percent slopes (VaD).—This soil is similar to Vallecitos loam, 30 to 50 percent slopes, eroded, but it has a thicker profile, is less sloping, and is only slightly eroded. It occurs on toe slopes in areas of steeper soils. Slopes dominantly range from 12 to 15 percent. The surface layer ranges in color from brown to dark brown. The subsoil ranges from reddish brown to yellowish brown. Included with this soil are a few small areas of Climara and Gaviota soils and areas that have a dark-brown surface layer.

This soil has low fertility. Available water holding capacity is about 3 to 5 inches. Runoff is medium, and the hazard of erosion is moderate.

This soil is used for dryland pasture. Capability unit IVe–1 (15); pasture and range site 6.

Vallecitos loam, 15 to 30 percent slopes (VaE).—This soil is similar to Vallecitos loam, 30 to 50 percent slopes, eroded, but it is less steep. It occurs on rounded hills or on rounded ridgetops in areas of steeper soils. Slopes dominantly range from 20 to 30 percent. Included with this soil are rock outcrops and moderately eroded areas.

On this soil runoff is medium to rapid, and the hazard of erosion is moderate to severe.

This soil is used mostly for dryland pasture, but a few areas are used for dryland grain. Capability unit VIe–1 (15); pasture and range site 6.

Vallecitos loam, 30 to 50 percent slopes (VaF).—This soil is similar to Vallecitos loam, 30 to 50 percent slopes, eroded, but it has a slightly thicker profile. It occurs in large areas in the uplands on somewhat rounded ridgetops.

Included with this soil are small to medium areas of Climara and Montara soils that formed on ultrabasic intrusions. Also included are some small Landslides, small severely eroded areas, soils that have slopes up to 60 percent, and some rock outcrops. Other included areas have a clay loam surface layer.

This soil has low to moderate fertility. Runoff is rapid, and the hazard of erosion is severe. The root zone is shallow to moderately deep.

This soil is used for dryland pasture and for watersheds, wildlife, and recreation. Capability unit VIe–1 (15); pasture and range site 6.

Vallecitos rocky loam, 9 to 30 percent slopes, eroded (VrE2).—This soil is similiar to Vallecitos loam, 30 to 50 percent slopes, eroded, but it is rocky and somewhat less steep. It occurs on low rounded hills or on ridgetops. Outcrops of rock cover from 2 to 10 percent of the surface. Erosion is slight to moderate and occurs mostly around the rock outcrops. The average slope is about 20 percent.

Included with this soil are some small areas of Climara and Montara soils on intrusions of ultrabasic rock. Also included are small areas of soils that have a clay, clay loam, or gravelly surface layer.

This soil has low fertility. Available water holding capacity is about 3 inches. Runoff is medium to rapid, and the hazard of erosion is moderate to severe.

This soil is used for dryland pasture and for watersheds, wildlife, and recreation. Capability unit VIs–5 (15) ; pasture and range site 6.

Vallecitos rocky loam, 30 to 50 percent slopes, eroded (VrF2).—This soil is similar to Vallecitos loam, 30 to 50 percent slopes, eroded, but it has a thinner profile. It is moderately eroded and occurs on narrow, somewhat angular to rounded, winding ridgetops and on mountainous areas. Slopes dominantly range from 45 to 50 percent. In places this soil is gravelly. Rock outcrops cover 2 to 10 percent of the surface.

Included with this soil are small to medium areas of Montara and Climara soils that formed on ultrabasic intrusions. Also included are soils that have slopes as steep as 60 percent, soils that have a loam or clay surface layer, small Landslides, small severely eroded areas, and small to medium areas of thin soils.

This soil has low fertility. Available water holding capacity is 1 to 3 inches. The root zone is shallow to moderately deep. Runoff is rapid to very rapid, and the hazard of erosion is severe to very severe.

This soil is used for range and for wildlife, watersheds, and recreation. Capability unit VIIs–1 (15) ; pasture and range site 6.

Willows Series

The Willows series consists of poorly drained, generally clayey, nearly level soils that formed on flood plains in alluvium derived from sandstone and shale. The vegetation is annual grasses and salt-tolerant plants. Elevations are less than 400 feet above sea level, and annual rainfall is less than 14 inches. The average annual temperature is about 60° F., and the frost-free period is about 260 days. The main associated soils are the Clear Lake, Cropley, and Sorrento.

Typically the surface layer is grayish-brown clay that ranges from 24 to 33 inches in thickness. The next layer is yellowish-brown clay that is mottled in the lower part and extends to a depth of about 84 inches.

These soils are slightly saline-alkali in most places, but some areas are moderately to severely saline-alkali.

Willows soils are used for irrigated sugar beets and for dryland grain and pasture.

Willows clay (0 to 2 percent slopes) (Wc).—This soil occurs in the basin of the Bolsa-Soap Lake area and on the floor of a few larger upland valleys. The soil is slightly saline-alkali.

Representative profile: On Turner Ranch, 60 yards north of Bolsa Road and one-quarter mile west of Shore Road intersection; in a field of barley along fence.

Ap—0 to 12 inches, grayish-brown (2.5Y 5/2) clay, very dark grayish brown (2.5Y 3/2) when moist; moderate, fine, granular structure; very hard when dry, very firm when moist, very sticky and very plastic when wet; abundant, very fine and fine roots; common, very fine and fine, interstitial pores; mildly alkaline; clear, smooth boundary.

A11—12 to 19 inches, grayish-brown (2.5Y 5/2) clay, very dark grayish brown (2.5Y 3/2) when moist; strong, very fine, angular blocky structure; very hard when dry, very firm when moist, very sticky and very plastic when wet; few very fine and fine roots; few, very fine and fine, interstitial pores; moderately alkaline; gradual, smooth boundary.

A12—19 to 33 inches, grayish-brown (2.5Y 5/2) clay, very dark grayish brown (2.5Y 3/2) when moist; strong, fine, angular blocky structure; very hard when dry, very firm when moist, very sticky and very plastic when wet; common, very fine and fine, tubular pores; common fine and medium slickensides; moderately alkaline; gradual, smooth boundary.

C1—33 to 57 inches, light yellowish-brown (2.5Y 6/4) clay, olive brown (2.5Y 4/4) when moist; moderate, medium, subangular blocky structure; very hard when dry, very firm when moist, very sticky and very plastic when wet; common, very fine and fine, tubular pores; pale-yellow horizontal layers (2 to 3 inches thick) of lime in soft masses; few coatings of material from the A horizon on surfaces of peds and in pores; moderately alkaline; gradual, smooth boundary.

C2g—57 to 84 inches, light yellowish-brown (2.5Y 6/4) clay, olive brown (2.5Y 4/4) when moist; weak, medium, subangular blocky structure; very hard when dry, very firm when moist, sticky and plastic when wet; common, very fine, fine and medium, tubular pores; mottled with gray on ped and pore surfaces; common soft masses and hard nodules of pale-yellow lime; salt crystals in large pores; moderately alkaline, slightly effervescent; gradual, smooth boundary.

In some places the C horizon overlies the surface of a buried soil.

Included in mapping were small areas of Pacheco and Clear Lake soils and areas in which there are buried soils high in organic-matter content.

This soil has low fertility. Available water holding capacity is 7 to 9 inches. Permeability is very slow, runoff is very slow to ponded, and there is no erosion hazard. Plant roots penetrate deeply except where the water table is moderately high.

This soil is used for irrigated sugar beets and dryland grain and incidental pasture. Capability units IIIw–5 (14) and IIIw–5 (15).

Willows clay, saline-alkali (0 to 2 percent slopes) (Wk).—This soil is similar to Willows clay but is moderately to severely affected by salts and alkali. The surface layer is fluffy in most places and ranges from silty clay to clay in texture. Salts and alkali increase with increasing depth. In some places this soil is in small areas surrounded by large areas of other soils. Fertility of the soil is very low.

This soil is used for dryland pasture, but it can be cultivated with the larger areas of surrounding soils. Capability unit IVw–6 (14) ; pasture and range site 11.

Willows sandy loam (0 to 2 percent slopes) (Ws).—This soil is similar to Willows clay, but its surface layer

is 8 to 10 inches of overwash. The overwash ranges from loam to sandy loam in texture but is grayish-brown sandy loam in most places. All of this soil is along medium-sized drainageways. Areas in the Bolsa area have an uneven surface that seems to be a few feet above the surrounding landscape. This soil is slightly saline-alkali. Available water holding capacity is 6 to 8 inches.

Included with this soil in mapping were small areas of Clear Lake soils. In one area of the soil southward from the San Juan-Hollister Road, texture and depth to clay are quite variable and there are minor inclusions of other soils.

Willows sandy loam is used for irrigated sugar beets and for dryland grain and incidental pasture. Capability unit IIIw–5 (14).

Willows soils, eroded (0 to 2 percent slopes) (Ww2).—These soils occur in the Bolsa area on low flats that generally do not have well-defined drainage channels. These soils are moderately affected by salts and alkali in most places, but strongly affected in spots and small areas. Erosion, caused by water running in from surrounding areas, ranges from slight to severe but is moderate to severe in most places. Texture varies from place to place. It is clay in slightly eroded areas, silty clay loam in moderately eroded areas, and clay loam to sandy loam in severely eroded areas. The slightly eroded to moderately eroded areas are characterized by small elongated potholes that have vertical walls and are generally 1 to 2 feet deep. In many places the surface layer of these soils has weak prismatic structure. In severely eroded areas, these soils are rough and gullied and have many small moderately eroded areas rising a foot or more above the general surface. Soil blowing occurs in spots and small areas where the concentration of alkali is severe.

These soils are used for dryland pasture. Capability unit IVw–6 (14); pasture and range site 11.

Yolo Series

The Yolo series consists of well-drained loamy soils that formed in alluvium derived from sandstone and shale. These soils are nearly level to moderately sloping and occupy flood plains and fans. The vegetation consists of annual grasses and forbs and scattered oaks. Elevations range from 400 to 600 feet above sea level. Annual rainfall is 12 to 18 inches. Average annual temperature is about 60° F., and the frost-free period is about 260 days. The main associated soils are the Botella, Gazos, Pleasanton, and Sorrento.

The surface layer is brown to grayish-brown loam and gravelly loam that ranges from 12 to 24 inches in thickness and from medium acid to neutral in reaction. The next layer is pale-brown loam 28 to 40 inches thick. Below this is pale-brown gravelly loam.

Yolo soils are used for dryland grain and incidental pasture.

Yolo loam, 2 to 9 percent slopes (YoC).—This soil occurs on fans, sloping valley floors, and flood plains. Slopes are dominantly between 3 to 6 percent.

Representative profile: On McCreary Ranch in bottom field, one-half mile east of ranchhouse.

Ap—0 to 8 inches, brown (10YR 5/3) loam, dark brown (10YR 3/3) when moist; moderate, fine, granular structure; hard when dry, very friable when moist, slightly sticky and slightly plastic when wet; abundant very fine and fine roots; common, very fine and fine, interstitial pores; some fine gravel; medium acid; clear, smooth boundary.

A1—8 to 20 inches, grayish-brown (10YR 5/2) loam, very dark brown (10YR 3/2) when moist; weak, coarse, subangular blocky structure; hard when dry, very friable when moist, slightly sticky and slightly plastic when wet; abundant very fine and fine roots; few, very fine and fine, tubular pores, common, fine and medium, interstitial pores; some fine gravel; slightly acid; gradual, smooth boundary.

C1—20 to 48 inches, pale-brown (10YR 6/3) loam, brown (10YR 4/3) when moist; weak, medium, subangular blocky structure; hard when dry, very friable when moist, slightly sticky and slightly plastic when wet; plentiful very fine and fine roots; common, very fine and fine, tubular pores; some fine gravel; neutral; gradual, smooth boundary.

IIC2—48 to 60 inches, pale-brown (10YR 6/3) gravelly loam, brown (10YR 4/3) when moist; weak, medium, subangular blocky structure; hard when dry, very friable when moist, slightly sticky and slightly plastic when wet; few very fine and fine roots; common, very fine, tubular pores; mildly alkaline; gradual, smooth boundary.

Included with this soil are some small areas of Botella, Cropley, Pleasanton, and Sorrento soils.

This soil is moderately fertile. Available water holding capacity is 9 to 11 inches. Permeability is moderate, runoff is slow to medium, and the hazard of erosion is slight to moderate. The root zone is very deep.

This soil is used for dryland grain and incidental pasture. Capability unit IIIe–1 (15).

Yolo loam, 0 to 2 percent slopes (YoA).—This soil is similar to Yolo loam, 2 to 9 percent slopes, but it is less sloping. It occurs along the larger drainageways and is subject to occasional flooding in some places. The substratum is stratified and is gravelly or has strata of gravel. Runoff is very slow, and the hazard of erosion is slight to none.

Included with this soil are Botella and Cropley soils and soils that have a sandy loam to light clay loam surface layer.

This soil is used for dryland grain and incidental pasture. Capability unit IIIc–1 (15).

Yolo gravelly loam, 0 to 5 percent slopes (YvB).—This soil is similar to Yolo loam, 2 to 9 percent slopes, but it is less sloping and is gravelly throughout the profile. The surface layer contains 15 percent or more angular gravel, and the substratum is very gravelly and stratified. In some places gullies have been cut by water from the adjacent hills.

Included with this soil are soils on a few toe slopes that have gradients of as much as 5 percent.

Available water holding capacity is about 6 to 8 inches. Permeability is moderately rapid, runoff is very slow to slow, and the hazard of erosion is slight to none.

This soil is used for dryland grain and incidental pasture. Capability unit IIIe–1 (15).

Use and Management of the Soils

The soils in San Benito County are used mainly for range and improved pasture and for growing field crops and irrigated tree fruits, nuts, grapes, and vegetables.

Appendix C. USACE Arid West Wetland Determination Data Forms

WETLAND DETERMINATION DATA FORM – Arid West Region

Project Site: South County Right of Way City/County: San Benito Sampling Date: 3/11/14 and 5/1/14
Applicant/Owner: Santa Clara Valley Water District State: CA Sampling Point: 2a
Investigator(s): M. Goklany & C. Gurney Section/Township/Range: T10S,R6E,sec24
Landform (hillslope, terrace, etc.): Upper terrace Local Relief (concave, convex, none): concave Slope (%): 2
Subregion (LRR): C Lat: 37.04305 Long: -121.27319 Datum: WGS 84
Soil Map Unit Name: VaG2 NWI classification R3UBH
Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No x (If no, explain in Remarks.)
Are Vegetation ____ Soil ____ or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes x No ____
Are Vegetation ____ Soil x or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

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

Hydrophytic Vegetation Present? Yes x No ____
Hydric Soil Present? Yes ____ No x
Wetland Hydrology Present? Yes x No ____
Is the Sampled Area within a Wetland? Yes x No ____

Remarks:
Pacheco Conduit #2. Clear, dry weather conditions on 3/11/14. The site was revisited on 5/1/14 to identify plants that did not initially have vegetative/reproductive structures. Seasonal wetland is in outside the active (5-10 year) floodplain of Pacheco Creek, but would likely receive flows in larger events. The wetland is in a concave depression and appears to be seep-fed. Soil is likely recently deposited and has not had time to develop redox features. Drought has resulted in drier than normal conditions. The area has received 23% of normal annual rainfall during the current growing season. Approximately 2.45" of precipitation fell during the week prior to wetland delineation survey.

VEGETATION

Tree Stratum (Plot size: 30' radius)	Absolute Cover %	Dominant Species?	Indicator Status
1. *Platanus racemosa*	10	Y	FAC
2.			
3.			
4.			
Total Cover:	10		
Sapling/Shrub Stratum (Plot size: 30' radius)			
1. *Baccharis salicifolia*	10	Y	FAC
2.			
3.			
4.			
5.			
Total Cover:	10		
Herb Stratum (Plot size: 5' x 5')			
1. *Bromus hordeaceus*	5	N	FACU
2. *Artemisia douglasiana*	3	N	FAC
3. *Eleocharis macrostachya (E. palustris)*	5	N	OBL
4. *Polypogon monspeliensis*	10	N	FACW
5. *Juncus xiphioides*	T	N	OBL
6. *Phyla nodiflora*	7	N	FACW
7. *Lotus corniculatus*	45	Y	FAC
8. *Juncus bufonius*	7	N	FACW
Total Cover:	82		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
Total Cover:			

% Bare Ground in Herb Stratum 0 % Cover of Biotic Crust 0

Dominance Test worksheet:
Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)
Total Number of Dominant Species Across All Strata: 3 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

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

Prevalence Index = B/A = ____

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

[1] Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? Yes x No ____

Remarks:
Herbs: 0.5 x 82 = 41, 0.2 x 20 = 16.4, FAC-neutral test 0:0

SOIL

Sampling Point: 2a

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

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-6	10YR 3/2	100					loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

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

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

Indicators for Problematic Hydric Soils[3]:

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

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (If present):

Type: cobble

Depth (inches): 6

Hydric Soil Present? Yes ___ No x

Remarks:
Soil is saturated. Cobble layer prohibited sampling at a depth greater than 6". No hydric indicators observed. The sampling location is in the active floodplain of a riverine system and deposition/erosion is common during storm events.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required: check all that apply)

- x Surface Water (A1)
- ___ High Water Table (A2)
- x Saturation (A3)
- ___ Water Marks (B1) **(Nonriverine)**
- ___ Sediment Deposits (B2) **(Nonriverine)**
- ___ Drift Deposits (B3) **(Nonriverine)**
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Plowed Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) **(Riverine)**
- ___ Sediment Deposits (B2) **(Riverine)**
- ___ Drift Deposits (B3) (Riverine)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes x No ___ Depth (inches): 2

Water Table Present? Yes ___ No x Depth (inches): ___

Saturation Present? (includes capillary fringe) Yes x No ___ Depth (inches): 6

Wetland Hydrology Present? Yes x No ___

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

Remarks:
Surface water covers 10% of the wetland.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project Site: South County Right of Way City/County: San Benito Sampling Date: 3/11/14 and 5/1/14
Applicant/Owner: Santa Clara Valley Water District State: CA Sampling Point: 2b
Investigator(s): M. Goklany & C. Gurney Section/Township/Range: T10S,R6E,sec24
Landform (hillslope, terrace, etc.): toe of slope / upper terrace Local Relief (concave, convex, none): convex Slope (%): 2-5
Subregion (LRR): C Lat: 37.04305 Long: -121.27325 Datum: WGS 84
Soil Map Unit Name: VaG2 NWI classification R3UBH
Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No x (If no, explain in Remarks.)
Are Vegetation ___ Soil ___ or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes x No ____
Are Vegetation ___ Soil ___ or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

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

Hydrophytic Vegetation Present? Yes ____ No x
Hydric Soil Present? Yes ____ No x
Wetland Hydrology Present? Yes ____ No x
Is the Sampled Area within a Wetland? Yes ____ No x

Remarks:
Pacheco Conduit #2. Clear, dry weather conditions on 3/11/14. The site was revisited on 5/1/14 to identify plants that did not initially have vegetative/reproductive structures. Sampling location is outside the active floodplain of Pacheco Creek. Habitat is sycamore alluvial woodland.
Drought has resulted in drier than normal conditions. The area has received 23% of normal annual rainfall during the current growing season. Approximately 2.45" of precipitation fell during the week prior to wetland delineation survey.

VEGETATION

Tree Stratum (Plot size: 30' radius)	Absolute Cover %	Dominant Species?	Indicator Status
1. *Platanus racemosa*	10	Y	FAC
2.			
3.			
4.			
Total Cover:	10		
Sapling/Shrub Stratum (Plot size: 30' radius)			
1. *Baccharis pilularis*	10	Y	UPL
2.			
3.			
4.			
5.			
Total Cover:	10		
Herb Stratum (Plot size: 5' x 5')			
1. *Bromus hordeaceus*	15	N	FACU
2. *Bromus diandrus*	25	Y	UPL
3. *Bromus madritensis*	15	N	UPL
4. *Grindelia camporum*	3	N	FACU
5. *Artemisia douglasiana*	5	N	FAC
6. *Centaurea solstitialis*	40	Y	UPL
7. *Erodium cicutarium*	3	N	UPL
8.			
Total Cover:	106		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
Total Cover:			

% Bare Ground in Herb Stratum 0 % Cover of Biotic Crust 0

Dominance Test worksheet:
Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)
Total Number of Dominant Species Across All Strata: 4 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 25 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species	15	x 3 =	45
FACU species	18	x 4 =	72
UPL Species	93	x 5 =	465
Column totals	126 (A)		582 (B)

Prevalence Index = B/A = 4.6

Hydrophytic Vegetation Indicators:
___ Dominance Test is >50%
___ Prevalence Index is ≤3.0[1]
___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
___ Problematic Hydrophytic Vegetation[1] (Explain)
[1] Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? Yes ____ No x

Remarks:
Herbs: 0.5 x 106= 53, 0.2 x 20 = 16.4, FAC-neutral test 0:0

SOIL

Sampling Point: 2b

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

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-6	10YR 3/2	100					loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

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

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

Indicators for Problematic Hydric Soils[3]:

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

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (If present):

Type: cobble

Depth (inches): 6

Hydric Soil Present? Yes ____ No x

Remarks:
Soil is saturated. Cobble layer prohibited sampling at a depth greater than 6". No hydric indicators observed. The sampling location is in the active floodplain of a riverine system and deposition/erosion is common during storm events.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required: check all that apply)

- x Surface Water (A1)
- ___ High Water Table (A2)
- x Saturation (A3)
- ___ Water Marks (B1) **(Nonriverine)**
- ___ Sediment Deposits (B2) **(Nonriverine)**
- ___ Drift Deposits (B3) **(Nonriverine)**
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Plowed Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) **(Riverine)**
- ___ Sediment Deposits (B2) **(Riverine)**
- ___ Drift Deposits (B3) (Riverine)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes x	No ____	Depth (inches): ____
Water Table Present?	Yes ____	No x	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes x	No ____	Depth (inches): ____

Wetland Hydrology Present? Yes x No ____

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

Remarks:
Surface water is 2" deep and covers 10% of the seasonal wetland.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project Site: South County Right of Way City/County: Santa Clara Sampling Date: 3/6/14 and 4/29/14
Applicant/Owner: Santa Clara Valley Water District State: CA Sampling Point: 11a
Investigator(s): M. Goklany & C. Gurney Section/Township/Range: T11S,R5E,sec16
Landform (hillslope, terrace, etc.): valley Local Relief (concave, convex, none): slightly concave Slope (%): 0-2
Subregion (LRR): C Lat: 36.96869 Long: -121.43165 Datum: WGS 84
Soil Map Unit Name: Pa NWI classification none
Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No x (If no, explain in Remarks.)
Are Vegetation ___ Soil x or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes x No ____
Are Vegetation ___ Soil ____ or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

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

Hydrophytic Vegetation Present? Yes ____ No x
Hydric Soil Present? Yes ____ No x
Wetland Hydrology Present? Yes ____ No x
Is the Sampled Area within a Wetland? Yes ____ No x

Remarks:
Santa Clara Conduit #11. Clear, dry weather conditions on 3/6/14. The site was revisited on 4/29/14 to identify plants that did not initially have vegetative/reproductive structures. Fill soil has likely been placed in various locations around the vault to the pipeline.
Drought has resulted in drier than normal conditions. The area has received 23% of normal annual rainfall during the current growing season. Approximately 2.45" of precipitation fell during the week prior to wetland delineation survey.

VEGETATION

Tree Stratum (Plot size: 30' radius)	Absolute Cover %	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
Total Cover:	0		
Sapling/Shrub Stratum (Plot size: 30' radius)			
1.			
2.			
3.			
4.			
5.			
Total Cover:	0		
Herb Stratum (Plot size: 5' x 5')			
1. *Chenopodium album*	25	Y	FACU
2. *Malva nicaeensis*	5	N	UPL
3. *Bromus diandrus*	10	Y	UPL
4. *Hordeum murinum*	7	N	FACU
5. *Melilotus indicus*	15	Y	FACU
6. *Dittrichia graveolens*	2	N	UPL
7.			
8.			
Total Cover:	64		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
Total Cover:			

% Bare Ground in Herb Stratum 36 % Cover of Biotic Crust 0

Dominance Test worksheet:
Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)
Total Number of Dominant Species Across All Strata: 3 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 3 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species		x 3 =	
FACU species	47	x 4 =	188
UPL Species	17	x 5 =	85
Column totals	64 (A)		273 (B)

Prevalence Index = B/A = 4.3

Hydrophytic Vegetation Indicators:
___ Dominance Test is >50%
___ Prevalence Index is ≤3.0[1]
___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
___ Problematic Hydrophytic Vegetation[1] (Explain)
[1] Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? Yes ____ No x

Remarks:
0.5 x 64 = 32, 0.2 x 64 = 12.8, FAC-neutral test: 0:0

SOIL

Sampling Point: 11a

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

Depth	Matrix		Redox Features				Texture	Remarks
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]		
0-13	10YR 3/1	40	7.5YR 5/8	1	C	M	loam	
	10YR 3/2	60						

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains

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

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

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

Indicators for Problematic Hydric Soils[3]:

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

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (If present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes _____ No x

Remarks:

No hydric indicators.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required: check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) **(Nonriverine)**
- ___ Sediment Deposits (B2) **(Nonriverine)**
- ___ Drift Deposits (B3) **(Nonriverine)**
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Plowed Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) **(Riverine)**
- ___ Sediment Deposits (B2) **(Riverine)**
- ___ Drift Deposits (B3) (Riverine)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- x FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes _____ No x Depth (inches): _____

Water Table Present? Yes _____ No x Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No x Depth (inches): _____

Wetland Hydrology Present? Yes _____ No x

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

Remarks:

No hydrology indicators.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project Site: South County Right of Way City/County: Santa Clara Sampling Date: 3/6/14 and 4/29/14
Applicant/Owner: Santa Clara Valley Water District State: CA Sampling Point: 11b
Investigator(s): M. Goklany & C. Gurney Section/Township/Range: T11S,R5E,sec16
Landform (hillslope, terrace, etc.): valley / shallow depression Local Relief (concave, convex, none): concave Slope (%): 0-2
Subregion (LRR): C Lat: 36.96876 Long: -121.43240 Datum: WGS 84
Soil Map Unit Name: Pa NWI classification none
Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No x (If no, explain in Remarks.)
Are Vegetation ___ Soil x or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes x No ____
Are Vegetation ___ Soil ___ or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

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

Hydrophytic Vegetation Present? Yes x No ____
Hydric Soil Present? Yes x No ____
Wetland Hydrology Present? Yes x No ____
Is the Sampled Area within a Wetland? Yes x No ____

Remarks:

Santa Clara Conduit #11. Clear, dry weather conditions on 3/6/14. The site was revisited on 4/29/14 to identify plants that did not initially have vegetative/reproductive structures. Fill soil has likely been placed in various locations around the vault to the pipeline, and the surrounding area may have been disked in 2012 (based on aerial imagery).

Drought has resulted in drier than normal conditions. The area has received 23% of normal annual rainfall during the current growing season. Approximately 2.45" of precipitation fell during the week prior to wetland delineation survey.

VEGETATION

Tree Stratum (Plot size: 30' radius)	Absolute Cover %	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
Total Cover:	0		
Sapling/Shrub Stratum (Plot size: 30' radius)			
1.			
2.			
3.			
4.			
5.			
Total Cover:	0		
Herb Stratum (Plot size: 5' x 5')			
1. *Salicornia* sp.	60	Y	OBL
2. *Hordeum marinum*	15	N	FAC
3. *Plantago coronopus*	5	N	FACW
4. *Rumex crispus*	5	N	FAC
5. *Chenopodium album*	5	N	FACU
6.			
7.			
8.			
Total Cover:	90		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
Total Cover:			

% Bare Ground in Herb Stratum 10 % Cover of Biotic Crust 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)
Total Number of Dominant Species Across All Strata: 1 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

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

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:

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

[1] Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? Yes x No ____

Remarks:

0.5 x 90 = 45, 0.2 x 90 = 18, FAC-neutral test: 1:1

Salicornia depressa, *S. pacifica* (syn. *Sarcocornia pacifica*), and *S. rubra* are present in Santa Clara county. All are OBL species.

SOIL

Sampling Point: 11b

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

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-12	10YR 3/1	98	5YR 5/8	2	C	M, PL	clay loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

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

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

Indicators for Problematic Hydric Soils[3]:

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

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (If present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes x No ___

Remarks:

Prominent redox concentrations in matrix and along pore linings in upper 12" of profile. Soil was very slightly moist throughout.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required: check all that apply)				Secondary Indicators (2 or more required)	
___	Surface Water (A1)	___	Salt Crust (B11)	___	Water Marks (B1) **(Riverine)**
___	High Water Table (A2)	___	Biotic Crust (B12)	___	Sediment Deposits (B2) **(Riverine)**
___	Saturation (A3)	___	Aquatic Invertebrates (B13)	___	Drift Deposits (B3) (Riverine)
___	Water Marks (B1) **(Nonriverine)**	___	Hydrogen Sulfide Odor (C1)	___	Drainage Patterns (B10)
___	Sediment Deposits (B2) **(Nonriverine)**	___	Oxidized Rhizospheres along Living Roots (C3)	___	Dry-Season Water Table (C2)
___	Drift Deposits (B3) **(Nonriverine)**	___	Presence of Reduced Iron (C4)	___	Crayfish Burrows (C8)
___	Surface Soil Cracks (B6)	___	Recent Iron Reduction in Plowed Soils (C6)	x	Saturation Visible on Aerial Imagery (C9)
___	Inundation Visible on Aerial Imagery (B7)	___	Thin Muck Surface (C7)	___	Shallow Aquitard (D3)
___	Water-stained Leaves (B9)		Other (Explain in Remarks)	x	FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ___ No x Depth (inches): ___

Water Table Present? Yes ___ No x Depth (inches): ___

Saturation Present? Yes ___ No x Depth (inches): ___

(includes capillary fringe)

Wetland Hydrology Present? Yes x No ___

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

Remarks:

Saturation on aerial imagery from 10/6/2007, 9/29/2009, and 9/11/2011. Aerial imagery from 5/5/2012 shows that the sampling location was likely disked.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project Site: South County Right of Way City/County: Santa Clara Sampling Date: 3/19/14
Applicant/Owner: Santa Clara Valley Water District State: CA Sampling Point: 12
Investigator(s): M. Goklany & C. Gurney Section/Township/Range: T11S,R5E,sec17
Landform (hillslope, terrace, etc.): valley Local Relief (concave, convex, none): concave Slope (%): 0
Subregion (LRR): C Lat: 36.97068 Long: -121.44125 Datum: WGS 84
Soil Map Unit Name: Pd NWI classification none
Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No x (If no, explain in Remarks.)
Are Vegetation ____ Soil ____ or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes x No ____
Are Vegetation ____ Soil ____ or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

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

Hydrophytic Vegetation Present? Yes x No ____
Hydric Soil Present? Yes x No ____
Wetland Hydrology Present? Yes x No ____
Is the Sampled Area within a Wetland? Yes x No ____

Remarks:

Santa Clara Conduit #12. Clear, dry weather conditions. Vegetative / reproductive structures needed for plant identification to species were absent. The area was not revisisted due to access issues. Regardless, hydrophytic plant species dominated the area, and hydric soil and hydrology indicators allowed us to determine that the area is a perennial marsh. Perennial marsh surrounding vault is inundated up to an upland mound / 5' high berm. The berm extends to the south along the edge of an agricultural field. Cattle and feral pigs were observed in the wetland.

Drought has resulted in drier than normal conditions. The area has received 23% of normal annual rainfall during the current growing season. Approximately 2.45" of precipitation fell 2 weeks prior to wetland delineation survey.

VEGETATION

Tree Stratum (Plot size: 30' radius)	Absolute Cover %	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
Total Cover:			
Sapling/Shrub Stratum (Plot size: 30' radius)			
1.			
2.			
3.			
4.			
5.			
Total Cover:			
Herb Stratum (Plot size: 5' x 5')			
1. *Typha* sp.	35	Y	OBL
2. *Persicaria* sp.	12	Y	FACW
3. *Trifolium* sp.	3	N	-
4. *Juncus mexicanus*	T	N	FACW
5.			
6.			
7.			
8.			
Total Cover:	65		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
Total Cover:			

% Bare Ground in Herb Stratum ____ % Cover of Biotic Crust 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

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

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:

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

[1] Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? Yes x No ____

Remarks:

0.5 x 65 = 32.5, 0.2 x 65 = 13, FAC-neutral test: 2:2 *Persicaria* sp. and *Trifolium* sp. did not have vegetative/reproductive structures during the 3/19/14 site visit. This location was not revisited due to access issues. *Persicaria amphibia, P. hydropiper, P. lapathifolia, P. maculosa, P. punctata* are present in Santa Clara county. All are FACW or OBL species. Unknown grasses are also present within the wetland area

SOIL

Sampling Point: 12

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

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-1	2.5Y 3/1	100					clay	organic soil material
1-13	10YR 4/2	50	7.5YR 4/6	7	C	M	clay	
	10YR 3/1	43						

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

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

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

Indicators for Problematic Hydric Soils[3]:

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

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (If present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** x **No** ___

Remarks:

Top 1" has very greasy feel when rubbed . Soil is saturated throughout. Prominent redix concentrations throughout soil profile below 1".

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required: check all that apply)

				Secondary Indicators (2 or more required)	
x	Surface Water (A1)	___	Salt Crust (B11)	___	Water Marks (B1) **(Riverine)**
x	High Water Table (A2)	___	Biotic Crust (B12)	___	Sediment Deposits (B2) **(Riverine)**
x	Saturation (A3)	___	Aquatic Invertebrates (B13)	___	Drift Deposits (B3) (Riverine)
___	Water Marks (B1) **(Nonriverine)**	x	Hydrogen Sulfide Odor (C1)	___	Drainage Patterns (B10)
___	Sediment Deposits (B2) **(Nonriverine)**	___	Oxidized Rhizospheres along Living Roots (C3)	___	Dry-Season Water Table (C2)
___	Drift Deposits (B3) **(Nonriverine)**	___	Presence of Reduced Iron (C4)	___	Crayfish Burrows (C8)
___	Surface Soil Cracks (B6)	___	Recent Iron Reduction in Plowed Soils (C6)	___	Saturation Visible on Aerial Imagery (C9)
___	Inundation Visible on Aerial Imagery (B7)	___	Thin Muck Surface (C7)	___	Shallow Aquitard (D3)
___	Water-stained Leaves (B9)		Other (Explain in Remarks)	___	FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes x	No ___	Depth (inches): 4-12
Water Table Present?	Yes x	No ___	Depth (inches): 2
Saturation Present? (includes capillary fringe)	Yes x	No ___	Depth (inches): 0-13

Wetland Hydrology Present? **Yes** x **No** ___

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

Remarks:

Hydrology is indicative of a perennial marsh wetland. Surface water covers approximately 60% of the sampling location.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project Site: South County Right of Way City/County: San Benito Sampling Date: 3/6/14
Applicant/Owner: Santa Clara Valley Water District State: CA Sampling Point: 18
Investigator(s): M. Goklany & C. Gurney Section/Township/Range: T11S,R4E,sec13
Landform (hillslope, terrace, etc.): floodplain Local Relief (concave, convex, none): convex Slope (%): 0-1
Subregion (LRR): C Lat: 36.97918 Long: -121.48210 Datum: WGS 84
Soil Map Unit Name: Wc NWI classification none
Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No x (If no, explain in Remarks.)
Are Vegetation x Soil ____ or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes x No ____
Are Vegetation ____ Soil ____ or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

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

Hydrophytic Vegetation Present? Yes ____ No x
Hydric Soil Present? Yes ____ No x
Wetland Hydrology Present? Yes ____ No x
Is the Sampled Area within a Wetland? Yes ____ No x

Remarks:
Santa Clara Conduit #18. Clear, dry weather conditions. Active floodplain of the Pajaro River. Sampling location adjacent is above top of bank near mound surrounding vault in agricultural field (vegetation has been disturbed by farming practices). Section of river has likely been straightened. NWI classifies channel as PUBHx.
Drought has resulted in drier than normal conditions. The area has received 23% of normal annual rainfall during the current growing season. Approximately 2.45" of precipitation fell during the week prior to wetland delineation survey.

VEGETATION

Tree Stratum (Plot size: 30' radius)	Absolute Cover %	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
Total Cover:	0		
Sapling/Shrub Stratum (Plot size: 30' radius)			
1.			
2.			
3.			
4.			
5.			
Total Cover:	0		
Herb Stratum (Plot size: 5' x 5')			
1. *Avena* sp.	50	Y	UPL
2. *Brassica nigra*	30	Y	UPL
3. *Festuca perennis* (*Lolium perenne*)	10	N	FAC
4.			
5.			
6.			
7.			
8.			
Total Cover:	90		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
Total Cover:			

% Bare Ground in Herb Stratum 10 % Cover of Biotic Crust 0

Dominance Test worksheet:
Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)
Total Number of Dominant Species Across All Strata: 2 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species	10	x 3 =	30
FACU species		x 4 =	
UPL Species	80	x 5 =	400
Column totals	90 (A)		430 (B)

Prevalence Index = B/A = 4.8

Hydrophytic Vegetation Indicators:
___ Dominance Test is >50%
___ Prevalence Index is ≤3.0[1]
___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
___ Problematic Hydrophytic Vegetation[1] (Explain)
[1] Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? Yes ____ No x

Remarks:
0.5 x 90 = 45, 0.2 x 90 = 18, FAC-neutral test: 0:0
Farming practices have altered the vegetative community at this location, and *Avena* sp. has possibly been planted for livestock feed.

SOIL

Sampling Point: 18

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

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-8	2.5Y 2.5/1	90					clay	many fine roots in top 5"
	10YR 5/6	10					clay	
8-17	2.5Y 2.5/1	70					clay	
	10YR 5/6	30					clay	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

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

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

Indicators for Problematic Hydric Soils[3]:

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

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (If present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes_____ No x

Remarks:

No hydric indicators.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required: check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) **(Nonriverine)**
- ___ Sediment Deposits (B2) **(Nonriverine)**
- ___ Drift Deposits (B3) **(Nonriverine)**
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Plowed Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) **(Riverine)**
- ___ Sediment Deposits (B2) **(Riverine)**
- ___ Drift Deposits (B3) (Riverine)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes_____ No x Depth (inches):_____

Water Table Present? Yes_____ No x Depth (inches):_____

Saturation Present? (includes capillary fringe) Yes_____ No x Depth (inches):_____

Wetland Hydrology Present? Yes_____ No x

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

Remarks:

No hydrology indicators.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project Site: South County Right of Way City/County: San Benito County Sampling Date: 3/5/14 and 5/1/14
Applicant/Owner: Santa Clara Valley Water District State: CA Sampling Point: 19b
Investigator(s): M. Goklany & C. Gurney Section/Township/Range: T11S,R4E,sec13
Landform (hillslope, terrace, etc.): flooplain Local Relief (concave, convex, none): slightly convex Slope (%): 0-2
Subregion (LRR): C Lat: 36.98072 Long: -121.48926 Datum: WGS 84
Soil Map Unit Name: Wc NWI classification none
Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No x (If no, explain in Remarks.)
Are Vegetation ___ Soil ___ or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes x No ____
Are Vegetation ___ Soil ___ or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

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

Hydrophytic Vegetation Present?	Yes ____	No x	**Is the Sampled Area within a Wetland?**	Yes ____	No x
Hydric Soil Present?	Yes ____	No x			
Wetland Hydrology Present?	Yes ____	No x			

Remarks:

Santa Clara Conduit #19. Clear, dry weather conditions on 3/5/14. The site was revisited on 4/29/14 to identify plants that did not initially have vegetative/reproductive structures. Active floodplain of the Pajaro River. NWI classifies channel as PUSCx. Upland sampling location above top of bank adjacent to mound surrounding vault.

Drought has resulted in drier than normal conditions. The area has received 23% of normal annual rainfall during the current growing season. Approximately 2.45" of precipitation fell during the week prior to wetland delineation survey.

VEGETATION

Tree Stratum (Plot size: 30' radius)	Absolute Cover %	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
Total Cover:	0		
Sapling/Shrub Stratum (Plot size: 30' radius)			
1.			
2.			
3.			
4.			
5.			
Total Cover:	0		
Herb Stratum (Plot size: 5' x 5')			
1. *Bromus diandrus*	45	Y	UPL
2. *Hordeum marinum*	35	Y	FAC
3. *Sonchus asper*	3	N	FAC
4. *Bromus hordeaceus*	10	N	FACU
5. *Carduus pycnocephalus*	3	N	UPL
6. *Geranium molle*	T	N	UPL
7. *Festuca perennis (Lolium perenne)*	15		FAC
8.			
Total Cover:	111		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
Total Cover:	0		

% Bare Ground in Herb Stratum 0 % Cover of Biotic Crust 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	____	x 1 =	____
FACW species	____	x 2 =	____
FAC species	53	x 3 =	159
FACU species	10	x 4 =	40
UPL Species	48	x 5 =	240
Column totals	111 (A)		439 (B)

Prevalence Index = B/A = 3.9

Hydrophytic Vegetation Indicators:

___ Dominance Test is >50%

___ Prevalence Index is ≤3.0[1]

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

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? Yes ____ No x

Remarks:

0.5 x 111 = 55.5, 0.2 x 111 = 22.2, FAC-neutral test = 0:1

SOIL

Sampling Point: 19b

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

Depth	Matrix		Redox Features				Texture	Remarks
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]		
0-13	2.5Y 3/1	70					clay loam	many fine roots in top 4"
	2.5Y 4/5	25						
	10YR 4/4	5						

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

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

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

Indicators for Problematic Hydric Soils[3]:

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

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (If present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** x

Remarks:

No hydric indicators. Soil was very slightly moist throughout.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required: check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) **(Nonriverine)**
- ___ Sediment Deposits (B2) **(Nonriverine)**
- ___ Drift Deposits (B3) **(Nonriverine)**
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Plowed Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) **(Riverine)**
- ___ Sediment Deposits (B2) **(Riverine)**
- ___ Drift Deposits (B3) (Riverine)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes _____ No x Depth (inches): _____

Water Table Present? Yes _____ No x Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No x Depth (inches): _____

Wetland Hydrology Present? **Yes** _____ **No** x

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

Remarks:

No hydrology indicators.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project Site: South County Right of Way City/County: Santa Clara County Sampling Date: 3/5/14
Applicant/Owner: Santa Clara Valley Water Distrct State: CA Sampling Point: 20
Investigator(s): M. Goklany & C. Gurney Section/Township/Range: T11S,R4E,sec11
Landform (hillslope, terrace, etc.): valley floor Local Relief (concave, convex, none): none Slope (%): 0-1
Subregion (LRR): C Lat: 36.98442 Long: -121.49735 Datum: WGS 84
Soil Map Unit Name: Ck NWI classification none
Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No x (If no, explain in Remarks.)
Are Vegetation x Soil ____ or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes x No ____
Are Vegetation ____ Soil ____ or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

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

Hydrophytic Vegetation Present? Yes x No ____
Hydric Soil Present? Yes ____ No x
Wetland Hydrology Present? Yes ____ No x
Is the Sampled Area within a Wetland? Yes ____ No x

Remarks:
Santa Clara Conduit #20. Clear, dry weather conditions. Sampling location in agricultural field. Natural vegetation has been replaced by *F. perennis* crop. Drought has resulted in drier than normal conditions. The area has received 23% of normal annual rainfall during the current growing season. Approximately 2.45" of precipitation fell during the week prior to wetland delineation survey.

VEGETATION

Tree Stratum (Plot size: 30' radius)	Absolute Cover %	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
Total Cover:	0		
Sapling/Shrub Stratum (Plot size: 30' radius)			
1.			
2.			
3.			
4.			
5.			
Total Cover:	0		
Herb Stratum (Plot size: 5' x 5')			
1. *Festuca perennis (Lolium perenne)*	90	Y	FAC
2.			
3.			
4.			
5.			
6.			
7.			
8.			
Total Cover:	90		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
Total Cover:			

% Bare Ground in Herb Stratum 10 % Cover of Biotic Crust 0

Dominance Test worksheet:
Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)
Total Number of Dominant Species Across All Strata: 1 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

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

Prevalence Index = B/A = ____

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

[1] Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? Yes x No ____

Remarks:
Monoculture of *F. perennis* for livestock feed.

SOIL

Sampling Point: 20

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

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-5	10YR 3/1	85					clay loam	Many fine roots in top layer
	10YR 4/4	15					clay loam	
5-15	7.5YR 4/6	5					sand	
	10YR 4/4	35					clay loam	
	10YR 3/1	60					clay loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

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

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

Indicators for Problematic Hydric Soils[3]:

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

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (If present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes _____ No x

Remarks:

No hydric indicators.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required: check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) **(Nonriverine)**
- ___ Sediment Deposits (B2) **(Nonriverine)**
- ___ Drift Deposits (B3) **(Nonriverine)**
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Plowed Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) **(Riverine)**
- ___ Sediment Deposits (B2) **(Riverine)**
- ___ Drift Deposits (B3) (Riverine)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- x Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes _____ No x Depth (inches): _____

Water Table Present? Yes _____ No x Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No x Depth (inches): _____

Wetland Hydrology Present? Yes _____ No x

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

Remarks:

No hydrology indicators.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project Site: South County Right of Way City/County: Santa Clara Sampling Date: 3/6/14 and 4/29/14
Applicant/Owner: Santa Clara Valley Water District State: CA Sampling Point: 21a
Investigator(s): M. Goklany & C. Gurney Section/Township/Range: T11S,R4E,sec11
Landform (hillslope, terrace, etc.): floodplain Local Relief (concave, convex, none): none Slope (%): 0-1
Subregion (LRR): C Lat: 36.98870 Long: -121.50096 Datum: WGS 84
Soil Map Unit Name: Ck NWI classification none
Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No x (If no, explain in Remarks.)
Are Vegetation ___ Soil ___ or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes x No ____
Are Vegetation x Soil ___ or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

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

Hydrophytic Vegetation Present? Yes x No ____
Hydric Soil Present? Yes x No ____
Wetland Hydrology Present? Yes x No ____
Is the Sampled Area within a Wetland? Yes x No ____

Remarks:
Santa Clara Conduit #21. Clear, dry weather conditions on 3/6/14. The site was revisited on 4/29/14 to identify plants that did not initially have vegetative/reproductive structures. Mound surrounding vault has been coverted to upland. The surrounding area is all seasonal wetland. Hummocks were present at this sampling location.
Drought has resulted in drier than normal conditions. The area has received 23% of normal annual rainfall during the current growing season. Approximately 2.45" of precipitation fell during the week prior to wetland delineation survey.

VEGETATION

Tree Stratum (Plot size: 30' radius)	Absolute Cover %	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
Total Cover:	0		
Sapling/Shrub Stratum (Plot size: 30' radius)			
1.			
2.			
3.			
4.			
5.			
Total Cover:	0		
Herb Stratum (Plot size: 5' x 5')			
1. *Festuca perennis (Lolium perenne)*	90	Y	FAC
2. *Trifolium repens*	25	N	FACU
3. *Rumex conglomeratus*	1	N	FACW
4. *Juncus mexicanus*	1	N	FACW
5. *Plantago lanceolata*	T	N	FAC
6. *Polypogon monspeliensis*	10	N	FACW
7.			
8.			
Total Cover:	127		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
Total Cover:			

% Bare Ground in Herb Stratum 0 % Cover of Biotic Crust 0

Dominance Test worksheet:
Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)
Total Number of Dominant Species Across All Strata: 1 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

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

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:
x Dominance Test is >50%
___ Prevalence Index is ≤3.0[1]
___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
___ Problematic Hydrophytic Vegetation[1] (Explain)
[1] Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? Yes x No ____

Remarks:
0.5 x 132 = 66, 0.2 x 132 = 26.4, FAC-neutral test: 0:0

SOIL

Sampling Point: 21a

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

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-14	10YR 3/1	98	10YR 4/6	2	C	M	clay loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

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

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

Indicators for Problematic Hydric Soils[3]:

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

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (If present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes x No ____

Remarks:

Soil is very moist. Slightly more clay in bottom 3" of profile. Prominent redox concentrations in upper 10" of profile.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required: check all that apply)				Secondary Indicators (2 or more required)	
x	Surface Water (A1)	___	Salt Crust (B11)	___	Water Marks (B1) **(Riverine)**
___	High Water Table (A2)	___	Biotic Crust (B12)	___	Sediment Deposits (B2) **(Riverine)**
___	Saturation (A3)	___	Aquatic Invertebrates (B13)	___	Drift Deposits (B3) (Riverine)
___	Water Marks (B1) **(Nonriverine)**	___	Hydrogen Sulfide Odor (C1)	___	Drainage Patterns (B10)
___	Sediment Deposits (B2) **(Nonriverine)**	___	Oxidized Rhizospheres along Living Roots (C3)	___	Dry-Season Water Table (C2)
___	Drift Deposits (B3) **(Nonriverine)**	___	Presence of Reduced Iron (C4)	___	Crayfish Burrows (C8)
___	Surface Soil Cracks (B6)	___	Recent Iron Reduction in Plowed Soils (C6)	___	Saturation Visible on Aerial Imagery (C9)
___	Inundation Visible on Aerial Imagery (B7)	___	Thin Muck Surface (C7)	___	Shallow Aquitard (D3)
___	Water-stained Leaves (B9)		Other (Explain in Remarks)	___	FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes x No ____ Depth (inches): 2

Water Table Present? Yes ____ No x Depth (inches): ____

Saturation Present? (includes capillary fringe) Yes ____ No x Depth (inches): ____

Wetland Hydrology Present? Yes x No ____

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

Remarks:

Approximately 10% of the impact area at this sampling location was covered by surface water in lower areas between hummucks.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project Site: South County Right of Way City/County: Santa Clara Sampling Date: 3/6/14 and 4/29/14
Applicant/Owner: Santa Clara Valley Water District State: CA Sampling Point: 21b
Investigator(s): M. Goklany & C. Gurney Section/Township/Range: T11S,R4E,sec11
Landform (hillslope, terrace, etc.): floodplain Local Relief (concave, convex, none): convex Slope (%): 0-2
Subregion (LRR): C Lat: 36.98872 Long: -121.50099 Datum: WGS 84
Soil Map Unit Name: Ck NWI classification none
Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No x (If no, explain in Remarks.)
Are Vegetation ___ Soil ___ or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes x No ____
Are Vegetation ___ Soil ___ or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

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

Hydrophytic Vegetation Present? Yes ____ No x
Hydric Soil Present? Yes ____ No x
Wetland Hydrology Present? Yes ____ No x
Is the Sampled Area within a Wetland? Yes ____ No x

Remarks:
Santa Clara Conduit #21. Clear, dry weather conditions on 3/6/14. The site was revisited on 4/29/14 to identify plants that did not initially have vegetative/reproductive structures. Mound surrounding vault has been coverted to upland, and the surrounding area is all seasonal wetland.
Drought has resulted in drier than normal conditions. The area has received 23% of normal annual rainfall during the current growing season. Approximately 2.45" of precipitation fell during the week prior to wetland delineation survey.

VEGETATION

Tree Stratum (Plot size: 30' radius)	Absolute Cover %	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
Total Cover:	0		
Sapling/Shrub Stratum (Plot size: 30' radius)			
1.			
2.			
3.			
4.			
5.			
Total Cover:	0		
Herb Stratum (Plot size: 5' x 5')			
1. *Hordeum murinum*	12	Y	FACU
2. *Hordeum marinum*	6	Y	FAC
3. *Malva nicaeensis*	5	N	UPL
4. *Festuca perennis (Lolium perenne)*	4	N	FAC
5. *Sonchus asper*	2	N	FAC
6. *Plantago lanceolata*	1	N	FAC
7.			
8.			
Total Cover:	30		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
Total Cover:			

% Bare Ground in Herb Stratum 68 % Cover of Biotic Crust 0

Dominance Test worksheet:
Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)
Total Number of Dominant Species Across All Strata: 2 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 50 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species	7	x 3 =	21
FACU species	18	x 4 =	72
UPL Species	5	x 5 =	25
Column totals	30 (A)		118 (B)

Prevalence Index = B/A = 3.9

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

[1] Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? Yes ____ No x

Remarks:
0.5 x 30 = 15, 0.2 x 30 = 6, FAC-neutral: 0:0

SOIL

Sampling Point: 21b

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

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-4	10YR 3/1	100					clay loam	
4-18	10YR 3/1	83					clay	
	10YR 4/6	15					silt	
	10YR 2/1	2	10YR 4/6	2	C	M	clay	redox only in bottom 6" of profile

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains

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

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

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

Indicators for Problematic Hydric Soils[3]:

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

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (If present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes_____ No__x__

Remarks:

Soil was very dry throughout. No hydric indicators.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required: check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) **(Nonriverine)**
- ___ Sediment Deposits (B2) **(Nonriverine)**
- ___ Drift Deposits (B3) **(Nonriverine)**
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Plowed Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) **(Riverine)**
- ___ Sediment Deposits (B2) **(Riverine)**
- ___ Drift Deposits (B3) (Riverine)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes_____ No__x__ Depth (inches):_____

Water Table Present? Yes_____ No__x__ Depth (inches):_____

Saturation Present? Yes_____ No__x__ Depth (inches):_____

(includes capillary fringe)

Wetland Hydrology Present? Yes_____ No__x__

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

Remarks:

No hydrology indicators.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project Site: South County Right of Way City/County: Santa Clara County Sampling Date: 3/5/14
Applicant/Owner: Santa Clara Valley Water District State: CA Sampling Point: 52a
Investigator(s): M. Goklany & C. Gurney Section/Township/Range: T9S,R3E,sec36
Landform (hillslope, terrace, etc.): floodplain Local Relief (concave, convex, none): none Slope (%): 0-1
Subregion (LRR): C Lat: 37.10411 Long: -121.58318 Datum: WGS 84
Soil Map Unit Name: CrC NWI classification none
Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No x (If no, explain in Remarks.)
Are Vegetation ____ Soil ____ or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes x No ____
Are Vegetation ____ Soil ____ or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

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

Hydrophytic Vegetation Present? Yes x No ____
Hydric Soil Present? Yes x No ____
Wetland Hydrology Present? Yes x No ____
Is the Sampled Area within a Wetland? Yes x No ____

Remarks:

Santa Clara Conduit #52. Clear, dry conditions. Sampling area in floodplain of San Martin, near Martin Murphy Trail in Coyote Lake - Harvey Bear County Park. This location is a mosaic of seasonal wetland/upland prairie, and approximately 75% of the sample area is dominated by hydrophytes, and has hydric soil and hydrology indicators.

Drought has resulted in drier than normal conditions. The area has received 23% of normal annual rainfall during the current growing season. Approximately 2.45" of precipitation fell during the week prior to wetland delineation survey.

VEGETATION

Tree Stratum (Plot size: 30' radius)	Absolute Cover %	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
Total Cover:	0		
Sapling/Shrub Stratum (Plot size: 30' radius)			
1.			
2.			
3.			
4.			
5.			
Total Cover:	0		
Herb Stratum (Plot size: 5' x 5')			
1. *Hordeum marinum*	35	Y	FAC
2. *Festuca perennis (Lolium perenne)*	35	Y	FAC
3. *Juncus xiphioides*	20	Y	OBL
4. *Polypogon monspeliensis*	10	N	FACW
5. *Rumex crispus*	1	N	FAC
6. *Geranium dissectum*	T	N	UPL
7. *Cyperus eragrostis*	T	N	FACW
8. *Helminthotheca echioides*	T	N	UPL
Total Cover:	101		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
Total Cover:			

% Bare Ground in Herb Stratum 0 % Cover of Biotic Crust 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

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

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

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

[1] Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? Yes x No ____

Remarks:

0.5 x 101 = 50.2, 0.2 x 101 = 20.2, FAC-neutral test: 0:0

Grasses and forbs were beginning to green-up. *J. xiphioides* (perennial) was mostly dead, potentially from experiencing several years of drought. Concentrations of *J. xiphioides*, *P. monspeliensis*, and *C. eragrostis* were used to determine the wetland/upland boundary.

SOIL

Sampling Point: 52a

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

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-15	10YR 4/1	95	5YR 4/6	2	C	PL	silty clay loam	
	10YR 4/2	3						

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

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

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

Indicators for Problematic Hydric Soils[3]:

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

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (If present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes x No ___

Remarks:

Prominent redox concentrations throughout soil profile along pore linings. Soil was saturated throughout profile. Two more exploratory pits were dug along the wetland/upland boundary.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required: check all that apply)				Secondary Indicators (2 or more required)	
x	Surface Water (A1)	___	Salt Crust (B11)	___	Water Marks (B1) **(Riverine)**
x	High Water Table (A2)	___	Biotic Crust (B12)	___	Sediment Deposits (B2) **(Riverine)**
x	Saturation (A3)	___	Aquatic Invertebrates (B13)	___	Drift Deposits (B3) (Riverine)
___	Water Marks (B1) **(Nonriverine)**	___	Hydrogen Sulfide Odor (C1)	___	Drainage Patterns (B10)
___	Sediment Deposits (B2) **(Nonriverine)**	___	Oxidized Rhizospheres along Living Roots (C3)	___	Dry-Season Water Table (C2)
___	Drift Deposits (B3) **(Nonriverine)**	___	Presence of Reduced Iron (C4)	___	Crayfish Burrows (C8)
___	Surface Soil Cracks (B6)	___	Recent Iron Reduction in Plowed Soils (C6)	___	Saturation Visible on Aerial Imagery (C9)
___	Inundation Visible on Aerial Imagery (B7)	___	Thin Muck Surface (C7)	___	Shallow Aquitard (D3)
___	Water-stained Leaves (B9)		Other (Explain in Remarks)	___	FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes x No ___ Depth (inches): 2

Water Table Present? Yes x No ___ Depth (inches): 6

Saturation Present? (includes capillary fringe) Yes x No ___ Depth (inches): 0-15

Wetland Hydrology Present? Yes x No ___

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

Remarks:

Surface water on 10% of the sample area, mostly surrounding the vault, but small depressions with water were scattered across the area.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project Site: South County Right of Way City/County: Santa Clara Sampling Date: 3/5/14
Applicant/Owner: Santa Clara Valley Water District State: CA Sampling Point: 52b
Investigator(s): M. Goklany & C. Gurney Section/Township/Range: T9S,R3E,sec36
Landform (hillslope, terrace, etc.): floodplain Local Relief (concave, convex, none): none Slope (%): 0-1
Subregion (LRR): C Lat: 37.10419 Long: -121.58323 Datum: WGS 84
Soil Map Unit Name: CrC NWI classification none
Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No x (If no, explain in Remarks.)
Are Vegetation ___ Soil ___ or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes x No ____
Are Vegetation ___ Soil ___ or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

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

Hydrophytic Vegetation Present? Yes x No ____
Hydric Soil Present? Yes ____ No x
Wetland Hydrology Present? Yes ____ No x
Is the Sampled Area within a Wetland? Yes ____ No x

Remarks:
Santa Clara Conduit #52. Sunny, dry conditions. Sampling area in floodplain of San Martin, near Martin Murphy Trail in Coyote Lake - Harvey Bear County Park. This location is a mosaic of wetland/upland prairie, and approximately 25% of the sample area is upland.
Drought has resulted in drier than normal conditions. The area has received 23% of normal annual rainfall during the current growing season. Approximately 2.45" of precipitation fell during the week prior to wetland delineation survey.

VEGETATION

Tree Stratum (Plot size: 30' radius)	Absolute Cover %	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
Total Cover:	0		
Sapling/Shrub Stratum (Plot size: 30' radius)			
1.			
2.			
3.			
4.			
5.			
Total Cover:	0		
Herb Stratum (Plot size: 5' x 5')			
1. *Festuca perennis (Lolium perenne)*	60	Y	FAC
2. *Hordeum marinum*	30	Y	FAC
3. *Vicia sativa*	5	N	FACU
4. *Brassica nigra*	2	N	UPL
5. *Medicago polymorpha*	25	Y	FACU
6. *Helminthotheca echioides*	3	N	UPL
7.			
8.			
Total Cover:	125		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
Total Cover:			

% Bare Ground in Herb Stratum 0 % Cover of Biotic Crust 0

Dominance Test worksheet:
Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)
Total Number of Dominant Species Across All Strata: 3 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 66.7 (A/B)

Prevalence Index worksheet:

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

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:
x Dominance Test is >50%
___ Prevalence Index is ≤3.0[1]
___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
___ Problematic Hydrophytic Vegetation[1] (Explain)
[1] Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? Yes x No ____

Remarks:
0.5 x 125 = 62.5, 0.2 x 97 = 19.4, FAC-neutral test: 0:0
Grasses and forbs were beginning to green-up.

SOIL

Sampling Point: 52b

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

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-10	10YR 3/1	100					clay loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

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

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

Indicators for Problematic Hydric Soils[3]:

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

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (If present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** x

Remarks:

No hydric indicators. Soil was slightly moist throughout.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required: check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) **(Nonriverine)**
- ___ Sediment Deposits (B2) **(Nonriverine)**
- ___ Drift Deposits (B3) **(Nonriverine)**
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Plowed Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) **(Riverine)**
- ___ Sediment Deposits (B2) **(Riverine)**
- ___ Drift Deposits (B3) (Riverine)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes _____ No x Depth (inches): _____

Water Table Present? Yes _____ No x Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No x Depth (inches): _____

Wetland Hydrology Present? **Yes** _____ **No** x

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

Remarks:

No hydrology indicators. Microtopography of the sampling location has created a mosaic of upland/wetland. This sampling point was slightly more elevated than the wetland pit, and conditions were substantially drier.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project Site: South County Right of Way City/County: Santa Clara County Sampling Date: 3/11/14
Applicant/Owner: Santa Clara Valley Water District State: CA Sampling Point: 54
Investigator(s): M. Goklany & C. Gurney Section/Township/Range: T9S,R3E,sec36
Landform (hillslope, terrace, etc.): ephemeral drainage Local Relief (concave, convex, none): slightly concave Slope (%): 0-1
Subregion (LRR): C Lat: 37.11520 Long: -121.59886 Datum: WGS 84
Soil Map Unit Name: CrA NWI classification none
Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No x (If no, explain in Remarks.)
Are Vegetation ___ Soil ___ or Hydrology x significantly disturbed? Are "Normal Circumstances" present? Yes x No ____
Are Vegetation ___ Soil ___ or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

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

Hydrophytic Vegetation Present? Yes ____ No x
Hydric Soil Present? Yes ____ No x
Wetland Hydrology Present? Yes x No ____
Is the Sampled Area within a Wetland? Yes ____ No x

Remarks:
Santa Clara Conduit #54. Roadside/irrigation ditch is manmade, currently maintained, and intersects with Corralitos Creek approximately 200' north of the sampling location (waters of the U.S.). Sample point located on sparsely vegetated bed of ephemeral drainage at the edge of an agricultural field.
Drought has resulted in drier than normal conditions. The area has received 23% of normal annual rainfall during the current growing season. Approximately 2.45" of precipitation fell during the week prior to wetland delineation survey.

VEGETATION

Tree Stratum (Plot size: 30' radius)	Absolute Cover %	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
Total Cover:	0		
Sapling/Shrub Stratum (Plot size: 30' radius)			
1.			
2.			
3.			
4.			
5.			
Total Cover:	0		
Herb Stratum (Plot size: 5' x 5')			
1. *Festuca perennis (Lolium perenne)*	5	Y	FAC
2. *Hordeum murinum*	5	Y	FACU
3. *Bromus diandrus*	3	Y	UPL
4. *Cichorium intybus*	2	Y	UPL
5. *Convolvulus arvensis*	T	N	UPL
6. *Rumex crispus*	T	N	FAC
7. *Lamium amplexicaule*	T	N	UPL
8. *Taraxacum officinale*	T	N	FACU
Total Cover:	10		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
Total Cover:			

% Bare Ground in Herb Stratum 90 % Cover of Biotic Crust 0

Dominance Test worksheet:
Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)
Total Number of Dominant Species Across All Strata: 4 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 25 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species	5	x 3 =	15
FACU species	5	x 4 =	20
UPL Species	5	x 5 =	25
Column totals	15 (A)		60 (B)

Prevalence Index = B/A = 4.0

Hydrophytic Vegetation Indicators:
___ Dominance Test is >50%
___ Prevalence Index is ≤3.0[1]
___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
___ Problematic Hydrophytic Vegetation[1] (Explain)
[1] Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? Yes ____ No x

Remarks:
0.5 x 10 = 5, 0.2 x 10 = 2, FAC-neutral test: 0:3
Grasses and forbs were beginning to green up. Vegetation is likely rountinely removed from drainage.

SOIL

Sampling Point: 54

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

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-13	10YR 3/1	100					clay	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

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

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

Indicators for Problematic Hydric Soils[3]:

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

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (If present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ____ No x

Remarks:

Soil slightly moist throughout. No hydric indicators.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required: check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) **(Nonriverine)**
- ___ Sediment Deposits (B2) **(Nonriverine)**
- ___ Drift Deposits (B3) **(Nonriverine)**
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Plowed Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) **(Riverine)**
- ___ Sediment Deposits (B2) **(Riverine)**
- ___ Drift Deposits (B3) (Riverine)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ____ No x Depth (inches): ____

Water Table Present? Yes ____ No x Depth (inches): ____

Saturation Present? (includes capillary fringe) Yes ____ No x Depth (inches): ____

Wetland Hydrology Present? Yes x No ____

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

Remarks:

No hydrology indicators.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project Site: South County Right of Way City/County: Santa Clara County Sampling Date: 3/5/14 and 4/29/14
Applicant/Owner: Santa Clara Valley Water District State: CA Sampling Point: 57a
Investigator(s): M. Goklany & C. Gurney Section/Township/Range: T9S,R3E,sec26
Landform (hillslope, terrace, etc.): floodplain Local Relief (concave, convex, none): slightly convex Slope (%): 0-2
Subregion (LRR): C Lat: 37.12534 Long: -121.60671 Datum: WGS 84
Soil Map Unit Name: SdA and HfC NWI classification R4SBC
Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No x (If no, explain in Remarks.)
Are Vegetation ___ Soil ___ or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes x No ____
Are Vegetation ___ Soil ___ or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

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

Hydrophytic Vegetation Present? Yes ____ No x
Hydric Soil Present? Yes ____ No x
Wetland Hydrology Present? Yes ____ No x
Is the Sampled Area within a Wetland? Yes ____ No x

Remarks:
Santa Clara Conduit #57. Partly cloudy, dry conditions on 3/5/14. The site was revisited on 4/29/14 to identify plants that did not initially have vegetative/reproductive structures. Sampling on upland terrace above in ephemeral section of Tennant Creek next to livestock pen.
Drought has resulted in drier than normal conditions. The area has received 23% of normal annual rainfall during the current growing season. Approximately 2.45" of precipitation fell during the week prior to wetland delineation survey.

VEGETATION

Tree Stratum (Plot size: 30' radius)	Absolute Cover %	Dominant Species?	Indicator Status
1. *Juglans hindsii*	10	Y	FAC
2. *Quercus agrifolia*	6	Y	UPL
3. *Cinnamomum camphora*	8	Y	UPL
4.			
Total Cover:	24		
Sapling/Shrub Stratum (Plot size: 30' radius)			
1. *Baccharis pilularis*	2	N	UPL
2. *Prunus caroliniana*	4	Y	FACU
3. *Prunus subcordata*	5	Y	UPL
4.			
5.			
Total Cover:	11		
Herb Stratum (Plot size: 5' x 5')			
1. *Vicia sativa*	20	Y	FACU
2. *Bromus diandrus*	25	Y	UPL
3. *Geranium molle*	1	N	UPL
4. *Festuca perennis* (*Lolium perenne*)	10	N	UPL
5. *Rumex conglomeratus*	3	N	FACW
6. *Avena* sp.	8	N	UPL
7. *Tragopogon porrifolius*	2	N	UPL
8. *Raphanus sativus*	15	N	UPL
Total Cover:	84		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
Total Cover:			

% Bare Ground in Herb Stratum 16 % Cover of Biotic Crust 0

Dominance Test worksheet:
Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)
Total Number of Dominant Species Across All Strata: 7 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	
FACW species	3	x 2 =	6
FAC species	10	x 3 =	30
FACU species	24	x 4 =	96
UPL Species	44	x 5 =	220
Column totals	81 (A)		433 (B)

Prevalence Index = B/A = 5.3

Hydrophytic Vegetation Indicators:
___ Dominance Test is >50%
___ Prevalence Index is ≤3.0[1]
___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
___ Problematic Hydrophytic Vegetation[1] (Explain)
[1] Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? Yes ____ No x

Remarks:
Trees: 0.5 x 24 = 12, 0.2 x 24 = 4.8, Shrubs: 0.5 x 11 = 5.5, 0.2 x 11 = 2.2, Herbs: 0.5 x 84 = 42, 0.2 x 84 = 16.8, FAC-neutral test: 0:6
Vegetation sampling area was above OHWs of Tennant Creek.

SOIL

Sampling Point: 57a

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

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-9	10YR 3/2	75					clay loam	
	7.5YR 4/3	25					clay loam	many small and medium gravels
9-13	7.5YR 4/3	100						

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

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

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

Indicators for Problematic Hydric Soils[3]:

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

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (If present):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ___ **No** x

Remarks:

Soil moist throughout. No hydric indicators.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required: check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) **(Nonriverine)**
- ___ Sediment Deposits (B2) **(Nonriverine)**
- ___ Drift Deposits (B3) **(Nonriverine)**
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Plowed Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) **(Riverine)**
- ___ Sediment Deposits (B2) **(Riverine)**
- ___ Drift Deposits (B3) (Riverine)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ___ No x Depth (inches): ___

Water Table Present? Yes ___ No x Depth (inches): ___

Saturation Present? (includes capillary fringe) Yes ___ No x Depth (inches): ___

Wetland Hydrology Present? **Yes** ___ **No** x

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

Remarks:

Soil moist throughout, but not glistening. No hydrology indicators.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project Site: South County Right of Way City/County: Santa Clara County Sampling Date: 3/5/14 and 4/29/14
Applicant/Owner: Santa Clara Valley Water District State: CA Sampling Point: 57b
Investigator(s): M. Goklany & C. Gurney Section/Township/Range: T9S,R3E,sec26
Landform (hillslope, terrace, etc.): Streambed Local Relief (concave, convex, none): slightly concave Slope (%): ____
Subregion (LRR): C Lat: 37.12532 Long: -121.60666 Datum: WGS 84
Soil Map Unit Name: SdA and HfC NWI classification R4SBC
Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No x (If no, explain in Remarks.)
Are Vegetation ___ Soil ___ or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes x No ____
Are Vegetation ___ Soil ___ or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

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

Hydrophytic Vegetation Present? Yes x No ____
Hydric Soil Present? Yes x No ____
Wetland Hydrology Present? Yes x No ____
Is the Sampled Area within a Wetland? Yes x No ____

Remarks:

Santa Clara Conduit #57. Partly cloudy, dry conditions on 3/5/14. The site was revisited on 4/29/14 to identify plants that did not initially have vegetative/reproductive structures. Seasonal wetland in ephemeral stream channel (Tennant Creek) near to livestock pen and dirt path that crosses stream.

Third consecutive year of drought. Drought has resulted in drier than normal conditions. The area has received 23% of normal annual rainfall during the current growing season. Approximately 2.45" of precipitation fell during the week prior to wetland delineation survey.

VEGETATION

Tree Stratum (Plot size: 30' radius)	Absolute Cover %	Dominant Species?	Indicator Status
1. *Cinnamomum camphora*	5	Y	UPL
2. *Juglans hindsii*	2	Y	FAC
3.			
4.			
Total Cover:	7		
Sapling/Shrub Stratum (Plot size: 30' radius)			
1.			
2.			
3.			
4.			
5.			
Total Cover:	0		
Herb Stratum (Plot size: 5' x 5')			
1. *Rumex conglomeratus*	3	N	FACW
2. *Geranium molle*	T	N	UPL
3. *Raphanus sativus*	5	N	UPL
4. *Mentha spicata*	40	Y	OBL
5. *Bromus catharticus*	8	N	UPL
6. *Plantago lanceolata*	2	N	FAC
7. *Agrostis stolonifera*	10	N	FACW
8.			
Total Cover:	68		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
Total Cover:			

% Bare Ground in Herb Stratum 80 % Cover of Biotic Crust 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)
Total Number of Dominant Species Across All Strata: 3 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 66.7 (A/B)

Prevalence Index worksheet:

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

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:

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

[1] Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? Yes x No ____

Remarks:

Trees: 0.5 x 7 = 3.5, 0.2 x 7 = 1.4, Herbs: 0.5 x 68 = 34, 0.2 x 20 = 13.6, FAC-neutral test 1:2.
Sampling location was within OHWs of Tennant Creek.

SOIL

Sampling Point: 57b

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

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-10	10YR 3/2	82	5YR 4/6	18	C	M	silty clay loam	
10-13	10YR 3/2	90	5YR 4/6	10	C	M	silty clay loam	trace amount of sandy inclusions, many small and medium gravels

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

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

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

Indicators for Problematic Hydric Soils[3]:

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

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (If present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes x No ___

Remarks:

Soil moist throughout. Prominent redox concentrations throughout.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required: check all that apply)				Secondary Indicators (2 or more required)	
___	Surface Water (A1)	___	Salt Crust (B11)	___	Water Marks (B1) **(Riverine)**
___	High Water Table (A2)	___	Biotic Crust (B12)	___	Sediment Deposits (B2) **(Riverine)**
___	Saturation (A3)	___	Aquatic Invertebrates (B13)	___	Drift Deposits (B3) (Riverine)
___	Water Marks (B1) **(Nonriverine)**	___	Hydrogen Sulfide Odor (C1)	x	Drainage Patterns (B10)
___	Sediment Deposits (B2) **(Nonriverine)**	___	Oxidized Rhizospheres along Living Roots (C3)	___	Dry-Season Water Table (C2)
___	Drift Deposits (B3) **(Nonriverine)**	___	Presence of Reduced Iron (C4)	___	Crayfish Burrows (C8)
___	Surface Soil Cracks (B6)	___	Recent Iron Reduction in Plowed Soils (C6)	___	Saturation Visible on Aerial Imagery (C9)
___	Inundation Visible on Aerial Imagery (B7)	___	Thin Muck Surface (C7)	___	Shallow Aquitard (D3)
x	Water-stained Leaves (B9)		Other (Explain in Remarks)	___	FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ___ No x Depth (inches): ___

Water Table Present? Yes ___ No x Depth (inches): ___

Saturation Present? Yes ___ No x Depth (inches): ___

(includes capillary fringe)

Wetland Hydrology Present? Yes x No ___

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

Remarks:

Vegetation matted in one direction. 2" of surface water in puddle on manmade pathway over channel from recent rainfall. No surface water within OHWs of Tennant Creek. Soil was moist, but not glistening.

Appendix D. Arid West OHWM Data Forms

Arid West Ephemeral and Intermittent Streams OHWM Datasheet

Project: South Co. Right of Way
Project Number: 3270-35
Stream: ESB
Investigator(s): M. Goklany

Date: 3/6/14 **Time:** 2:30 pm
Town: San Benito Co. **State:** CA
Photo begin file#: **Photo end file#:**

Y ☐ / N ☒ Do normal circumstances exist on the site?

Y ☐ / N ☒ Is the site significantly disturbed?

Location Details: unnamed ephemeral stream

Projection: **Datum:** WGS84
Coordinates:

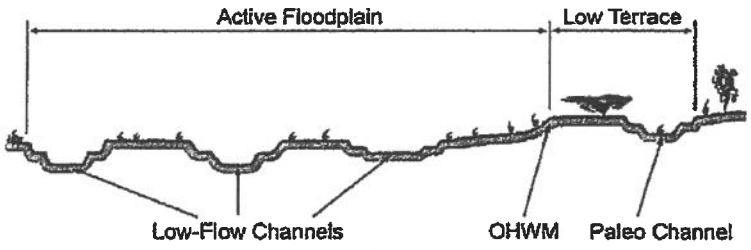
Potential anthropogenic influences on the channel system:
Area currently used for cattle grazing.
Normal circumstances are not present due to drought

Brief site description:
Drainage is in annual grassland + connects to Ortega Creek to the East
No standing/flowing water. Vault SCC#8 is in active floodplain.

Checklist of resources (if available):

- ☒ Aerial photography
  Dates: 2005-2013
- ☒ Topographic maps
- ☐ Geologic maps
- ☐ Vegetation maps
- ☒ Soils maps
- ☐ Rainfall/precipitation maps
- ☐ Existing delineation(s) for site
- ☒ Global positioning system (GPS)
- ☐ Other studies
- ☐ Stream gage data
  Gage number:
  Period of record:
  - ☐ History of recent effective discharges
  - ☐ Results of flood frequency analysis
  - ☐ Most recent shift-adjusted rating
  - ☐ Gage heights for 2-, 5-, 10-, and 25-year events and the most recent event exceeding a 5-year event

Hydrogeomorphic Floodplain Units

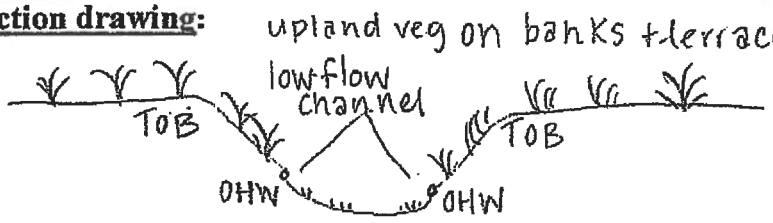


Procedure for identifying and characterizing the floodplain units to assist in identifying the OHWM:

1. Walk the channel and floodplain within the study area to get an impression of the geomorphology and vegetation present at the site.
2. Select a representative cross section across the channel. Draw the cross section and label the floodplain units.
3. Determine a point on the cross section that is characteristic of one of the hydrogeomorphic floodplain units.
   a) Record the floodplain unit and GPS position.
   b) Describe the sediment texture (using the Wentworth class size) and the vegetation characteristics of the floodplain unit.
   c) Identify any indicators present at the location.
4. Repeat for other points in different hydrogeomorphic floodplain units across the cross section.
5. Identify the OHWM and record the indicators. Record the OHWM position via:
   - ☐ Mapping on aerial photograph
   - ☒ GPS
   - ☐ Digitized on computer
   - ☐ Other:

Project ID: 3270-35 **Cross section ID:** ES8 **Date:** 3/6/14 **Time:** 2:30 pm

Cross section drawing:



OHWM

GPS point: OHW8A - 36.97460/-121.41513
OHW8B - 36.95459/-121.41513

Indicators:

- ☐ Change in average sediment texture
- ☐ Change in vegetation species
- ☒ Change in vegetation cover
- ☒ Break in bank slope
- ☐ Other: _____
- ☐ Other: _____

Comments:

Soil substrate in streambed w/ upland vegetation similar to that of banks & top of bank. Slight break in slope and less vegetative cover at/below OHW's.

Floodplain unit: ☒ Low-Flow Channel ☐ Active Floodplain ☐ Low Terrace

GPS point: same as above

Characteristics of the floodplain unit:

Average sediment texture: clay loam / medium silt
Total veg cover: 40 % Tree: 0 % Shrub: 0 % Herb: 40 %
Community successional stage:

- ☐ NA
- ☒ Early (herbaceous & seedlings)
- ☐ Mid (herbaceous, shrubs, saplings)
- ☐ Late (herbaceous, shrubs, mature trees)

Indicators:

- ☐ Mudcracks
- ☐ Ripples
- ☐ Drift and/or debris
- ☒ Presence of bed and bank
- ☐ Benches
- ☐ Soil development
- ☐ Surface relief
- ☐ Other: _____
- ☐ Other: _____
- ☐ Other: _____

Comments:

Low-flow channel corresponds to OHW's.
70% cover of grasses & forbs above OHW.
Upper terrace would recieve flows in 100-yr events.

Arid West Ephemeral and Intermittent Streams OHWM Datasheet

Project: South Co. Right of Way
Project Number: 3270-35
Stream: SW19
Investigator(s): M. Gaklany

Date: 3/6/14 **Time:** 930 am
Town: Santa Clara Co. **State:** CA
Photo begin file#: **Photo end file#:**

Y ☐ / N ☒ Do normal circumstances exist on the site?

Y ☐ / N ☒ Is the site significantly disturbed?

Location Details: Seasonal wetland / Pajaro River

Projection: **Datum:**
Coordinates:

Potential anthropogenic influences on the channel system:
Section of Pajaro River has been straightened. Normal circumstances are not present due to drought.

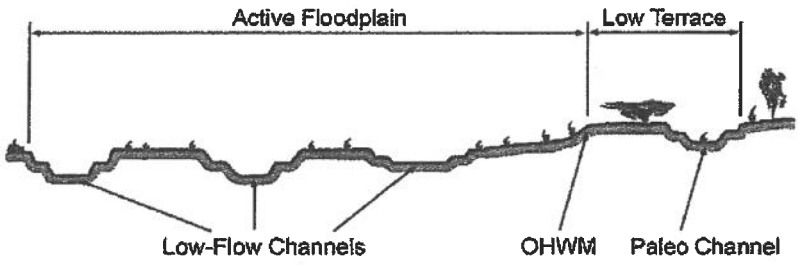
Brief site description: Vault at SEC #19 is above top of bank of river. ~200' N of lake/mitigation area. Seasonal wetland in channel dominated by Distichlis spicata. No standing/flowing water. Annual grassland is adjacent to channel.

Checklist of resources (if available):

- ☒ Aerial photography
  Dates: 2005-2013
- ☒ Topographic maps
- ☐ Geologic maps
- ☐ Vegetation maps
- ☒ Soils maps
- ☐ Rainfall/precipitation maps
- ☐ Existing delineation(s) for site
- ☒ Global positioning system (GPS)
- ☐ Other studies

- ☐ Stream gage data
  Gage number:
  Period of record:
  - ☐ History of recent effective discharges
  - ☐ Results of flood frequency analysis
  - ☐ Most recent shift-adjusted rating
  - ☐ Gage heights for 2-, 5-, 10-, and 25-year events and the most recent event exceeding a 5-year event

Hydrogeomorphic Floodplain Units

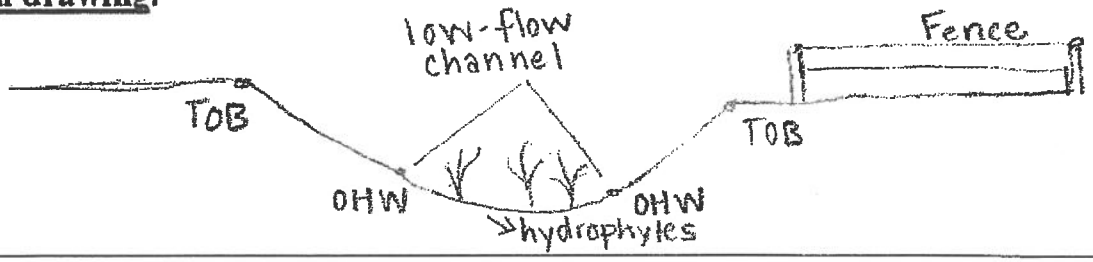


Procedure for identifying and characterizing the floodplain units to assist in identifying the OHWM:

1. Walk the channel and floodplain within the study area to get an impression of the geomorphology and vegetation present at the site.
2. Select a representative cross section across the channel. Draw the cross section and label the floodplain units.
3. Determine a point on the cross section that is characteristic of one of the hydrogeomorphic floodplain units.
   a) Record the floodplain unit and GPS position.
   b) Describe the sediment texture (using the Wentworth class size) and the vegetation characteristics of the floodplain unit.
   c) Identify any indicators present at the location.
4. Repeat for other points in different hydrogeomorphic floodplain units across the cross section.
5. Identify the OHWM and record the indicators. Record the OHWM position via:
   - ☐ Mapping on aerial photograph
   - ☐ Digitized on computer
   - ☒ GPS
   - ☐ Other:

Project ID: 3270-35 **Cross section ID:** W19 **Date:** 3/6/14 **Time:** 930am

Cross section drawing:



OHWM

GPS point: OHW19 - 36.98074 / - 121.48923

Indicators:

- ☐ Change in average sediment texture
- ☒ Change in vegetation species
- ☐ Change in vegetation cover
- ☒ Break in bank slope
- ☒ Other: Drainage patterns
- ☐ Other: _____

Comments:

Slight break in slope at OHW's.
Hydrophytes below OHW's vs. upland species on banks & terraces.
Vegetation is matted in one direction below OHW's.

Floodplain unit: ☒ Low-Flow Channel ☐ Active Floodplain ☐ Low Terrace

GPS point: same as above

Characteristics of the floodplain unit:

Average sediment texture: clay / medium silt
Total veg cover: 100 % Tree: ____ % Shrub: ____ % Herb: X %
Community successional stage:

- ☐ NA
- ☒ Early (herbaceous & seedlings)
- ☐ Mid (herbaceous, shrubs, saplings)
- ☐ Late (herbaceous, shrubs, mature trees)

Indicators:

- ☐ Mudcracks
- ☐ Ripples
- ☐ Drift and/or debris
- ☒ Presence of bed and bank
- ☐ Benches
- ☐ Soil development
- ☐ Surface relief
- ☒ Other: Drainage patterns
- ☐ Other: _____
- ☐ Other: _____

Comments:

Low-flow channel corresponds to OHW's
Upper terrace would recieve flows in 100-yr events.

Arid West Ephemeral and Intermittent Streams OHWM Datasheet

Project: South Co. Right of Way
Project Number: 3270-35
Stream: ES57
Investigator(s): M. Gokhany

Date: 3/5/14 **Time:** 8 am
Town: Santa Clara **State:** CA
Photo begin file#: Co. **Photo end file#:**

Y ☐ / N ☒ Do normal circumstances exist on the site?

Y ☒ / N ☐ Is the site significantly disturbed?

Location Details: Ephemeral section of Tennant Creek

Projection: **Datum:**
Coordinates: WGS84

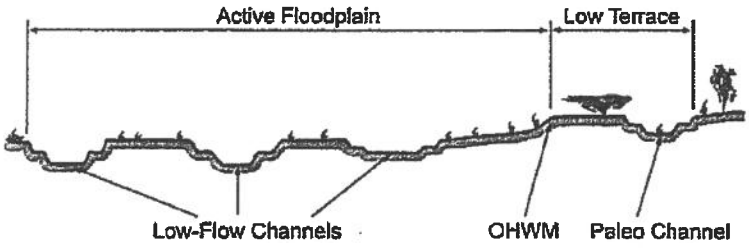
Potential anthropogenic influences on the channel system:
Residential area (house + livestock pen) at or below top of bank. Dirt pathway crosses creek, no culvert underneath. Normal circumstances are not present due to drainage.

Brief site description: Vault at SCCHS7 is just outside top of bank. Upland veg. (Vinca major) is present in channel. Small portion of channel is a seasonal wetland dominated by Mentha spicata. Creek runs alongside rural residence, greenhouses, and field used for row crops.

Checklist of resources (if available):

- ☒ Aerial photography
  Dates: 1993, 1998, 2003-2013
- ☒ Topographic maps
- ☐ Geologic maps
- ☐ Vegetation maps
- ☒ Soils maps
- ☐ Rainfall/precipitation maps
- ☐ Existing delineation(s) for site
- ☒ Global positioning system (GPS)
- ☐ Other studies
- ☐ Stream gage data
  Gage number:
  Period of record:
- ☐ History of recent effective discharges
- ☐ Results of flood frequency analysis
- ☐ Most recent shift-adjusted rating
- ☐ Gage heights for 2-, 5-, 10-, and 25-year events and the most recent event exceeding a 5-year event

Hydrogeomorphic Floodplain Units

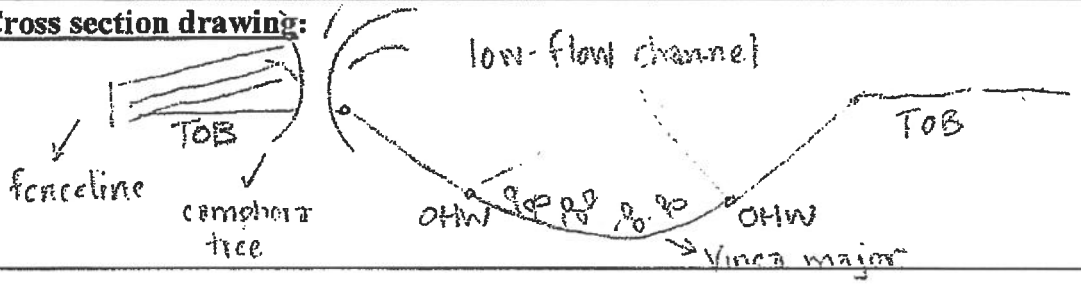


Procedure for identifying and characterizing the floodplain units to assist in identifying the OHWM:

1. Walk the channel and floodplain within the study area to get an impression of the geomorphology and vegetation present at the site.
2. Select a representative cross section across the channel. Draw the cross section and label the floodplain units.
3. Determine a point on the cross section that is characteristic of one of the hydrogeomorphic floodplain units.
   a) Record the floodplain unit and GPS position.
   b) Describe the sediment texture (using the Wentworth class size) and the vegetation characteristics of the floodplain unit.
   c) Identify any indicators present at the location.
4. Repeat for other points in different hydrogeomorphic floodplain units across the cross section.
5. Identify the OHWM and record the indicators. Record the OHWM position via:
   - ☐ Mapping on aerial photograph
   - ☒ GPS
   - ☐ Digitized on computer
   - ☐ Other:

Project ID: 327035 **Cross section ID:** ES57 **Date:** 3/5/14 **Time:** 8am

Cross section drawing:



OHWM

OHW57A - 37.12528/-121.60666

GPS point: OHW57B - 37.12528/-121.60667

Indicators:

- ☐ Change in average sediment texture
- ☐ Change in vegetation species
- ☒ Change in vegetation cover
- ☐ Break in bank slope
- ☒ Other: drainage patterns
- ☐ Other: _____

Comments:

Higher percent cover of bare ground below OHWs. Vegetation is matted in one direction and woody debris/herbaceous litter are present at OHWs

Floodplain unit: ☒ Low-Flow Channel ☐ Active Floodplain ☐ Low Terrace

GPS point: same as above

Characteristics of the floodplain unit:

Average sediment texture: medium silt

Total veg cover: 40 % Tree: 20 % Shrub: ____ % Herb: 20 %

Community successional stage:

- ☐ NA
- ☐ Early (herbaceous & seedlings)
- ☐ Mid (herbaceous, shrubs, saplings)
- ☒ Late (herbaceous, shrubs, mature trees)

Indicators:

- ☐ Mudcracks
- ☐ Ripples
- ☒ Drift and/or debris
- ☒ Presence of bed and bank
- ☐ Benches
- ☐ Soil development
- ☐ Surface relief
- ☒ Other: Drainage patterns
- ☐ Other: _____
- ☐ Other: _____

Comments: low-flow channel corresponds to OHWs. Cinnamomum camphora (tree) overhangs into channel. Vinca major in streambed & extends up banks (there is higher percentage of bare ground in the streambed.) Upper terraces would recieve flows in 100-yr events.

Appendix E. Photo-documentation

Photo 1. Vault at SCC8 in upland habitat.

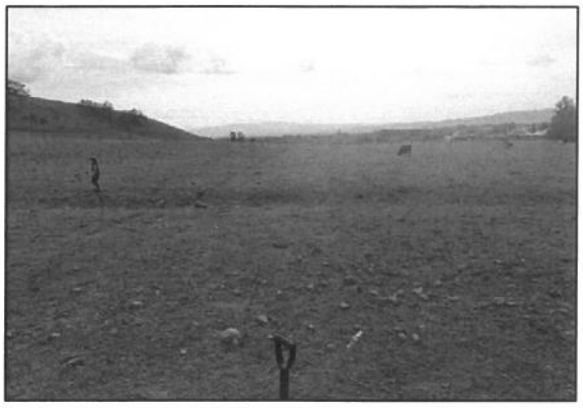


Photo 2. Ephemeral stream at SCC8.

Photo 3. Upland habitat at SCC11.

Photo 4. Seasonal Wetland at SCC11

Photo 5. Perennial marsh surrounding the vault at SCC12 with berm (upland habitat) in background.

Photo 6. Vault at SCC17 in upland habitat.

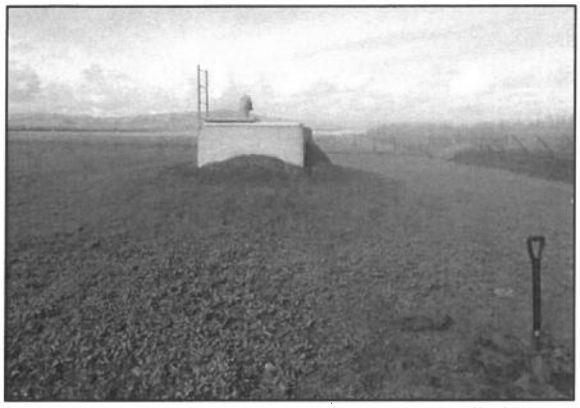


Photo 7. Vault at SCC18 in upland habitat.

Photo 8. Vault at SCC19 in upland habitat.

Photo 9. Perennial marsh adjacent to the vault at SCC12 and within the proposed access road to the vault at SCC13.

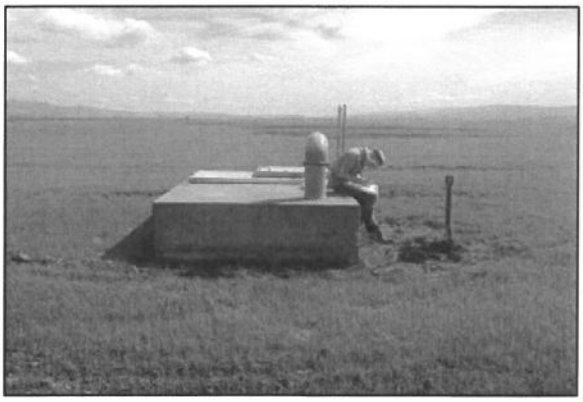


Photo 10. Vault at SCC20 in upland habitat.

Photo 11. Upland/wetland boundary at SCC21.

Photo 12. Standing water in seasonal wetland at SCC21b.

Photo 13. Irrigation ditch at SCC21 is routinely cleared of vegetation.

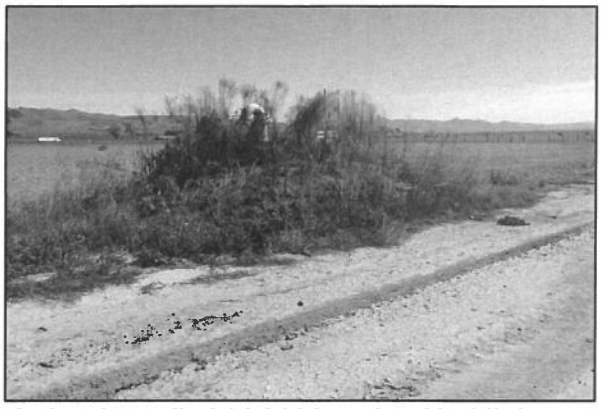


Photo 14. Vault at SCC22 in upland habitat.

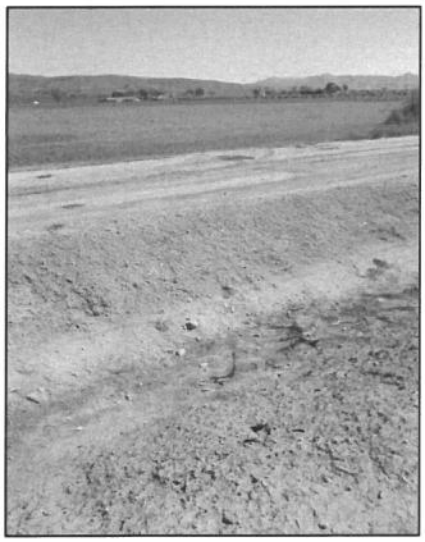


Photo 15. Irrigation ditch at SCC22 is routinely cleared of vegetation.

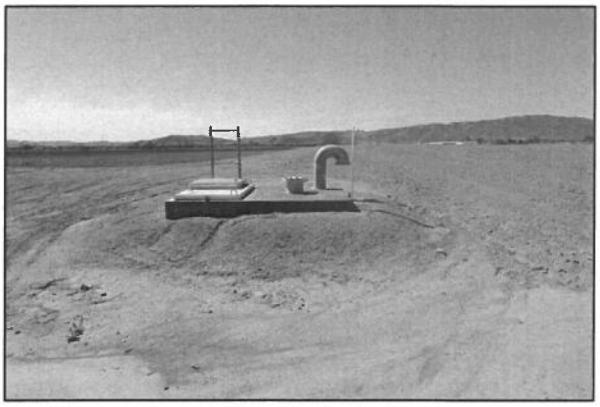


Photo 16. Vault at SCC23 in upland habitat.

Photo 17. Vault at SCC24 in upland habitat.

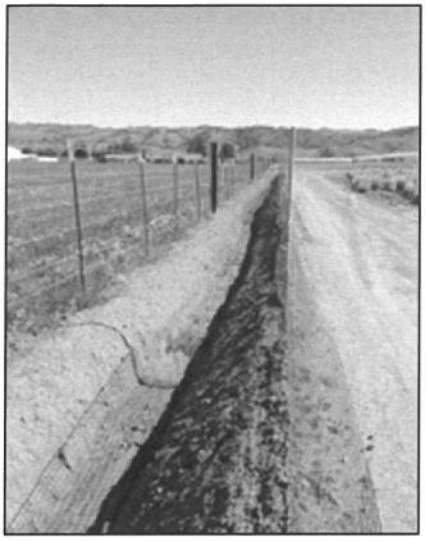


Photo 18. A maintained Irrigation ditch at SCC24.

Photo 19. Vault at SCC25 in upland habitat.

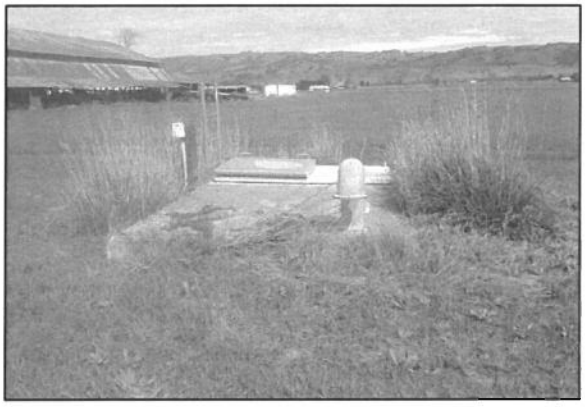


Photo 20. Vault at SCC26 in upland habitat.

Photo 21. Vault at SCC30 in upland habitat.

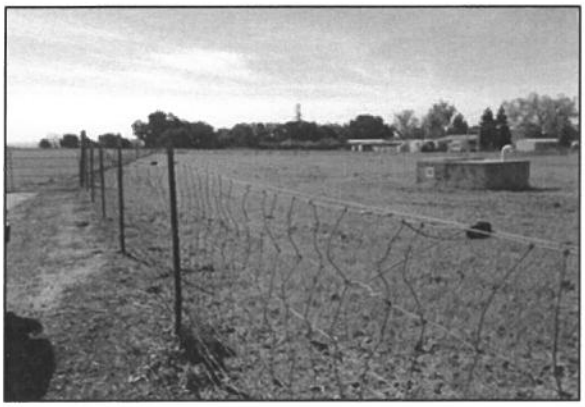


Photo 22. Vault at SCC34 in upland habitat.

Photo 23. Existing gate at SCC34.

Photo 24. Vault at SCC35 in upland habitat.

Photo 25. Possible gate location to access SCC35 in upland habitat.

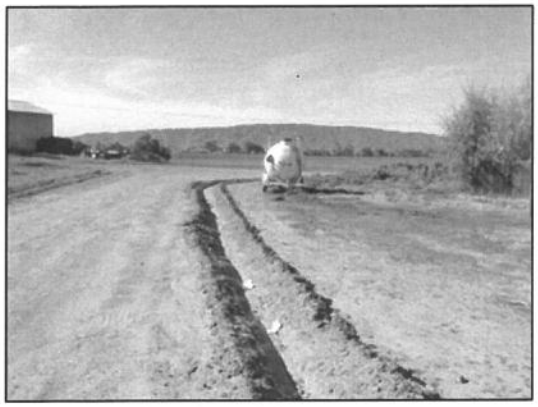


Photo 26. Maintained irrigation ditch along the access road to SCC35.

Photo 27. Gate location in upland habitat to access SCC40.

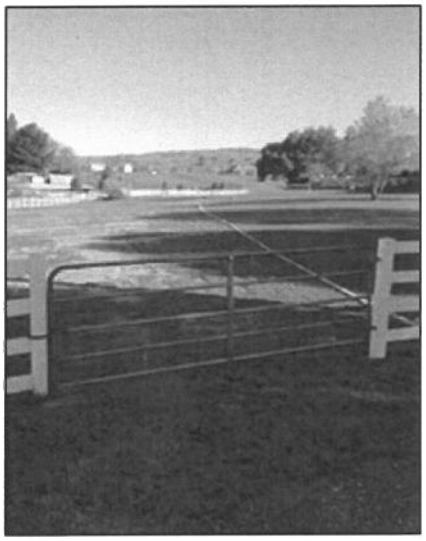


Photo 28. Existing gate at driveway location in upland habitat to access SCC43.

Photo 29. Existing gate to access SCC50 in upland habitat.

Photo 30. Upland/wetland mosaic at SCC52.

Photo 31. High water table in the seasonal wetland at SCC52.

Photo 32. Surface water in the seasonal wetland at SCC52.

Photo 33. Gate location at SCC53. Driveway passes over culvert and ephemeral stream.

Photo 34. Culvert and roadside ditch at SCC53.

Photo 35. Vault at SCC54 in upland habitat.

Photo 36. Irrigation ditch and upland habitat at SCC54.

Photo 37. Vault and upland habitat at SCC57.

Photo 38. Seasonal wetland within ephemeral section of Tennant Creek at SCC57 (photo was taken in early March).

Photo 39. Seasonal wetland at SCC57 (photo was taken in late April).

Photo 40. Vault at PC2 just outside top of bank and wetland SW2b.

Photo 41. Upland/wetland boundary of SW2a at PC2.

Photo 42. Surface water in seasonal wetland SW2a at PC2.

Photo 43. Pacheco Creek, a perennial stream adjacent to the BSA at PC2.

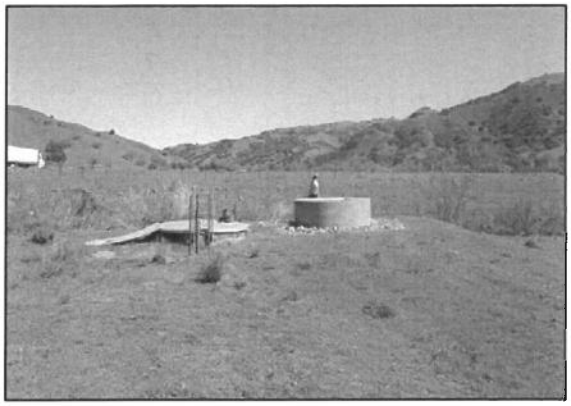


Photo 44. Vault at PC34 just outside the top of bank in upland habitat.

Photo 45. Ephemeral section of Elephant Head Creek near PC34.

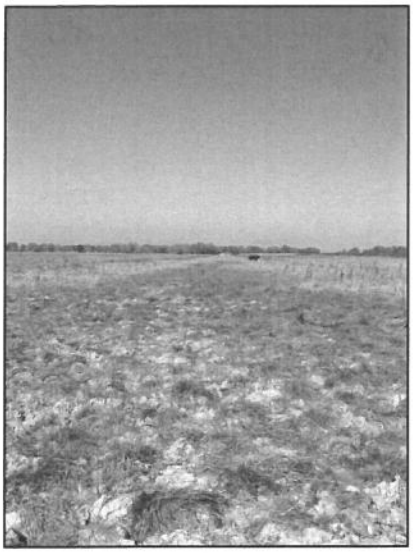


Photo 46. Seasonal wetland within the proposed access road to the vault at SCC13.

Photo 47. Seasonal wetlands were identified along the access road to PCC34.

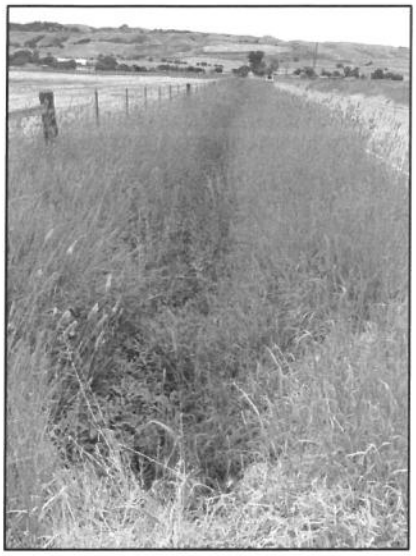


Photo 48. Seasonal wetlands within a non-maintained irrigation ditch along the proposed access road to SCC21.

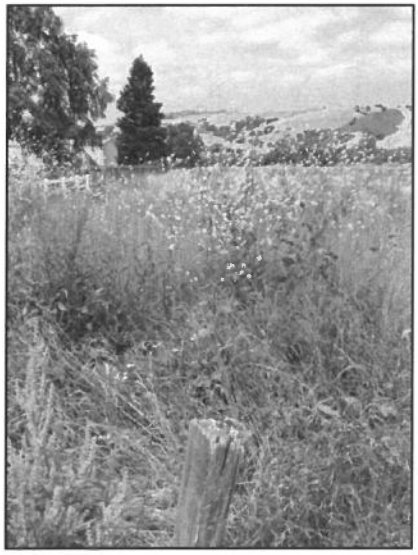


Photo 50. Ephemeral stream within the proposed access road to SCC54. The stream is obscured by ruderal, upland species.

Photo 49. Alkali sink wetland within the poposed access road from Lovers Lane to the vault at SCC12.

Appendix F. Aquatic Resources Table

Waters_Name	Cowardin_Code	HGM_Code	Measurement_Type	Amount	Units	Measurement_Type	Amount	Units	Waters_Types	DD_X	DD_Y	Local_Waterway
C20			Area	0.003660316	Acres	Linear	29.66993	FOOT		-121.4977003	36.98488641	Jones Creek and San Ysidro Creek
C21			Area	0.000582766	Acres	Linear	25.32126	FOOT		-121.5006766	36.98821121	Jones Creek and San Ysidro Creek
ES11a	R4SB7E		Area	0.103457587	Acres	Linear	417.1735	FOOT	RPW	-121.4357016	36.98951593	Ortega Creek and Pacheco Creek
ES11b	R4SB7E		Area	0.010785358	Acres	Linear	11.75992	FOOT	RPW	-121.4368931	36.9897707	Ortega Creek and Pacheco Creek
ES11b	R4SB7E		Area	0.087454829	Acres	Linear	363.9487	FOOT	RPW	-121.4382523	36.97005011	Ortega Creek and Pacheco Creek
ES24	R4SB7C		Area	0.004656165	Acres	Linear	40.28813	FOOT	RPW	-121.5123329	37.0005182	San Ysidro Creek
ES43	R4SB7C		Area	0.002643996	Acres	Linear	38.25482	FOOT	RPW	-121.5866087	37.08088411	Church Creek
ES54	R4SB7C		Area	0.003578512	Acres	Linear	48.93008	FOOT	RPW	-121.5988981	37.11522536	Unnamed Tributary to Little Llagas Creek
ES57	R4SB7C		Area	0.002406922	Acres	Linear	39.20761	FOOT	RPW	-121.6066747	37.12529204	Tennant Creek
ES8	R4SB7C		Area	0.000589462	Acres	Linear	12.16623	FOOT	RPW	-121.4151279	36.97459773	Unnamed Tributary, Pajaro River Watershed
PM11a	PEM1E		Area	0.51115453	Acres	Linear	660.8469	FOOT	RPWWD	-121.4338444	36.9691331	Ortega Creek and Pacheco Creek
PM11b	PEM1E		Area	0.235735677	Acres	Linear	443.4881	FOOT	RPWWD	-121.4374885	36.96991311	Ortega Creek and Pacheco Creek
PM12a	PEM1K		Area	0.560008578	Acres	Linear	791.3552	FOOT	RPWWD	-121.440212	36.97048465	Ortega Creek and Pacheco Creek
PM12b	R5SB7H		Area	0.03106333	Acres	Linear	34.07838	FOOT	RPWWD	-121.4413301	36.97067529	Ortega Creek and Pacheco Creek
PM22	PEM1E		Area	0.002734822	Acres	Linear	23.30317	FOOT	RPWWD	-121.5046881	36.99303045	Jones Creek and San Ysidro Creek
SW11	PEM2C		Area	0.018343486	Acres	Linear	51.68528	FOOT	RPWWN	-121.4324103	36.96877764	Ortega Creek
SW13	PEM1E		Area	1.694981426	Acres	Linear	1845.606	FOOT	RPWWD	-121.44454	36.97051125	Ortega Creek and Pacheco Creek
SW20a	R4SB7E		Area	0.003960153	Acres	Linear	19.98545	FOOT	RPWWD	-121.4977456	36.98484821	Jones Creek and San Ysidro Creek
SW20b	PEM2C		Area	0.002910789	Acres	Linear	18.14223	FOOT	RPWWN	-121.4993126	36.98672676	Jones Creek and San Ysidro Creek
SW20c	PEM2C		Area	0.004683048	Acres	Linear	21.31856	FOOT	RPWWN	-121.499697	36.98715187	Jones Creek and San Ysidro Creek
SW21a	R4SB7E		Area	0.004027999	Acres	Linear	39.31275	FOOT	RPW	-121.5008735	36.9881718	Jones Creek and San Ysidro Creek
SW21b	PEM2C		Area	0.013840307	Acres	Linear	138.9279	FOOT	RPWWN	-121.5009898	36.98869524	Jones Creek and San Ysidro Creek
SW22	PEM2C		Area	0.00028405	Acres	Linear	13.69753	FOOT	RPWWN	-121.5046719	36.9927635	Jones Creek and San Ysidro Creek
SW2a	PEM2C		Area	0.000303715	Acres	Linear	9.916064	FOOT	RPWWN	-121.2731934	37.0430469	Pacheco Creek
SW2b	R4SB3C		Area	0.002184538	Acres	Linear	23.26707	FOOT	RPWWD	-121.2732196	37.04295869	Pacheco Creek
SW34a	PEM2C		Area	0.006947334	Acres	Linear	54.83539	FOOT	RPWWN	-121.3632229	37.00717391	Elephant Head Creek and Pacheco Creek
SW34b	PEM2C		Area	0.004759667	Acres	Linear	25.65142	FOOT	RPWWN	-121.361075	37.0081007	Elephant Head Creek and Pacheco Creek
SW52	PEM2C		Area	0.036730946	Acres	Linear	56.56843	FOOT	RPWWD	-121.5831576	37.10407636	San Martin Creek
SW57	R4SB7C		Area	0.000813603	Acres	Linear	11.78469	FOOT	RPWWD	-121.6067073	37.12534023	Tennant Creek

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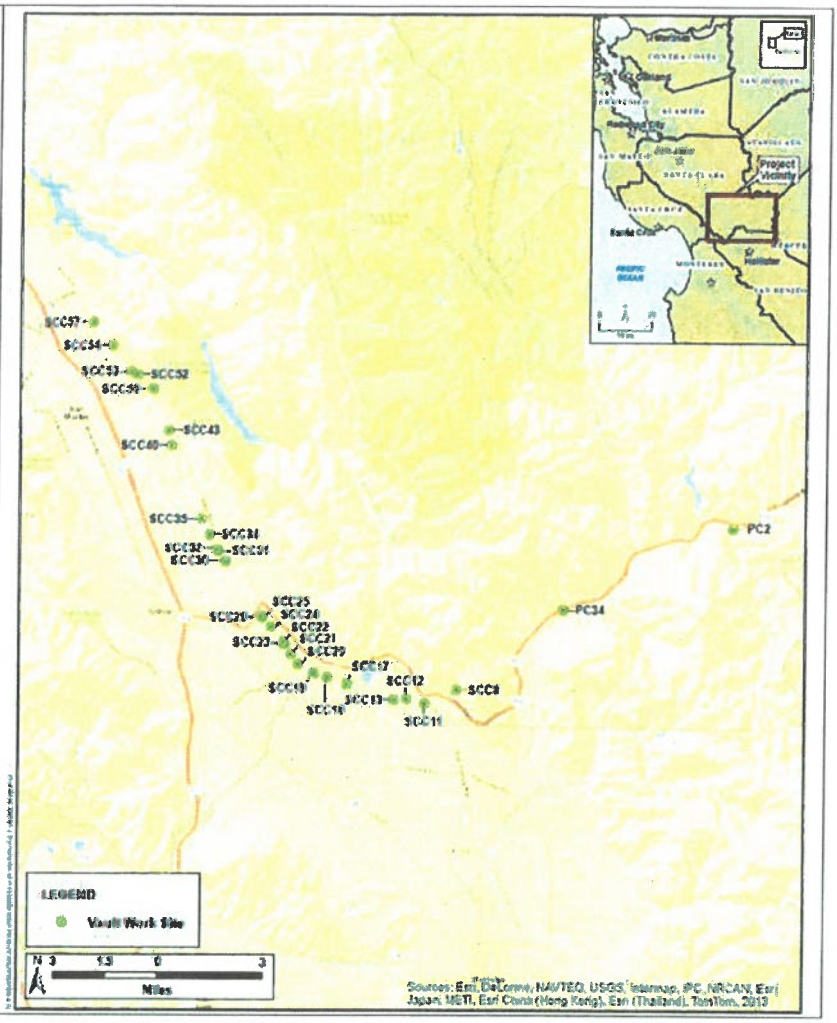
APPENDIX C
Cultural Resources Information

Indian Trust Assets
Request Form (MP Region)

Submit your request to your office's ITA designee or to MP-400, attention Deputy Regional Resources Manager.

Date:

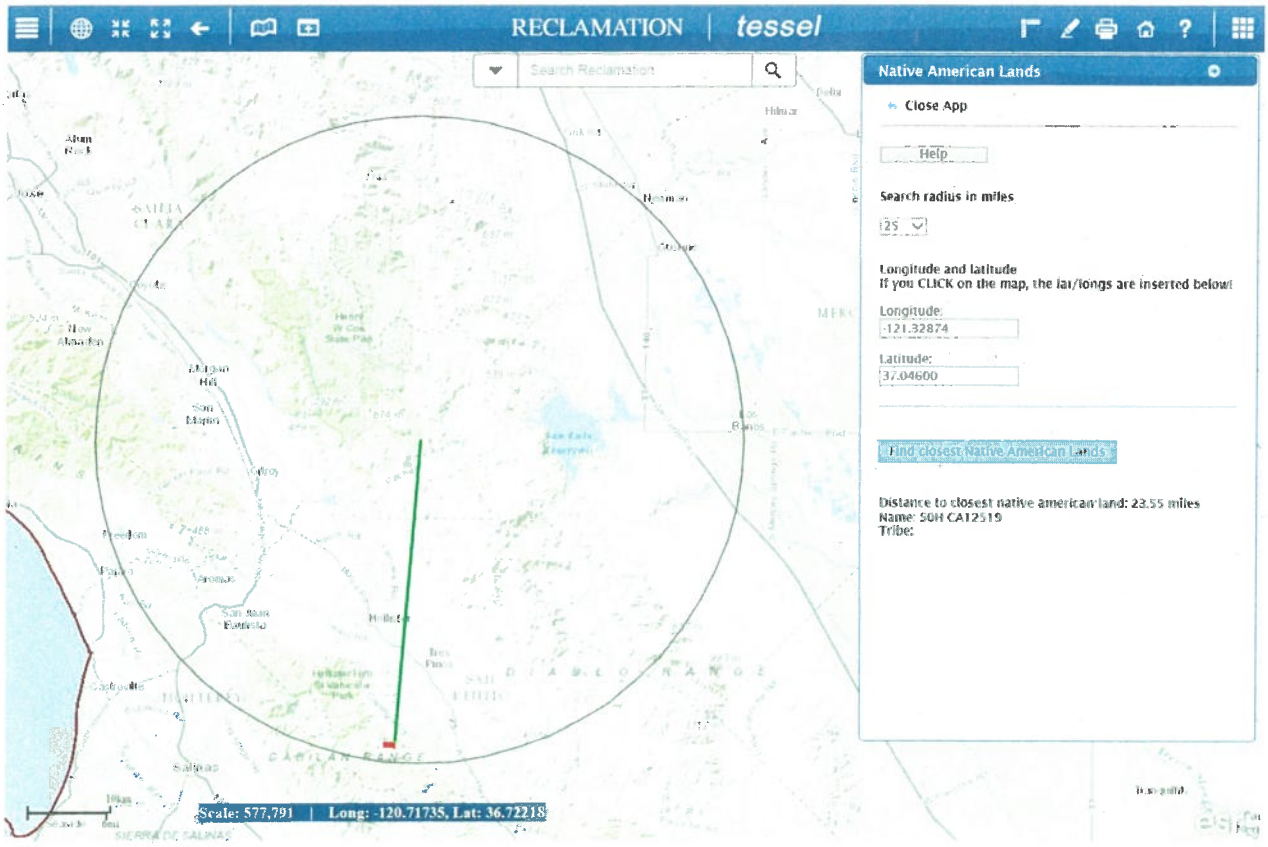
Requested by (preparer)	Molly Burns
Fund	
WBS	
Fund Cost Center	2142500
Region # (if other than MP)	
Project Name	Santa Clara Valley WD Pipeline Access Improvements Pacheco and Santa Clara Conduits
CEC or EA Number	EA 12-070
Project Description (attach additional sheets if needed and include photos if appropriate)	The project consists of (1) obtaining new easements for the purpose of accessing existing vaults for maintenance and repair purposes (water valves, air release valves, corrosion protection and other above ground maintenance sites), (2) Installing a gravel collars (approximately 32 feet x 32 feet), with reductions in size of the gravel collars at certain specific existing vaults (not all vaults) so that the vaults are kept free weeds and brush for full access by crews; (3) constructing new driveway exits off of public roads to provide access at certain vaults (not all vaults); (4) grading for a new gravel access road from Hwy 152 to SCC 8 (approximately 850 feet x 12 feet); (5) Installing one new sign post at vault SCC 12 to make the vault location more visible to crews and (6) installing a number of new gates as needed to control safe access at certain locations (not all locations).

***Project Location (Township, Range, Section, e.g., T12 R5E S10, or Lat/Long coords). Include map(s)**	

Signature: R Emerson Printed name of approver: Rain Emerson Date: 9/14/15

N:\SpecialProjects\DistancetoIndianLands\Indian Trust Assets Request Form2015 (03-20-2015).docx

N:\SpecialProjects\DistancetoIndianLands\Indian Trust Assets Request Form2015 (03-20-2015).docx


RECLAMATION
tessel
Search Reclamation
Native American Lands
Close App
Help
Search radius in miles
25
Longitude and latitude
If you CLICK on the map, the lat/longs are inserted below!
Longitude:
-121.32874
Latitude:
37.04600
Find closest Native American Lands
Distance to closest native american land: 23.55 miles
Name: SOH CA12519
Tribe:
Scale: 577,791 | Long: -120.71735, Lat: 36.72218

CULTURAL RESOURCES COMPLIANCE
Division of Environmental Affairs
Cultural Resources Branch (MP-153)

MP-153 Tracking Number: 13-SCAO-161

Project Name: Santa Clara Valley Water District South County Pipeline Access Improvements Project for the Pacheco Conduit and Santa Clara Conduit

NEPA Document: EA 12-070

NEPA Contact: Molly Burns, Natural Resource Specialist

MP 153 Cultural Resources Reviewer: Mark Carper, Archaeologist

Date: September 6, 2013

Reclamation proposes to approve/permit the Santa Clara Valley Water District to make modifications to the Santa Clara and Pacheco Conduits to improve access to air release and other appurtenances for maintenance purposes. This is the type of undertaking that does not have the potential to cause effects to historic properties, should such properties be present, pursuant to the NHPA Section 106 regulations codified at 36 CFR § 800.3(a)(1). Reclamation has no further obligations under NHPA Section 106, pursuant to 36 CFR § 800.3(a)(1).

The project consists of obtaining new easements for the purpose of accessing existing vaults for maintenance and repair purposes, gravel collars, constructing new driveway exits off of public roads to provide access at certain vaults grading for a new gravel access road, installing one new sign, installing a number of new gates as needed to control safe access at certain locations. The landscape upon which project components are situated consists of modified modern development consisting predominantly of fill material or high disturbance from conduit and roadway construction.

After reviewing documentation provided within EA 12-070, Reclamation has concluded this action would not have significant impacts on properties listed, or eligible for listing, on the National Register of Historic Places. This document serves as notification that Section 106 compliance has been completed for this undertaking. Please note that if project activities subsequently change, additional NHPA Section 106 review, including further consultation with the SHPO, may be required.

This document is intended to convey the completion of the NHPA Section 106 process for this undertaking. Please retain a copy in the administrative record for this action. Should changes be made to this project, additional NHPA Section 106 review, possibly including consultation with the State Historic Preservation Officer, may be necessary. Thank you for providing the opportunity to comment.

Valley Water

Clean Water • Healthy Environment • Flood Protection

April 16, 2019

Muwekma Ohlone Indian Tribe
C/O Mr. Alan Leventhal
Tribal Ethno-Historian
20885 Redwood Road, Suite 232
Castro Valley, CA 94546

Via E-Mail: alan.leventhal@sjsu.edu
& US Mail

RE: Tribal Cultural Resources under the California Environmental Quality Act
South County Pipeline Access Improvements Project
Tribal Consultation Process Pursuant to Public Resources Code § 21080.3.1

Dear Mr. Leventhal:

Thank you for meeting with Santa Clara Valley Water District (Valley Water) about the subject Project on March 15, 2019. Per your email request of April 4, 2019, you asked if Valley Water could track down information pertaining to cultural resources encountered during the excavation of the pipeline, and if there was monitoring and recovery, what sites were recorded and what monitoring program was implemented.

Upon inspection of our administrative record and associated files, Valley Water has no records of cultural resources being discovered during excavation activities on the pipelines. However, in answer to your request Valley Water was able to assemble some reports that could assist you. The original Santa Clara and Pacheco Conduits (San Felipe System) pipeline, developed under the aegis of the Bureau's Central Valley Project with Valley Water, was constructed in the early 1980's under the auspices of the federal government, following review and processing through the National Environmental Policy Act (NEPA) and California Environmental Quality Act (CEQA). You may review the 1970 era Bureau NEPA documents and Valley Water CEQA documents using the following links:

> https://fta.valleywater.org/fl/UHkwjqJSog. If you open these documents and do a search for the keyword "archaeological," early archaeological reports will be sorted to the front. Additionally, a write-up of the San Felipe System project and construction history can be accessed from the following link: https://www.usbr.gov/projects/pdf.php?id=106

Also attached are records information from Sonoma State University Northwest Information Center and Cultural Resources Compliance documents from the Bureau. Please note that the Bureau cultural resources staff completed a walk over field survey and concluded there would be no impacts on this Project. The Bureau issued a Section 106 Cultural Resources Compliance document as attached.

Unfortunately, Valley Water does not own much of the Project lands and is not at liberty to disclose potentially confidential information within land owner's records. However, should you wish to investigate additional cultural resources record information within the Bureau's possession, please contact Kathleen Linder. Ms. Linder can put you in touch with Mark Carper, Bureau Archaeologist, for possible further cultural resource record information on this Project or the larger San Felipe System:

Kathleen Linder
Natural Resources Specialist
Bureau of Reclamation, South-Central California Area Office
1243 N Street, Fresno, CA 93721
Phone: 559-487-5044

As noted in your April 4th email, given the lack of documented evidence of onsite cultural resources that are potential tribal cultural resources, and the limitation of impacts to the various access areas, Valley Water is in agreement that consultation has proceeded in good faith and no further AB 52 consultation is needed for the project as proposed[1]. We believe that mutual agreement has been reached between Valley Water and the Tribe, including agreement that there are no tribal cultural resources mitigation measures required (other than best management practice measures, specifically District BMP CU-1) because the proposed project would not result in significant impacts on tribal cultural resources. Accordingly, we consider AB 52 tribal consultation process pursuant to California Public Resources Code §21080.3.2 for this project to be concluded.

We look forward to continuing coordination, and the Tribe will receive copies of the CEQA Draft MND when the document is issued to begin public review. Valley Water staff has very much appreciated working with Chairwoman Charlene Nijmeh, Vice-Chair Monica V. Arellano, and yourself on this project.

Please contact me at any time on my direct line at 408-630-3096, or via email at mcoleman@valleywater.org, with questions.

Respectfully,

Michael F. Coleman, AICP
Environmental Planner
Valley Water

Attachments: Northwest Information Center records submittal
Bureau of Reclamation Section 106 Cultural Resources Compliance documents

cc: Chairwoman Charlene Nijmeh and Vice-Chair Monica V. Arellano, Muwekma Ohlone Indian Tribe
Rain Emerson, Kathleen Linder, Bureau of Reclamation, and District project file, project team

[1] Valley Water would reinitiate consultation if, as a result of revisions to the project description, the degree of proposed construction changes to affect cultural resources or known recorded sites within proximity to each construction locus.

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APPENDIX D
Definitions of Pipeline Equipment

Figure D-1-1: AIR RELEASE VALVE

There are three primary sources of air in a pipeline. First, at startup, the pipeline contains air which must be exhausted during filling. As the pipeline is filled, much of the air will be pushed downstream and released through hydrants, faucets, and other mechanical apparatus. A large amount of air, however, will become trapped at system high points.

Second, water contains about 2 percent air by volume based on normal solubility of air in water. The dissolved air will come out of solution with a rise in temperature or a drop in pressure which will occur at high points due to the increase in elevation. Finally, air can enter through equipment such as pumps, fittings, and valves when vacuum conditions occur.

The effect of trapped air in a pipeline can have serious effects on system operation and efficiency. As air pockets collect at high points, a restriction of the flow occurs that produces unnecessary head loss. A pipeline with many air pockets can impose enough restriction to stop all flow. Also, sudden changes in velocity can occur from the movement of air pockets.

When passing through a restriction in the line such as a control valve, a dislodged pocket of air can cause surges or water hammer. Water hammer can damage equipment or loosen fittings and cause leakage. Finally, corrosion in the pipe material is accelerated when exposed to the air pocket, which can result in premature failure of the pipeline.

Air is sometimes removed from a line with a manual vent during initial startup, but this method does not provide continual air release during system operation nor does it provide vacuum protection. Today, municipalities use a variety of automatic air valves at the pump discharge and along the pipeline.

VAULTS

This type of vault is a location where maintenance workers can access devices attached to the pipeline to maintain air relief valves (Devices that release entrapped air in the pipeline). There are other vaults that contain blow off valves that allow Valley Water work crews to drain portions of the pipeline for maintenance.

Typical Vault

Vault with Air Release Valve

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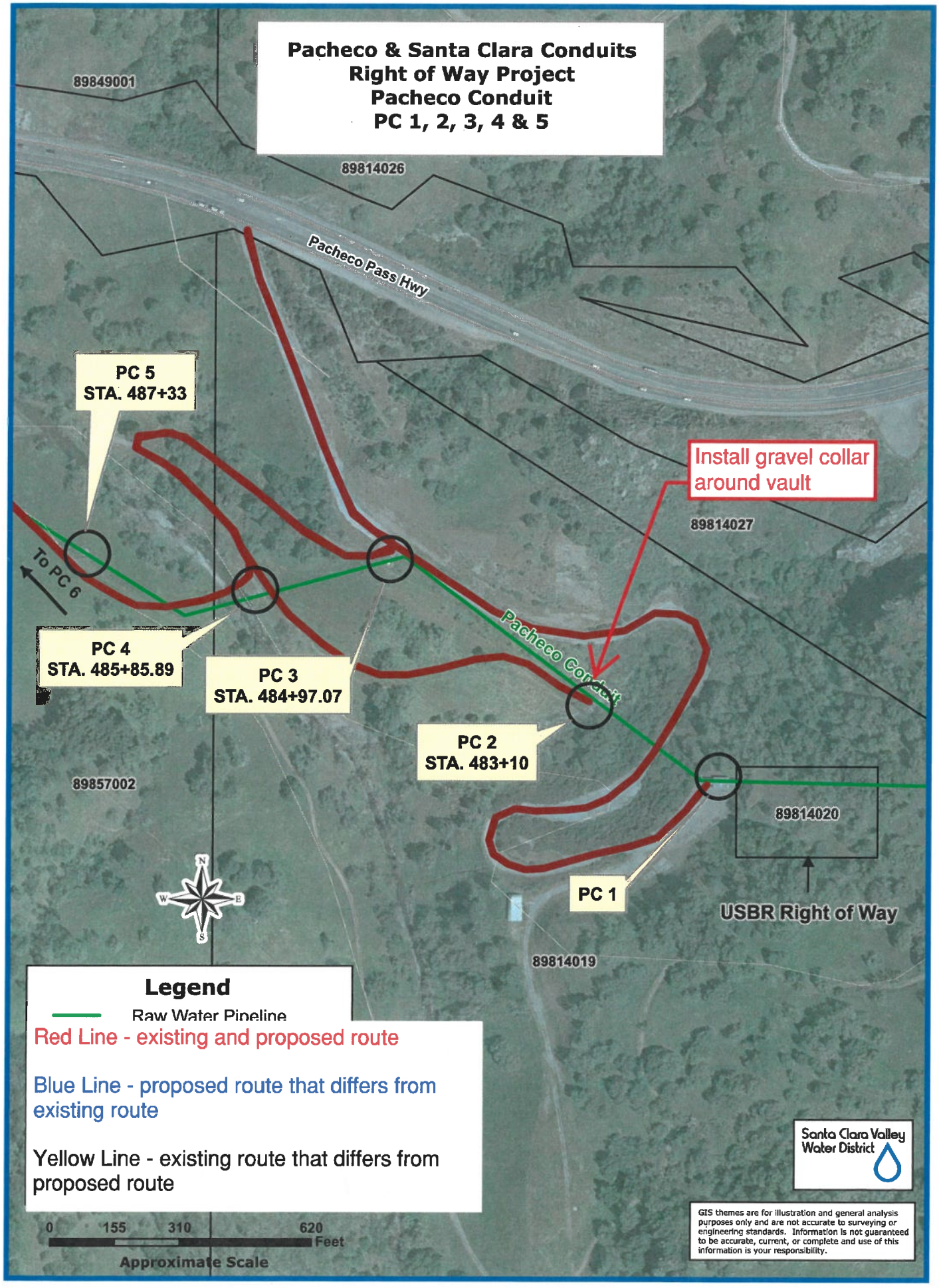
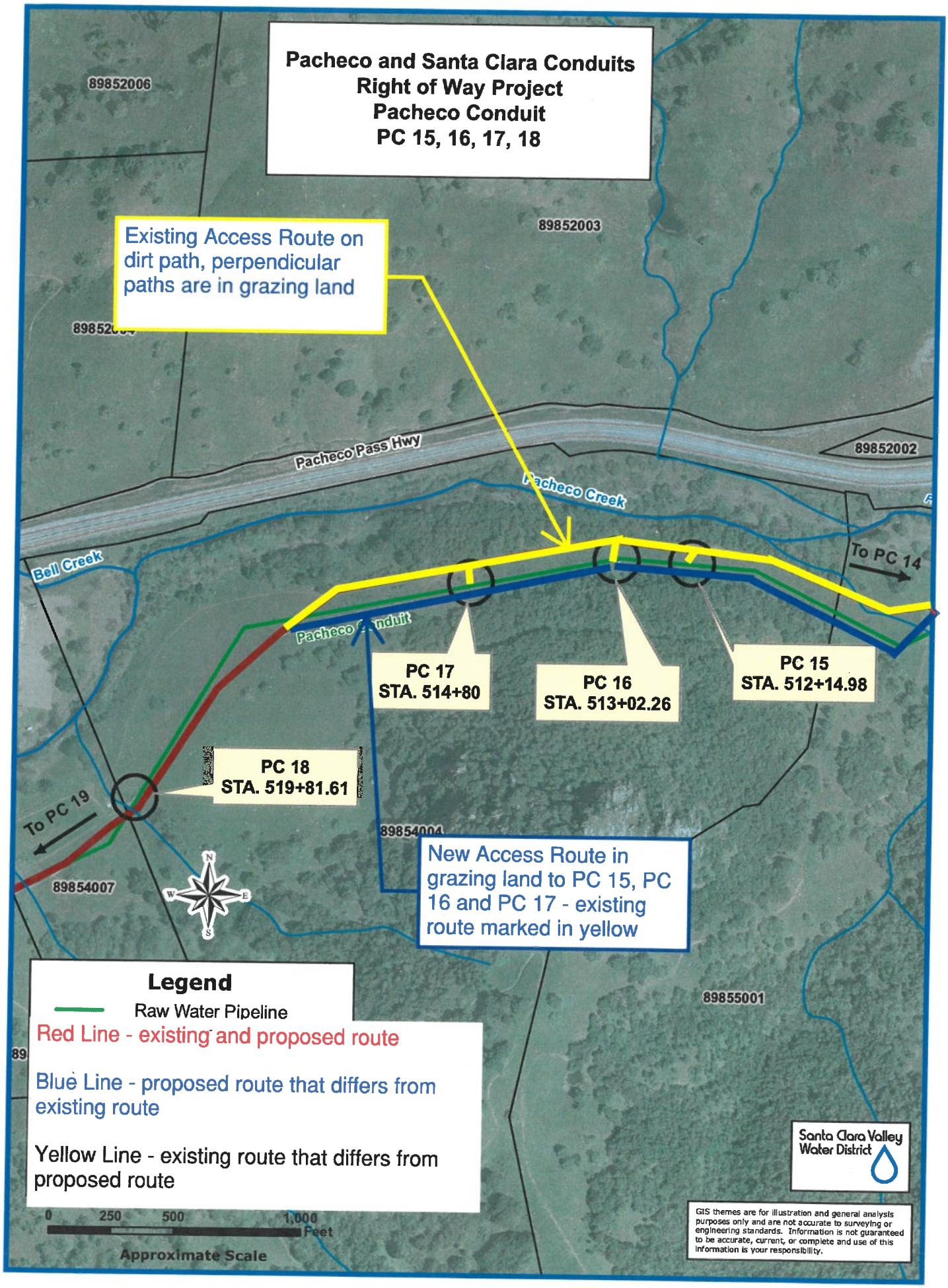
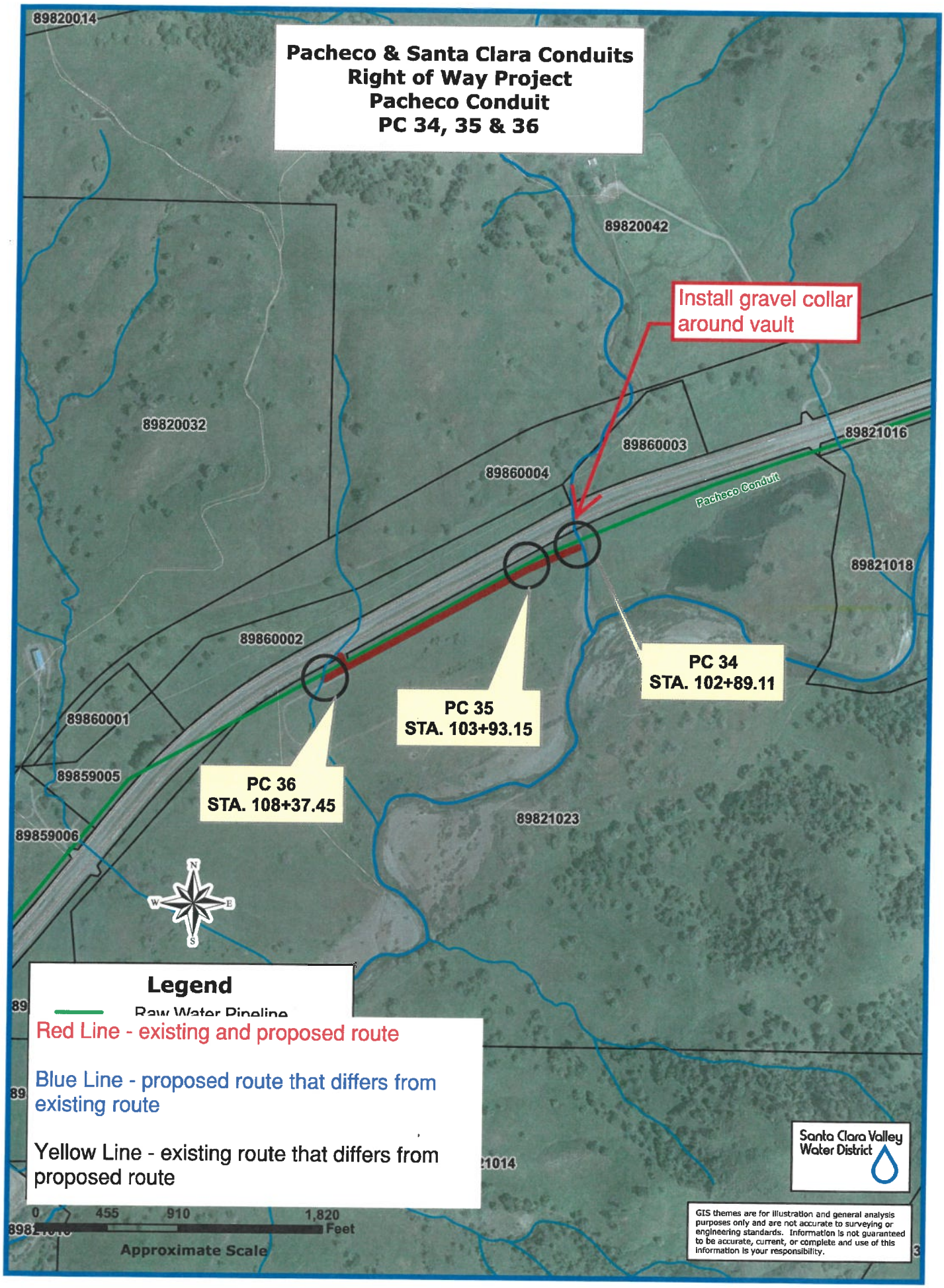
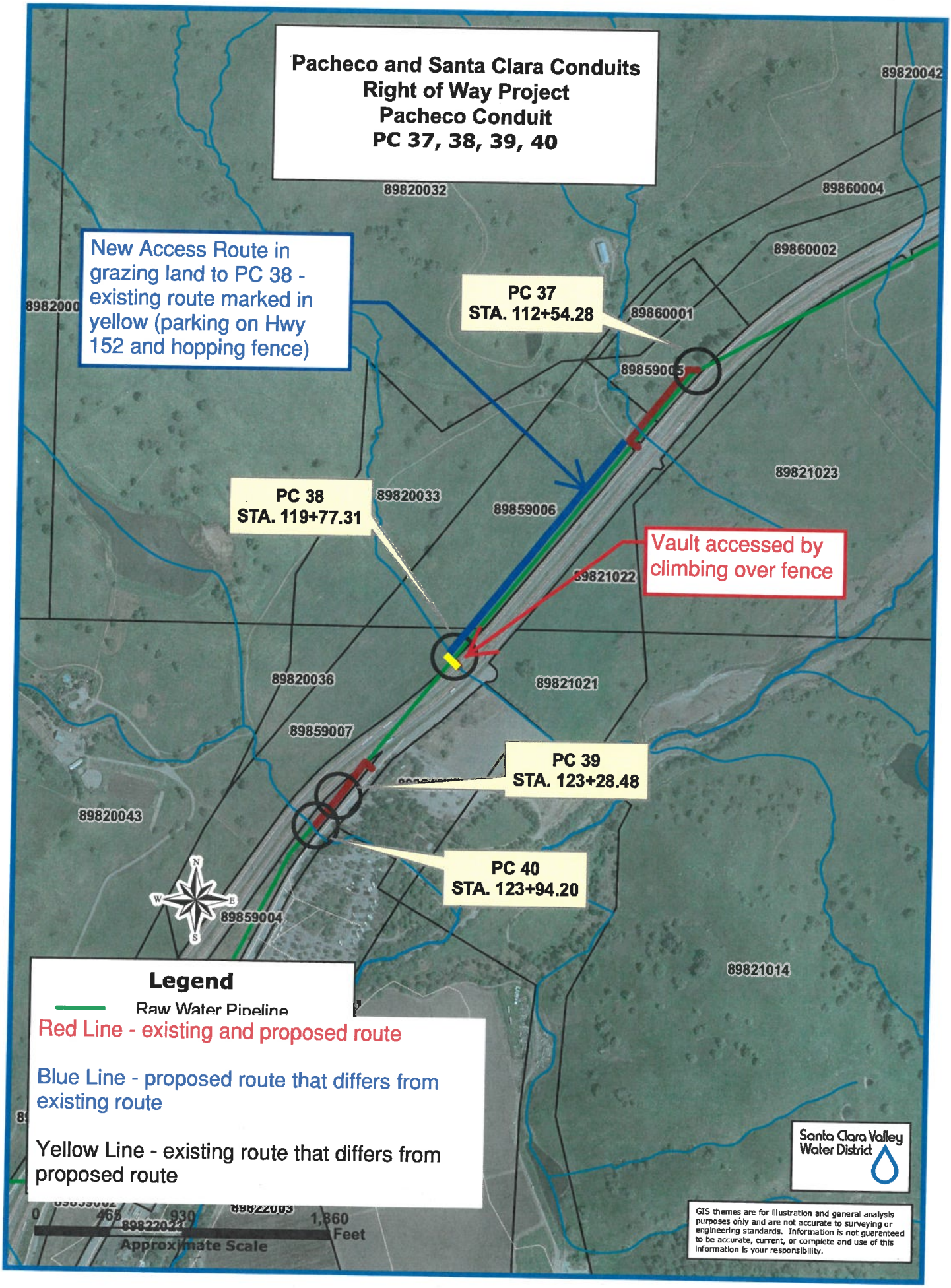
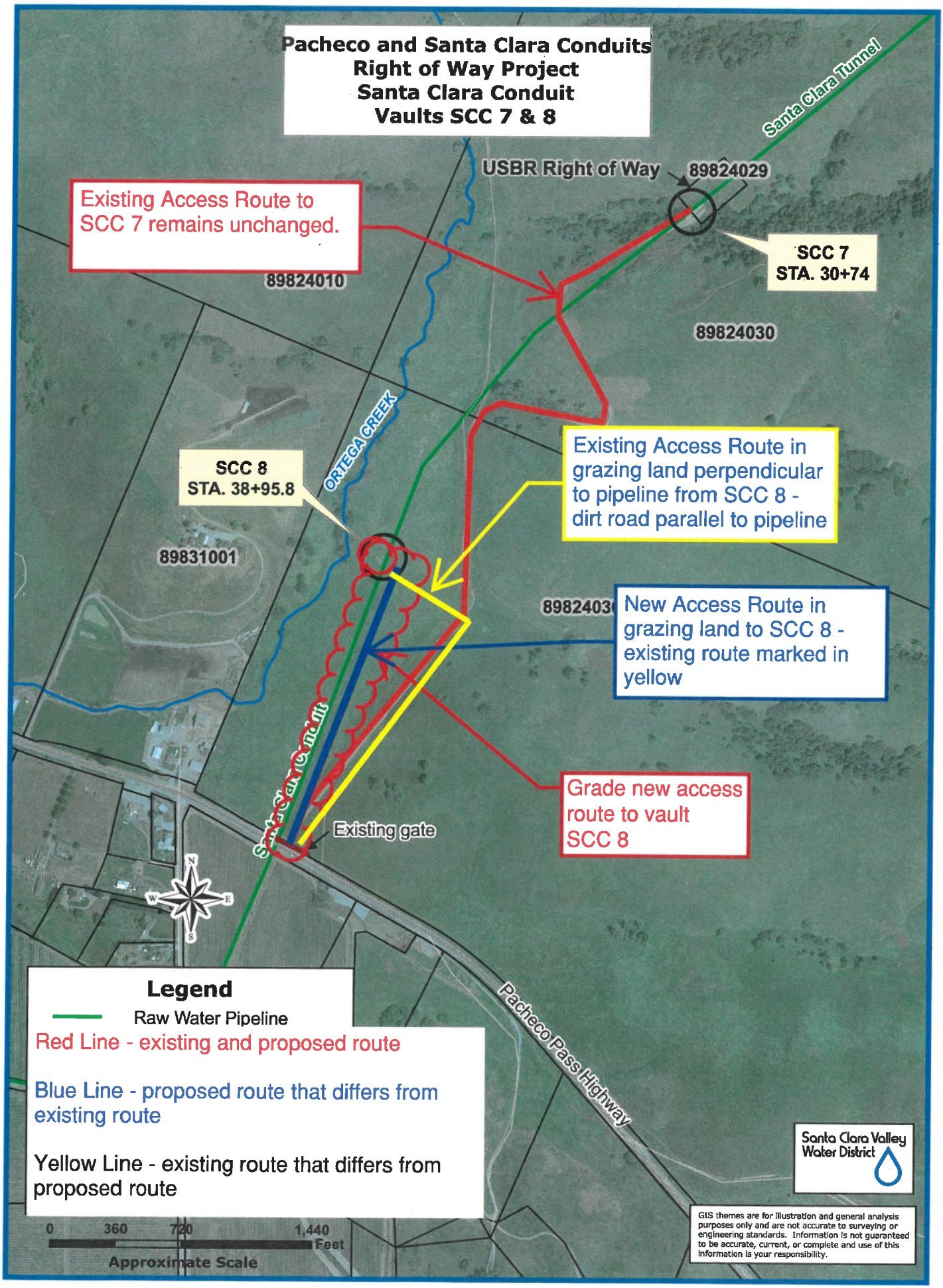
APPENDIX E
Travel Routes (Existing And Proposed)

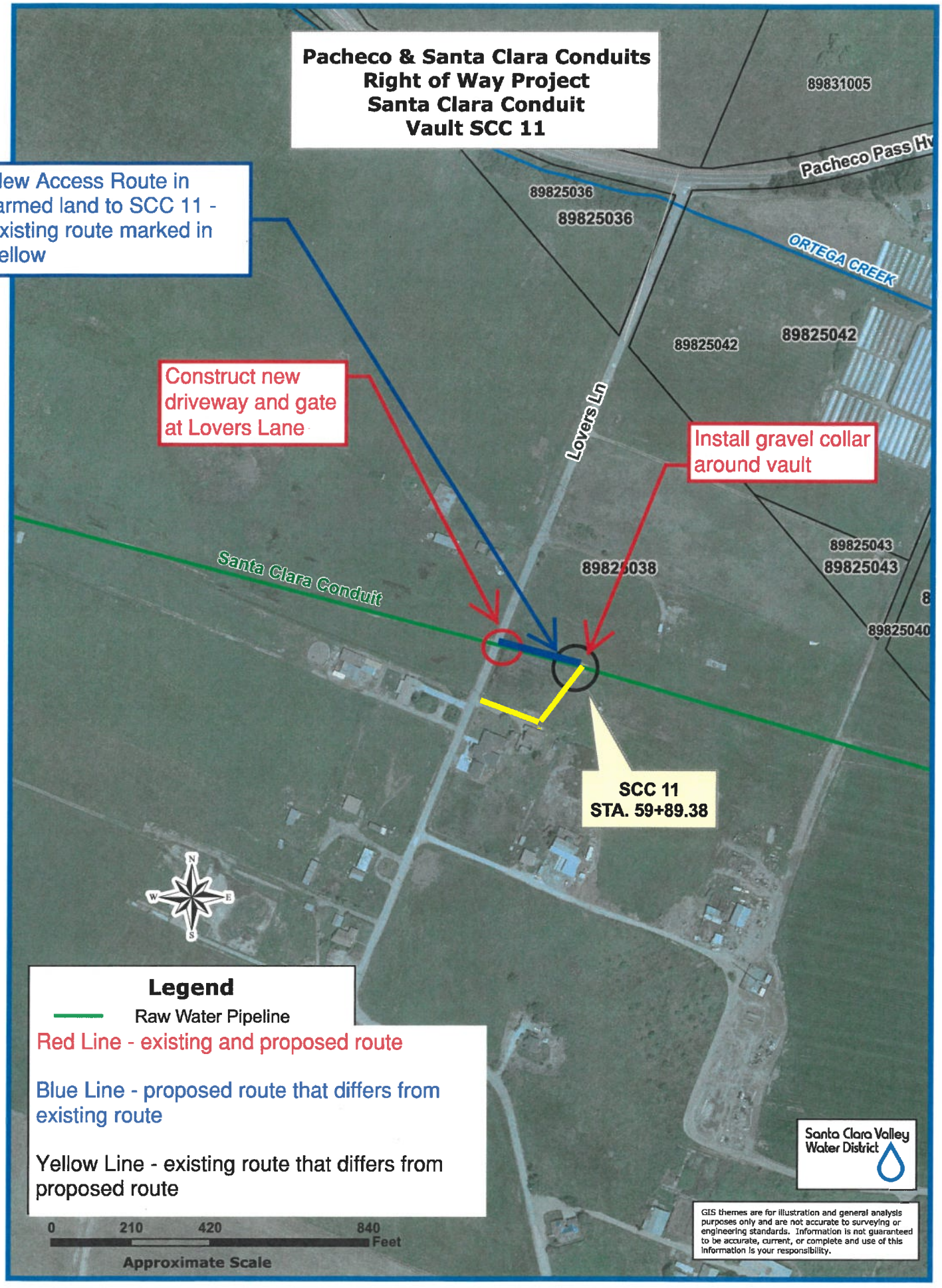

Pacheco & Santa Clara Conduits
Right of Way Project
Pacheco Conduit
PC 1, 2, 3, 4 & 5
89849001
89814026
Pacheco Pass Hwy
PC 5
STA. 487+33
Install gravel collar around vault
89814027
To PC 6
PC 4
STA. 485+85.89
PC 3
STA. 484+97.07
Pacheco Conduit
PC 2
STA. 483+10
89857002
89814020
PC 1
USBR Right of Way
89814019
N
W
E
S
Legend
Raw Water Pipeline
Red Line - existing and proposed route
Blue Line - proposed route that differs from existing route
Yellow Line - existing route that differs from proposed route
0
155
310
620
Feet
Approximate Scale
Santa Clara Valley Water District
GIS themes are for illustration and general analysis purposes only and are not accurate to surveying or engineering standards. Information is not guaranteed to be accurate, current, or complete and use of this information is your responsibility.

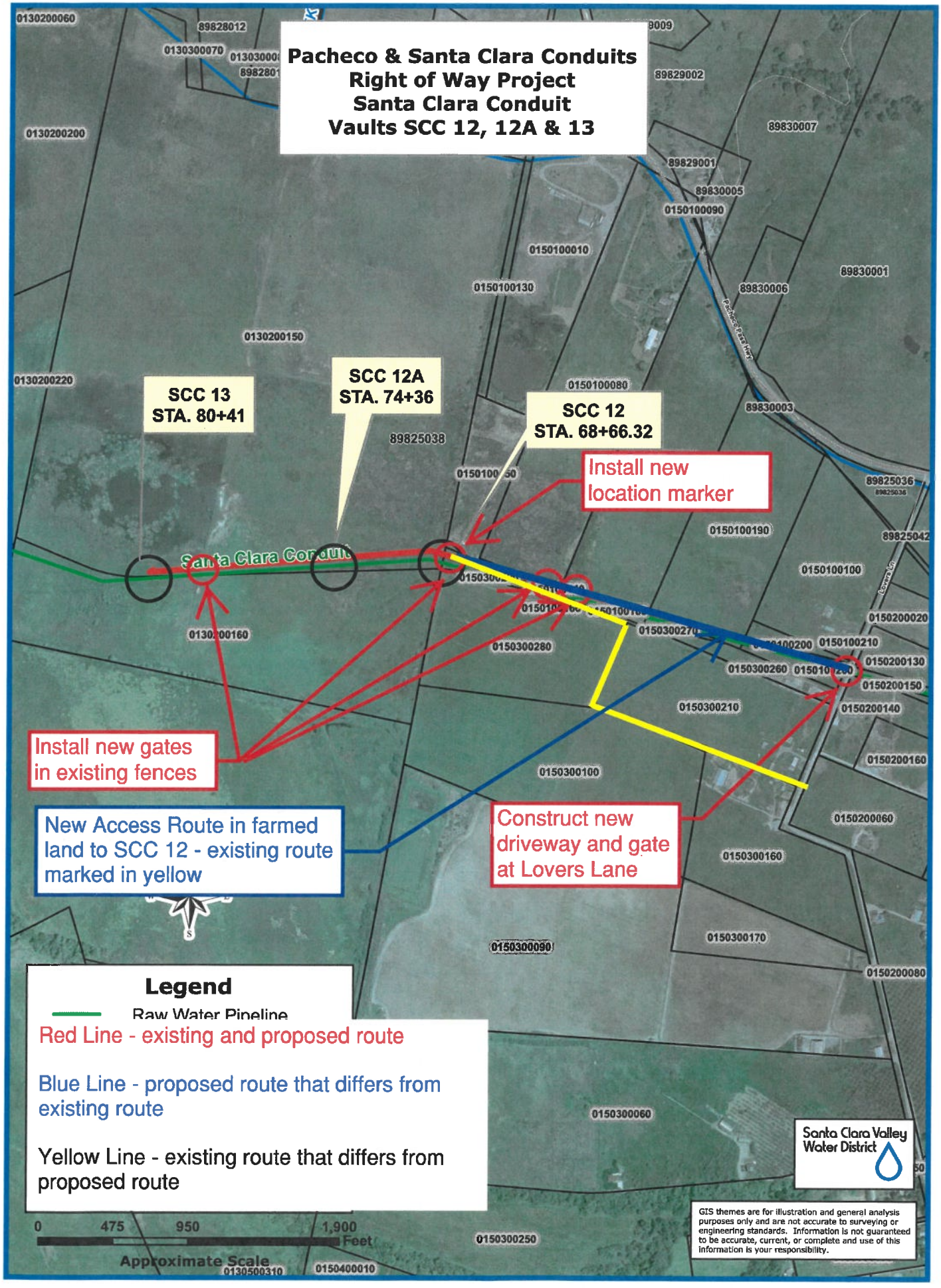

Pacheco and Santa Clara Conduits
Right of Way Project
Pacheco Conduit
PC 15, 16, 17, 18
Existing Access Route on dirt path, perpendicular paths are in grazing land
89852006
89852003
89852002
Pacheco Pass Hwy
Pacheco Creek
Bell Creek
To PC 14
Pacheco Conduit
PC 17
STA. 514+80
PC 16
STA. 513+02.26
PC 15
STA. 512+14.98
PC 18
STA. 519+81.61
To PC 19
89854004
89854007
New Access Route in grazing land to PC 15, PC 16 and PC 17 - existing route marked in yellow
89855001
Legend
Raw Water Pipeline
Red Line - existing and proposed route
Blue Line - proposed route that differs from existing route
Yellow Line - existing route that differs from proposed route
0 250 500 1,000 Feet
Approximate Scale
Santa Clara Valley Water District
GIS themes are for illustration and general analysis purposes only and are not accurate to surveying or engineering standards. Information is not guaranteed to be accurate, current, or complete and use of this information is your responsibility.

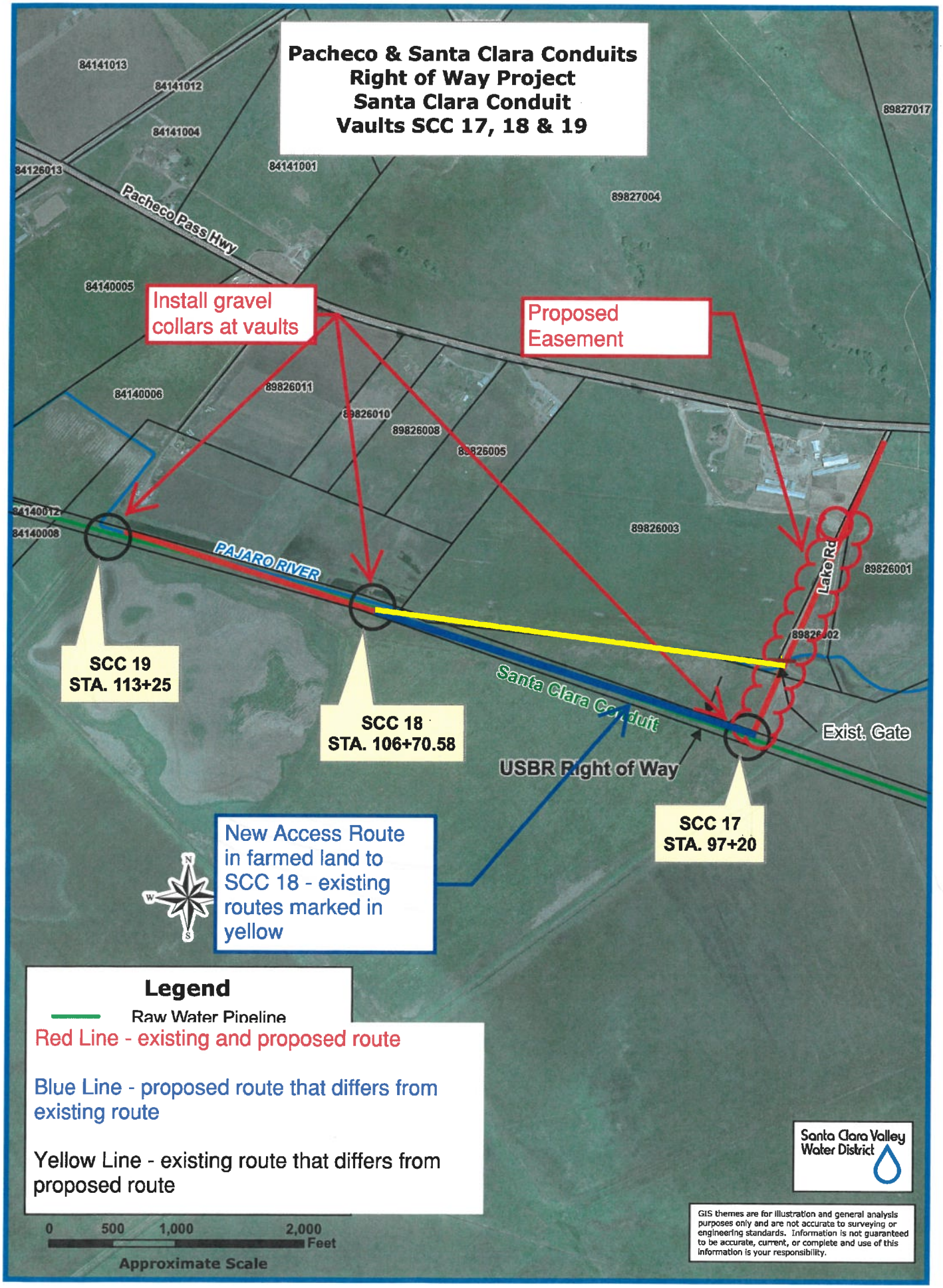

Pacheco & Santa Clara Conduits
Right of Way Project
Pacheco Conduit
PC 34, 35 & 36
89820014
89820042
Install gravel collar around vault
89820032
89860003
89821016
89860004
Pacheco Conduit
89821018
89860002
PC 34
STA. 102+89.11
PC 35
STA. 103+93.15
89860001
PC 36
STA. 108+37.45
89859005
89859006
89821023
N
W
E
S
Legend
Raw Water Pipeline
Red Line - existing and proposed route
Blue Line - proposed route that differs from existing route
Yellow Line - existing route that differs from proposed route
0
455
910
1,820
Feet
Approximate Scale
Santa Clara Valley Water District
GIS themes are for illustration and general analysis purposes only and are not accurate to surveying or engineering standards. Information is not guaranteed to be accurate, current, or complete and use of this information is your responsibility.

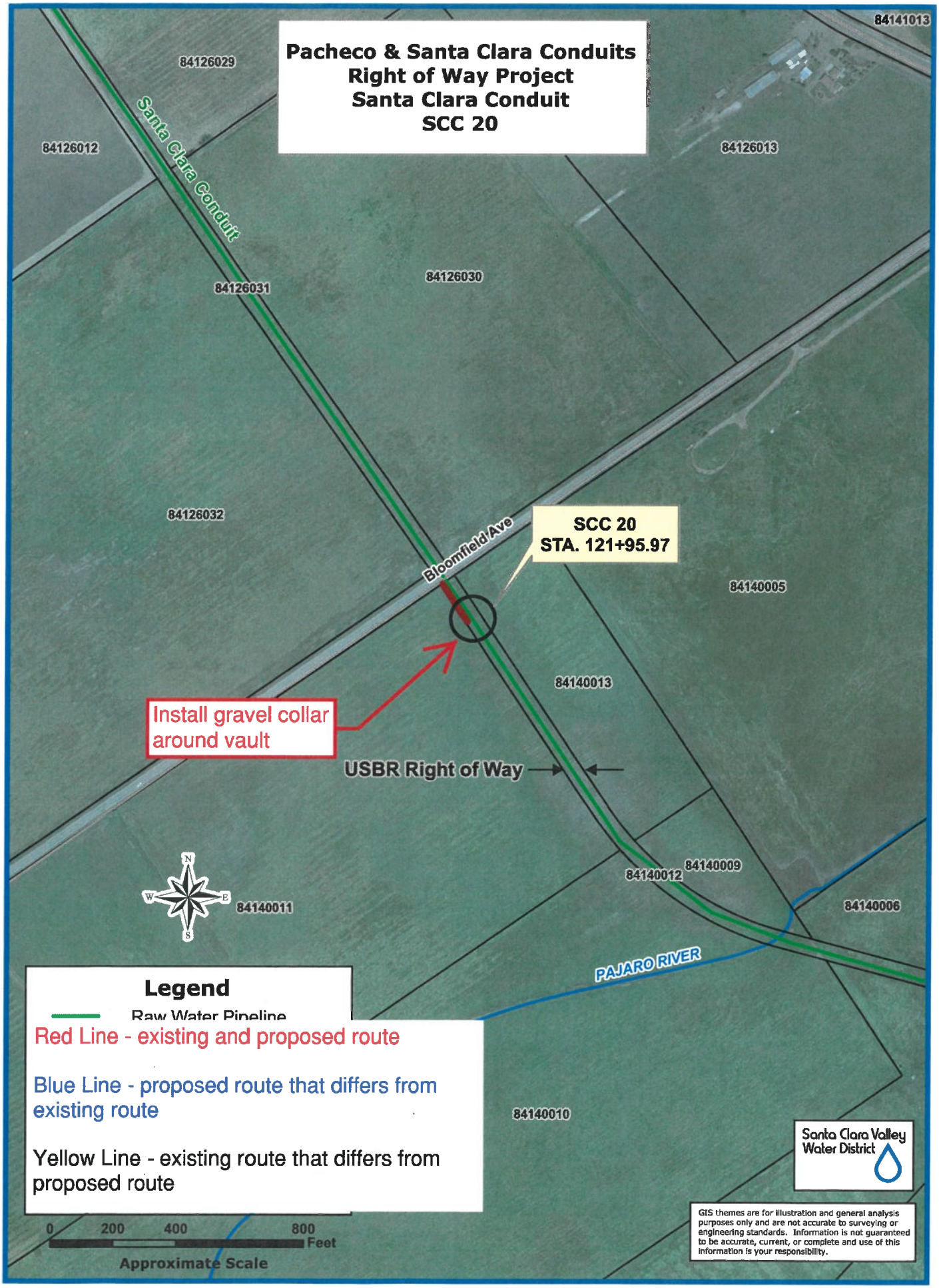

Pacheco and Santa Clara Conduits
Right of Way Project
Pacheco Conduit
PC 37, 38, 39, 40
New Access Route in grazing land to PC 38 - existing route marked in yellow (parking on Hwy 152 and hopping fence)
PC 37
STA. 112+54.28
PC 38
STA. 119+77.31
PC 39
STA. 123+28.48
PC 40
STA. 123+94.20
Vault accessed by climbing over fence
89820042
89820032
89860004
89860002
89860001
89859005
89821023
89820033
89859006
89821022
89820036
89821021
89859007
89820043
89859004
89821014
Legend
Raw Water Pipeline
Red Line - existing and proposed route
Blue Line - proposed route that differs from existing route
Yellow Line - existing route that differs from proposed route
0
465
930
1,860
Feet
Approximate Scale
Santa Clara Valley Water District
GIS themes are for illustration and general analysis purposes only and are not accurate to surveying or engineering standards. Information is not guaranteed to be accurate, current, or complete and use of this information is your responsibility.


Pacheco and Santa Clara Conduits
Right of Way Project
Santa Clara Conduit
Vaults SCC 7 & 8
Santa Clara Tunnel
USBR Right of Way
89824029
Existing Access Route to SCC 7 remains unchanged.
89824010
SCC 7
STA. 30+74
89824030
ORTEGA CREEK
SCC 8
STA. 38+95.8
Existing Access Route in grazing land perpendicular to pipeline from SCC 8 - dirt road parallel to pipeline
89831001
New Access Route in grazing land to SCC 8 - existing route marked in yellow
Grade new access route to vault SCC 8
Existing gate
Pacheco Pass Highway
Legend
Raw Water Pipeline
Red Line - existing and proposed route
Blue Line - proposed route that differs from existing route
Yellow Line - existing route that differs from proposed route
0 360 720 1,440 Feet
Approximate Scale
Santa Clara Valley Water District
GIS themes are for illustration and general analysis purposes only and are not accurate to surveying or engineering standards. Information is not guaranteed to be accurate, current, or complete and use of this information is your responsibility.


Pacheco & Santa Clara Conduits
Right of Way Project
Santa Clara Conduit
Vault SCC 11
New Access Route in farmed land to SCC 11 - existing route marked in yellow
Construct new driveway and gate at Lovers Lane
Install gravel collar around vault
89831005
Pacheco Pass Hy
89825036
89825036
ORTEGA CREEK
89825042
89825042
Lovers Ln
89825043
89825043
89825038
Santa Clara Conduit
89825040
SCC 11
STA. 59+89.38
N
W
E
S
Legend
Raw Water Pipeline
Red Line - existing and proposed route
Blue Line - proposed route that differs from existing route
Yellow Line - existing route that differs from proposed route
0
210
420
840
Feet
Approximate Scale
Santa Clara Valley Water District
GIS themes are for illustration and general analysis purposes only and are not accurate to surveying or engineering standards. Information is not guaranteed to be accurate, current, or complete and use of this information is your responsibility.


Pacheco & Santa Clara Conduits
Right of Way Project
Santa Clara Conduit
Vaults SCC 12, 12A & 13
SCC 13
STA. 80+41
SCC 12A
STA. 74+36
SCC 12
STA. 68+66.32
Install new
location marker
Install new gates
in existing fences
New Access Route in farmed
land to SCC 12 - existing route
marked in yellow
Construct new
driveway and gate
at Lovers Lane
Santa Clara Conduit
Legend
Raw Water Pipeline
Red Line - existing and proposed route
Blue Line - proposed route that differs from existing route
Yellow Line - existing route that differs from proposed route
0 475 950 1,900
Feet
Approximate Scale
Santa Clara Valley Water District
GIS themes are for illustration and general analysis purposes only and are not accurate to surveying or engineering standards. Information is not guaranteed to be accurate, current, or complete and use of this information is your responsibility.


Pacheco & Santa Clara Conduits
Right of Way Project
Santa Clara Conduit
Vaults SCC 17, 18 & 19
84141013
84141012
84141004
84126013
84141001
89827017
89827004
Pacheco Pass Hwy
84140005
Install gravel collars at vaults
Proposed Easement
84140006
89826011
89826010
89826008
89826005
84140012
84140008
89826003
PAJARO RIVER
Lake Rd
89826001
89826002
SCC 19
STA. 113+25
SCC 18
STA. 106+70.58
Santa Clara Conduit
Exist. Gate
USBR Right of Way
SCC 17
STA. 97+20
New Access Route in farmed land to SCC 18 - existing routes marked in yellow
N
W
S
Legend
Raw Water Pipeline
Red Line - existing and proposed route
Blue Line - proposed route that differs from existing route
Yellow Line - existing route that differs from proposed route
0
500
1,000
2,000
Feet
Approximate Scale
Santa Clara Valley Water District
GIS themes are for illustration and general analysis purposes only and are not accurate to surveying or engineering standards. Information is not guaranteed to be accurate, current, or complete and use of this information is your responsibility.


Pacheco & Santa Clara Conduits
Right of Way Project
Santa Clara Conduit
SCC 20
84141013
84126029
84126012
84126013
Santa Clara Conduit
84126031
84126030
84126032
Bloomfield Ave
SCC 20
STA. 121+95.97
84140005
84140013
Install gravel collar around vault
USBR Right of Way
N
W
E
S
84140011
84140012
84140009
84140006
PAJARO RIVER
84140010
Legend
Raw Water Pipeline
Red Line - existing and proposed route
Blue Line - proposed route that differs from existing route
Yellow Line - existing route that differs from proposed route
0
200
400
800
Feet
Approximate Scale
Santa Clara Valley Water District
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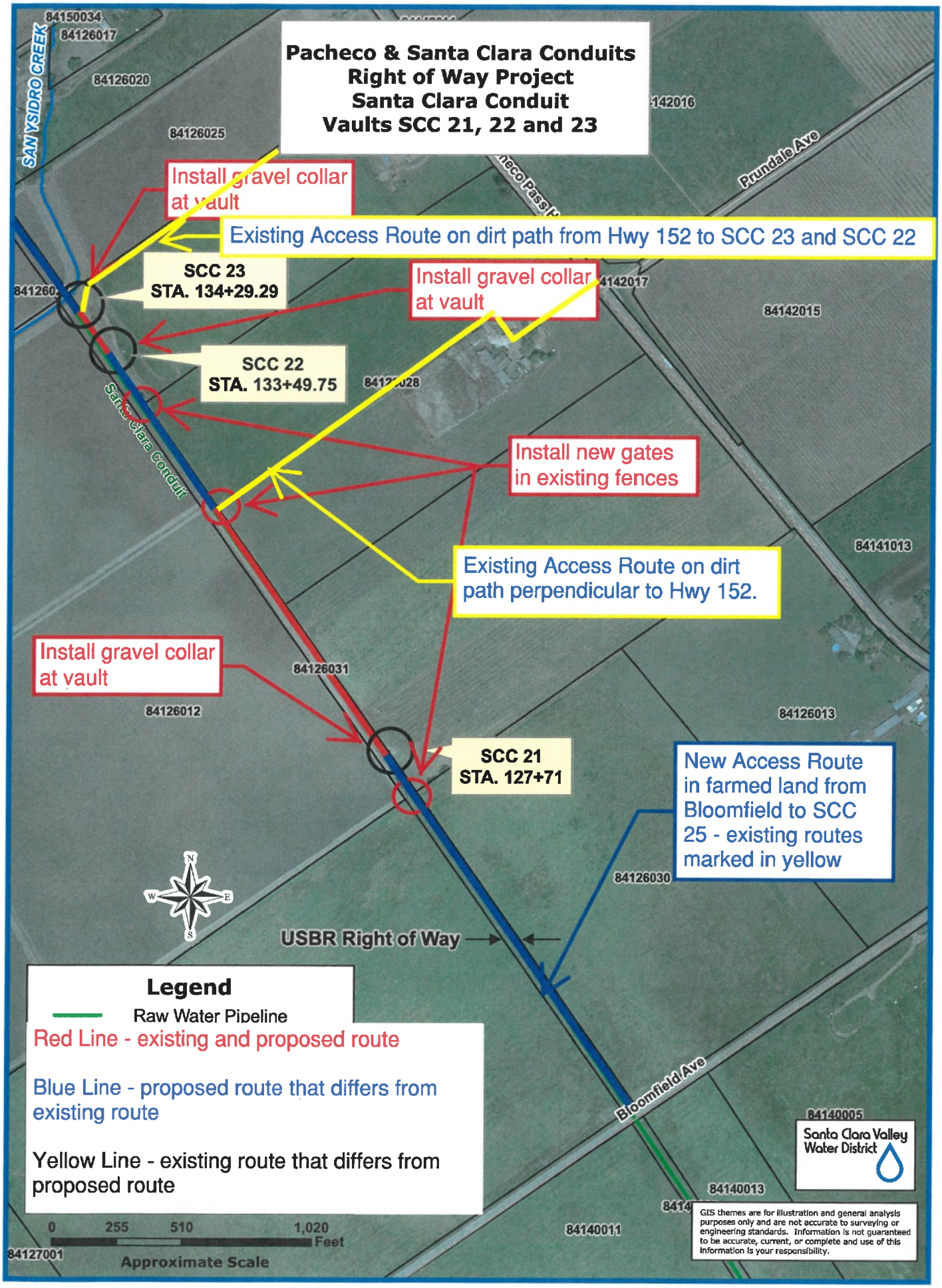
Pacheco & Santa Clara Conduits
Right of Way Project
Santa Clara Conduit
Vaults SCC 21, 22 and 23
Install gravel collar at vault
Existing Access Route on dirt path from Hwy 152 to SCC 23 and SCC 22
SCC 23
STA. 134+29.29
Install gravel collar at vault
SCC 22
STA. 133+49.75
Install new gates in existing fences
Existing Access Route on dirt path perpendicular to Hwy 152.
Install gravel collar at vault
SCC 21
STA. 127+71
New Access Route in farmed land from Bloomfield to SCC 25 - existing routes marked in yellow
USBR Right of Way
SAN YSIDRO CREEK
Prundale Ave
Bloomfield Ave
Santa Clara Conduit
84150034
84126017
84126020
84126025
84142016
84142017
84142015
84126028
84141013
84126031
84126012
84126013
84126030
84140005
84140013
84140011
84127001
Legend
Raw Water Pipeline
Red Line - existing and proposed route
Blue Line - proposed route that differs from existing route
Yellow Line - existing route that differs from proposed route
0 255 510 1,020 Feet
Approximate Scale
Santa Clara Valley Water District
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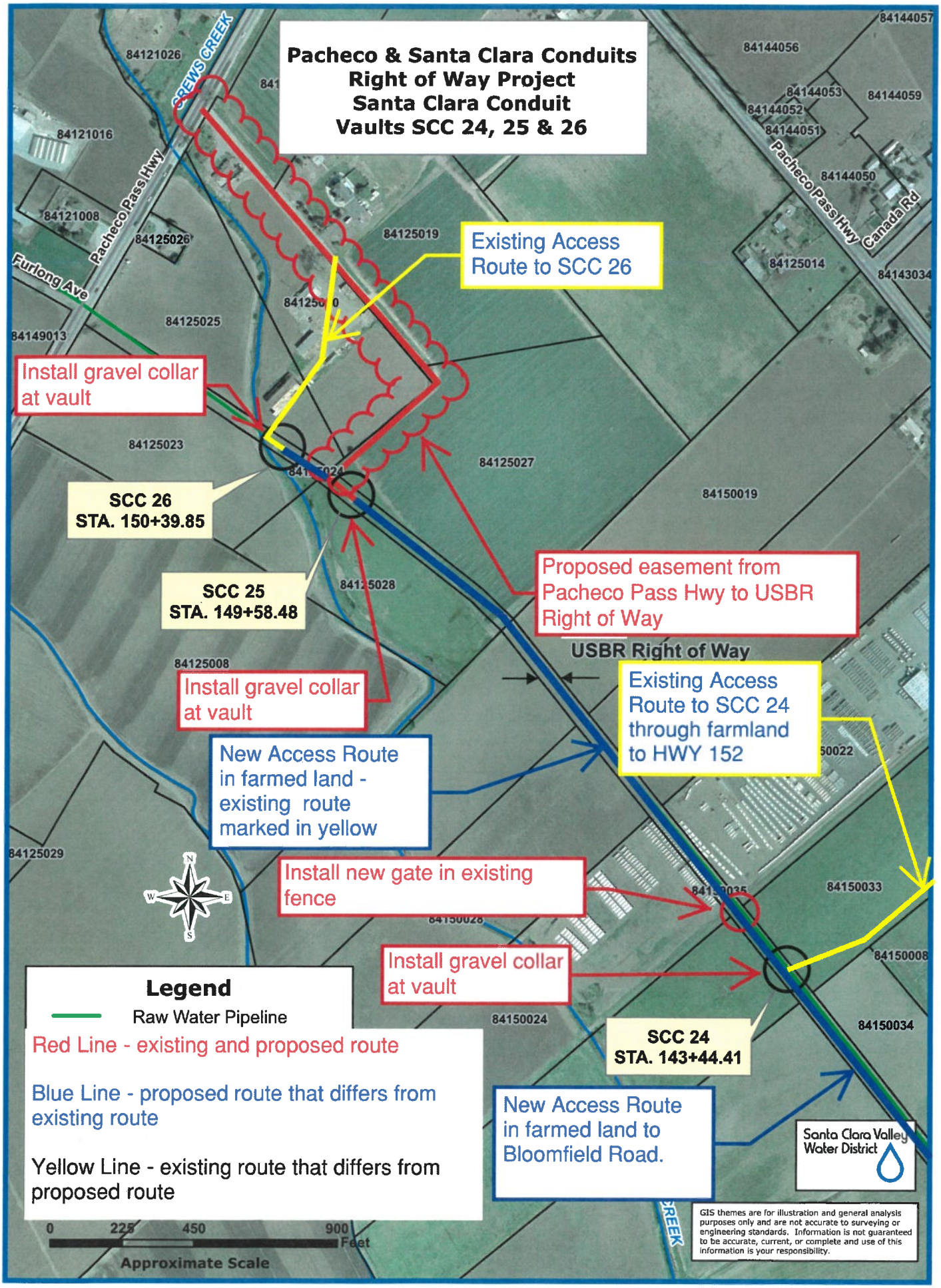
Pacheco & Santa Clara Conduits
Right of Way Project
Santa Clara Conduit
Vaults SCC 24, 25 & 26
Existing Access Route to SCC 26
Install gravel collar at vault
SCC 26
STA. 150+39.85
SCC 25
STA. 149+58.48
Install gravel collar at vault
Proposed easement from Pacheco Pass Hwy to USBR Right of Way
USBR Right of Way
Existing Access Route to SCC 24 through farmland to HWY 152
New Access Route in farmed land - existing route marked in yellow
Install new gate in existing fence
Install gravel collar at vault
SCC 24
STA. 143+44.41
New Access Route in farmed land to Bloomfield Road.
Legend
Raw Water Pipeline
Red Line - existing and proposed route
Blue Line - proposed route that differs from existing route
Yellow Line - existing route that differs from proposed route
0 225 450 900 Feet
Approximate Scale
Crews Creek
Pacheco Pass Hwy
Furlong Ave
Canada Rd
84121026
84121016
84121008
84125026
84125019
84125025
84149013
84125023
84125027
84150019
84125028
84125008
84125029
84150033
84150008
84150024
84150034
84144057
84144056
84144053
84144059
84144052
84144051
84144050
84125014
84143034
Santa Clara Valley Water District
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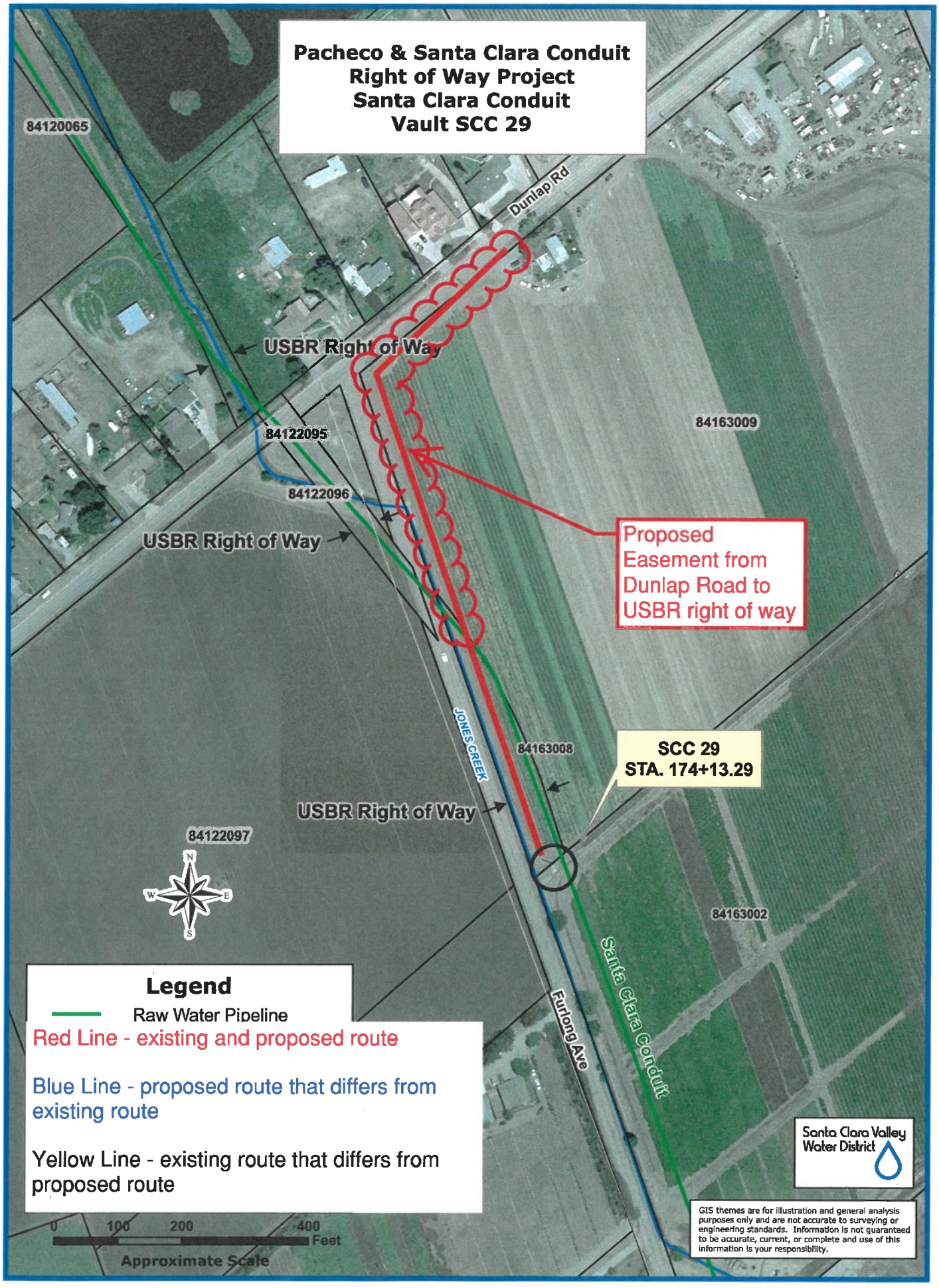
Pacheco & Santa Clara Conduit
Right of Way Project
Santa Clara Conduit
Vault SCC 29
84120065
Dunlap Rd
USBR Right of Way
84163009
84122095
84122096
USBR Right of Way
Proposed
Easement from
Dunlap Road to
USBR right of way
JONES CREEK
84163008
SCC 29
STA. 174+13.29
USBR Right of Way
84122097
84163002
Santa Clara Conduit
Furlong Ave
Legend
Raw Water Pipeline
Red Line - existing and proposed route
Blue Line - proposed route that differs from existing route
Yellow Line - existing route that differs from proposed route
0 100 200 400 Feet
Approximate Scale
Santa Clara Valley Water District
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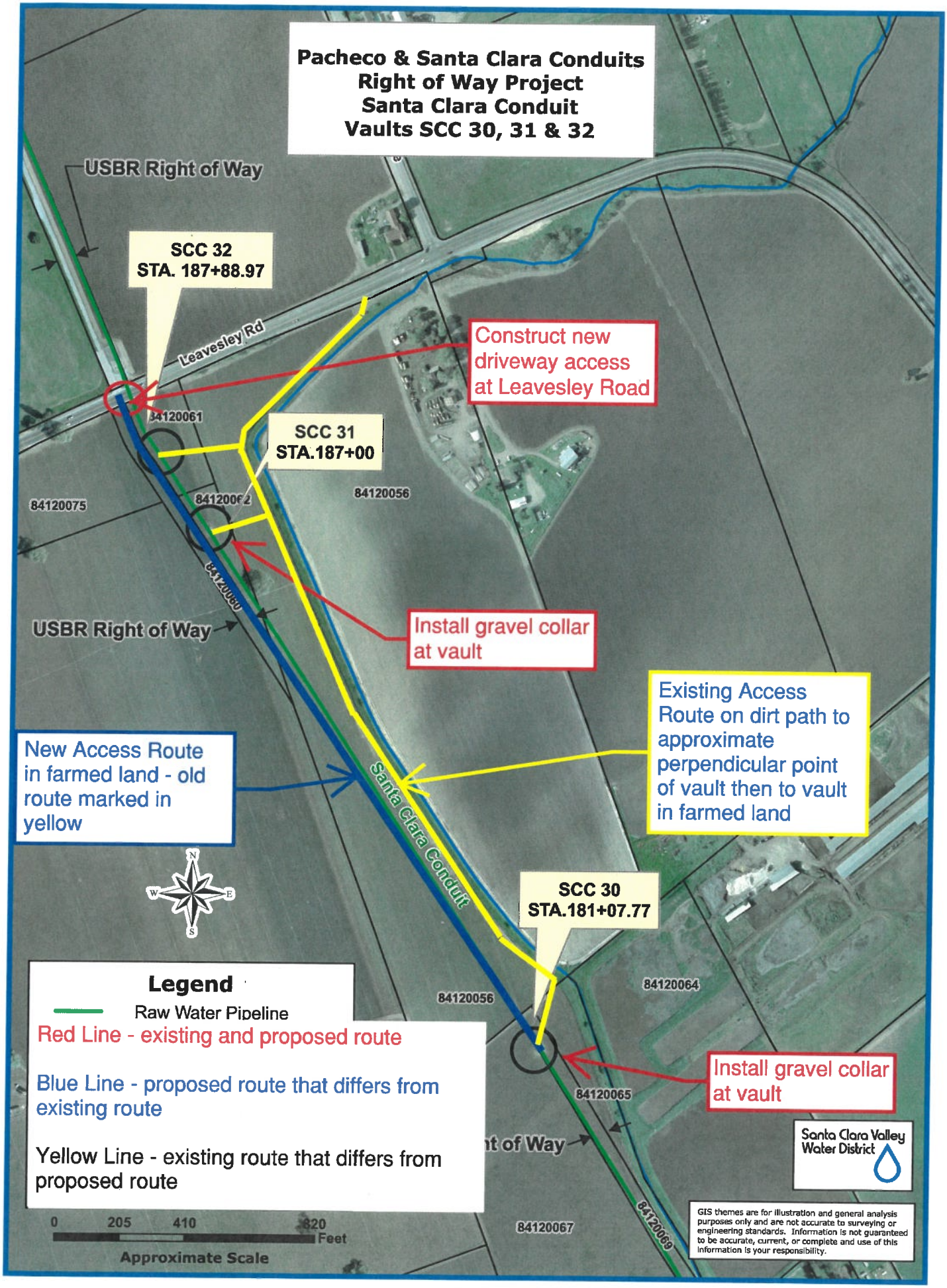
Pacheco & Santa Clara Conduits
Right of Way Project
Santa Clara Conduit
Vaults SCC 30, 31 & 32
USBR Right of Way
SCC 32
STA. 187+88.97
Leavesley Rd
Construct new driveway access at Leavesley Road
84120061
SCC 31
STA.187+00
84120056
84120075
84120062
84120050
USBR Right of Way
Install gravel collar at vault
Existing Access Route on dirt path to approximate perpendicular point of vault then to vault in farmed land
New Access Route in farmed land - old route marked in yellow
Santa Clara Conduit
SCC 30
STA.181+07.77
84120064
84120056
Install gravel collar at vault
84120065
Legend
Raw Water Pipeline
Red Line - existing and proposed route
Blue Line - proposed route that differs from existing route
Yellow Line - existing route that differs from proposed route
0 205 410 820 Feet
Approximate Scale
84120067
84120069
Santa Clara Valley Water District
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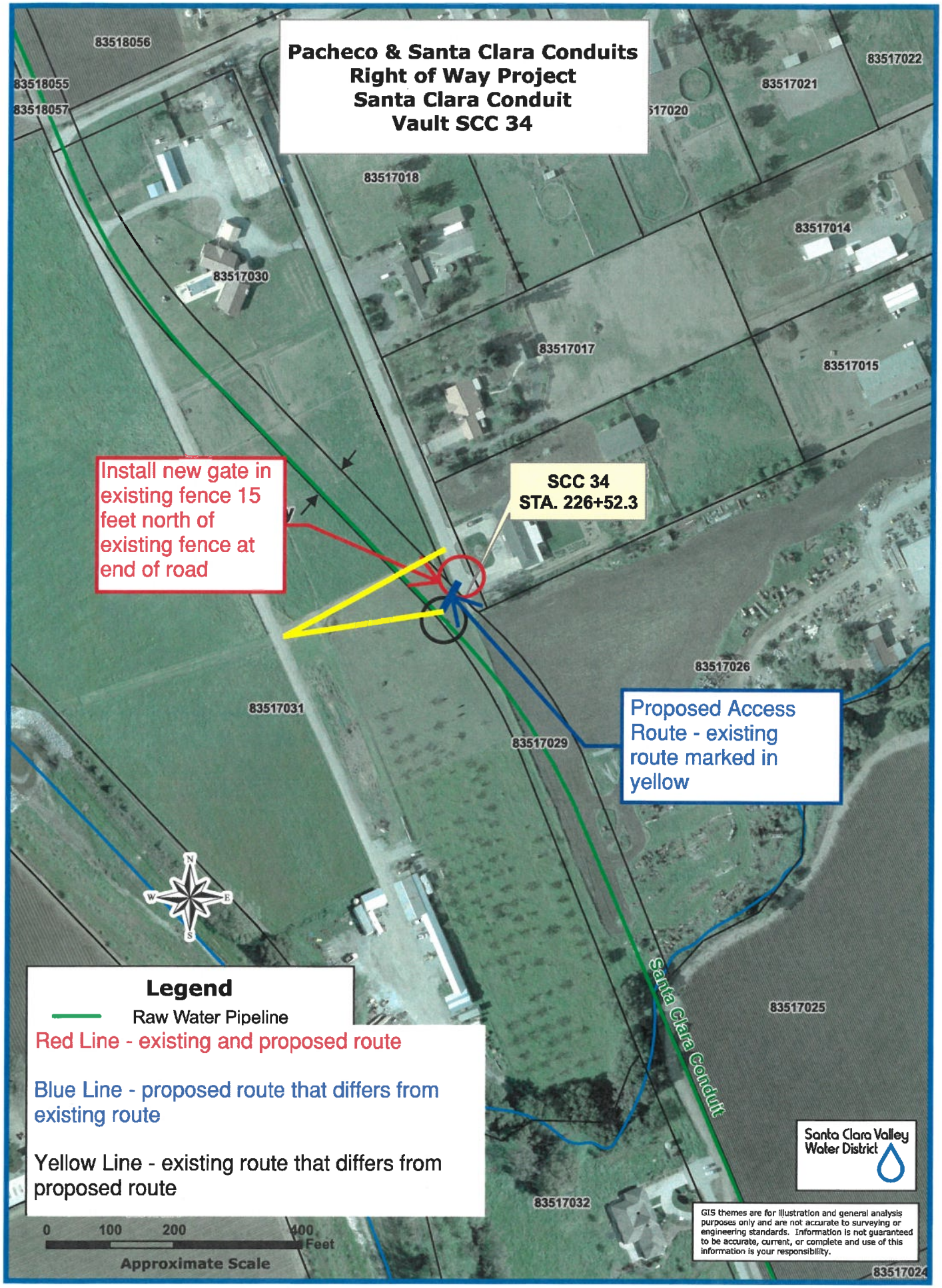
Pacheco & Santa Clara Conduits
Right of Way Project
Santa Clara Conduit
Vault SCC 34
83518056
83518055
83518057
83517022
83517021
83517020
83517018
83517014
83517030
83517017
83517015
Install new gate in existing fence 15 feet north of existing fence at end of road
SCC 34
STA. 226+52.3
83517026
83517031
83517029
Proposed Access Route - existing route marked in yellow
N
W
E
S
Legend
Raw Water Pipeline
Red Line - existing and proposed route
Blue Line - proposed route that differs from existing route
Yellow Line - existing route that differs from proposed route
Santa Clara Conduit
83517025
83517032
0 100 200 400 Feet
Approximate Scale
Santa Clara Valley Water District
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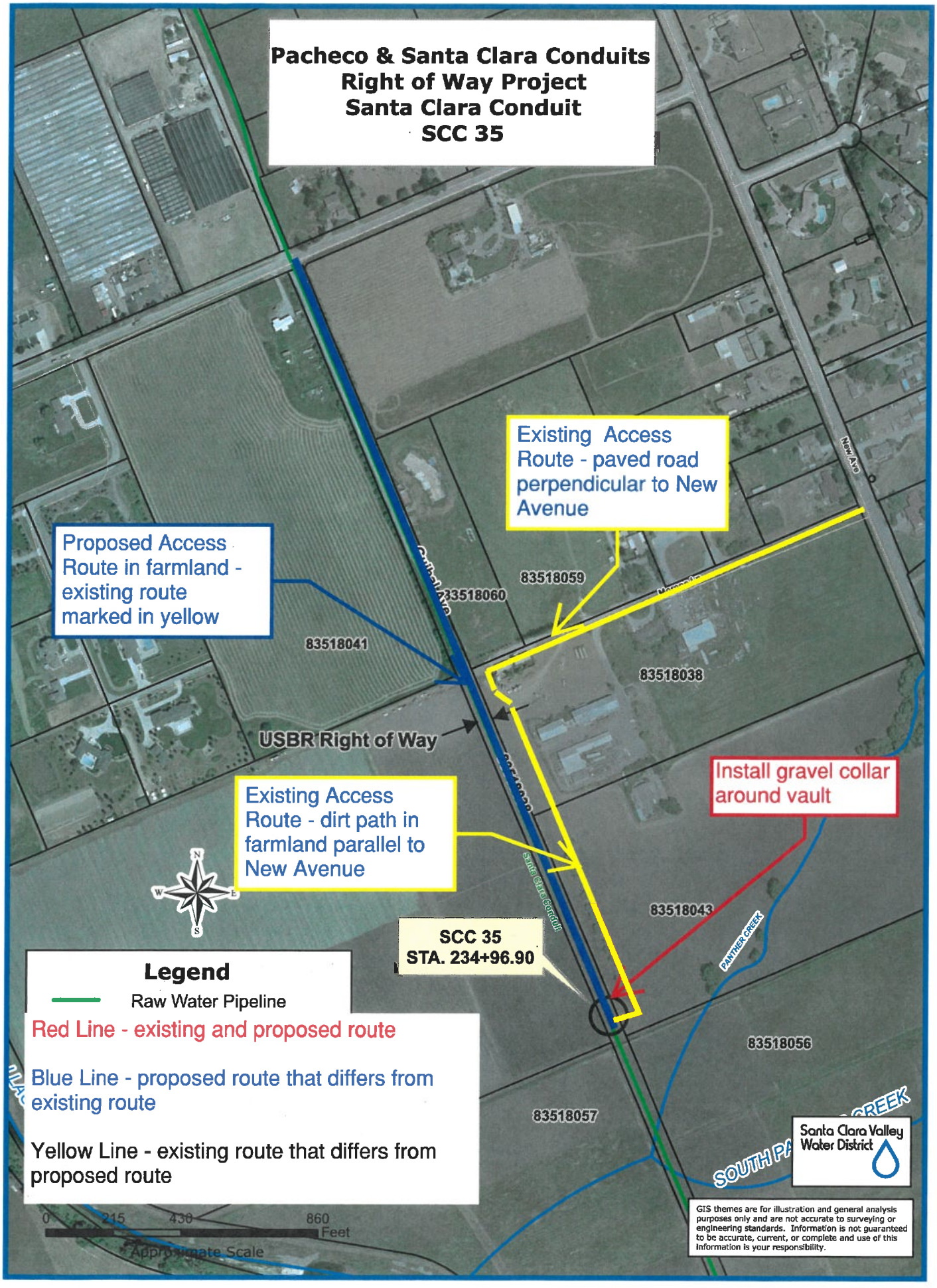
83517024


Pacheco & Santa Clara Conduits
Right of Way Project
Santa Clara Conduit
SCC 35
Existing Access Route - paved road perpendicular to New Avenue
Proposed Access Route in farmland - existing route marked in yellow
Existing Access Route - dirt path in farmland parallel to New Avenue
Install gravel collar around vault
USBR Right of Way
83518059
83518060
83518041
83518038
83518043
83518056
83518057
SCC 35
STA. 234+96.90
Legend
Raw Water Pipeline
Red Line - existing and proposed route
Blue Line - proposed route that differs from existing route
Yellow Line - existing route that differs from proposed route
0
215
430
860
Feet
Approximate Scale
Santa Clara Valley Water District
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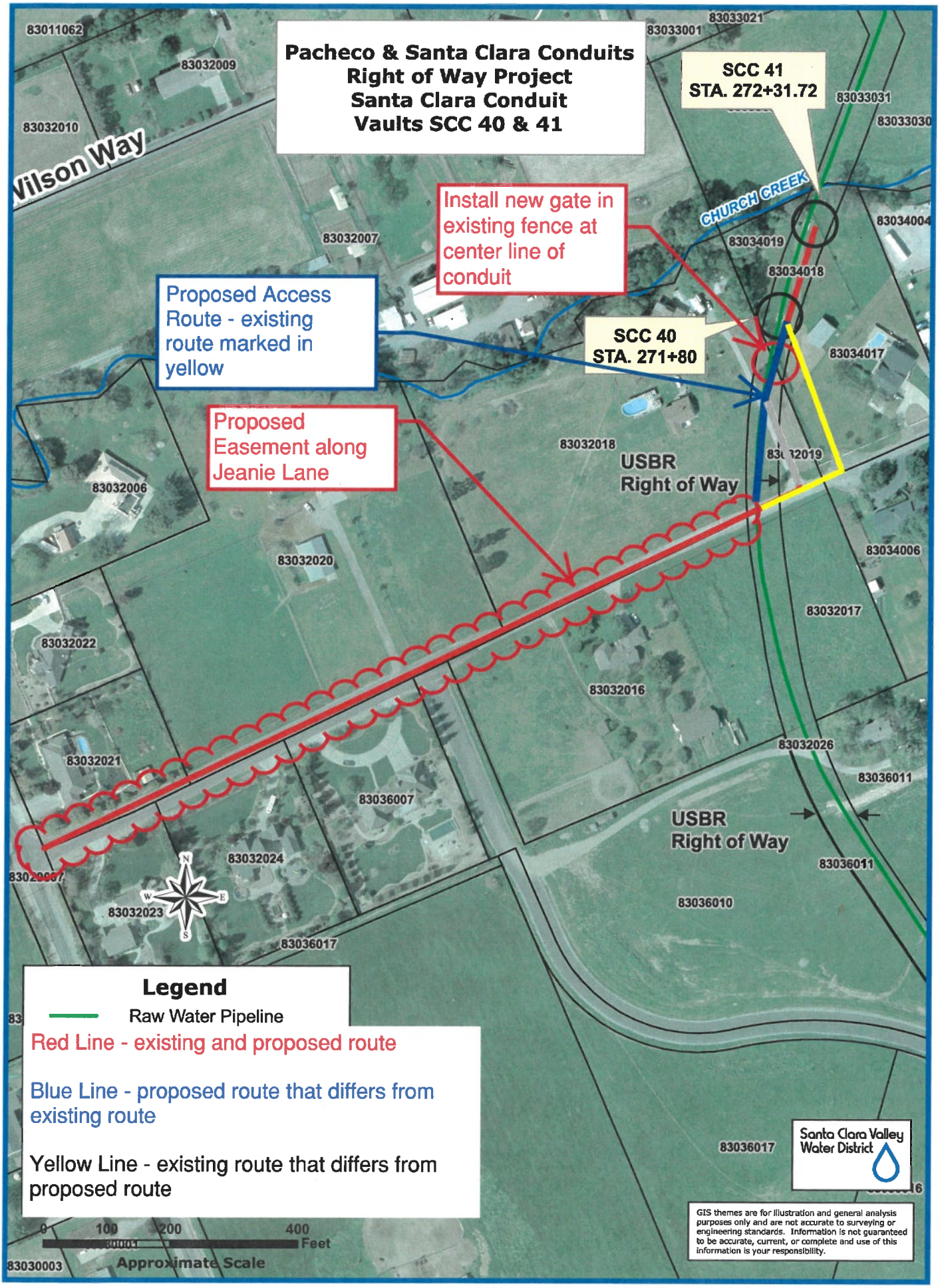
Pacheco & Santa Clara Conduits
Right of Way Project
Santa Clara Conduit
Vaults SCC 40 & 41
SCC 41
STA. 272+31.72
SCC 40
STA. 271+80
Install new gate in existing fence at center line of conduit
Proposed Access Route - existing route marked in yellow
Proposed Easement along Jeanie Lane
USBR Right of Way
USBR Right of Way
Vilson Way
CHURCH CREEK
83011062
83032009
83032010
83032007
83033021
83033001
83033031
83033030
83034004
83034019
83034018
83034017
83032018
83032006
83032020
83034006
83032017
83032022
83032016
83032026
83032021
83036011
83036007
83032024
83032023
83036010
83036017
Legend
Raw Water Pipeline
Red Line - existing and proposed route
Blue Line - proposed route that differs from existing route
Yellow Line - existing route that differs from proposed route
0 100 200 400
Feet
Approximate Scale
Santa Clara Valley Water District
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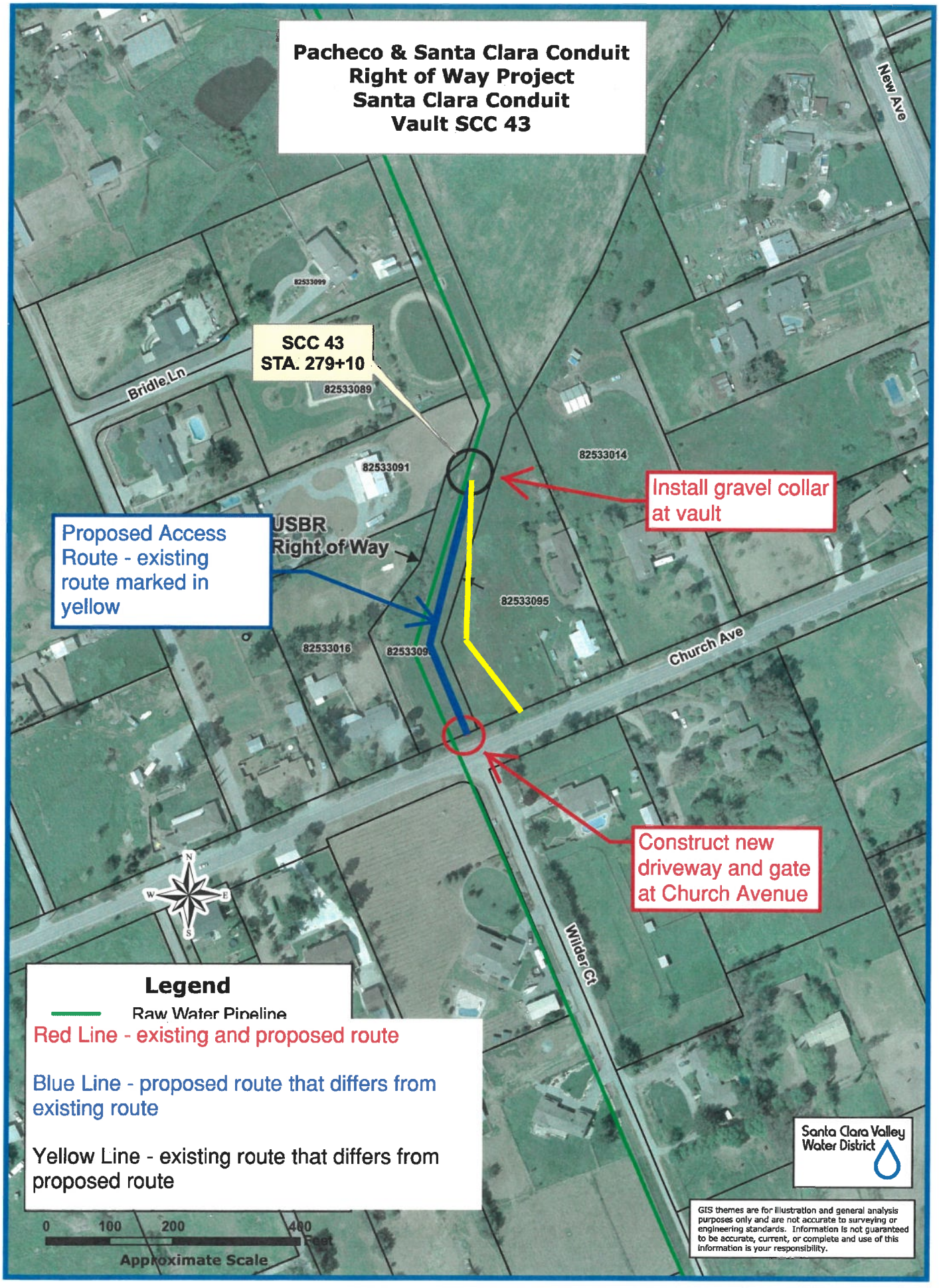
Pacheco & Santa Clara Conduit
Right of Way Project
Santa Clara Conduit
Vault SCC 43
SCC 43
STA. 279+10
Bridle Ln
New Ave
82533099
82533089
82533091
82533014
82533095
82533016
82533096
Church Ave
Wilder Ct
USBR
Right of Way
Proposed Access Route - existing route marked in yellow
Install gravel collar at vault
Construct new driveway and gate at Church Avenue
N
W
E
S
Legend
Raw Water Pipeline
Red Line - existing and proposed route
Blue Line - proposed route that differs from existing route
Yellow Line - existing route that differs from proposed route
0
100
200
400
Feet
Approximate Scale
Santa Clara Valley Water District
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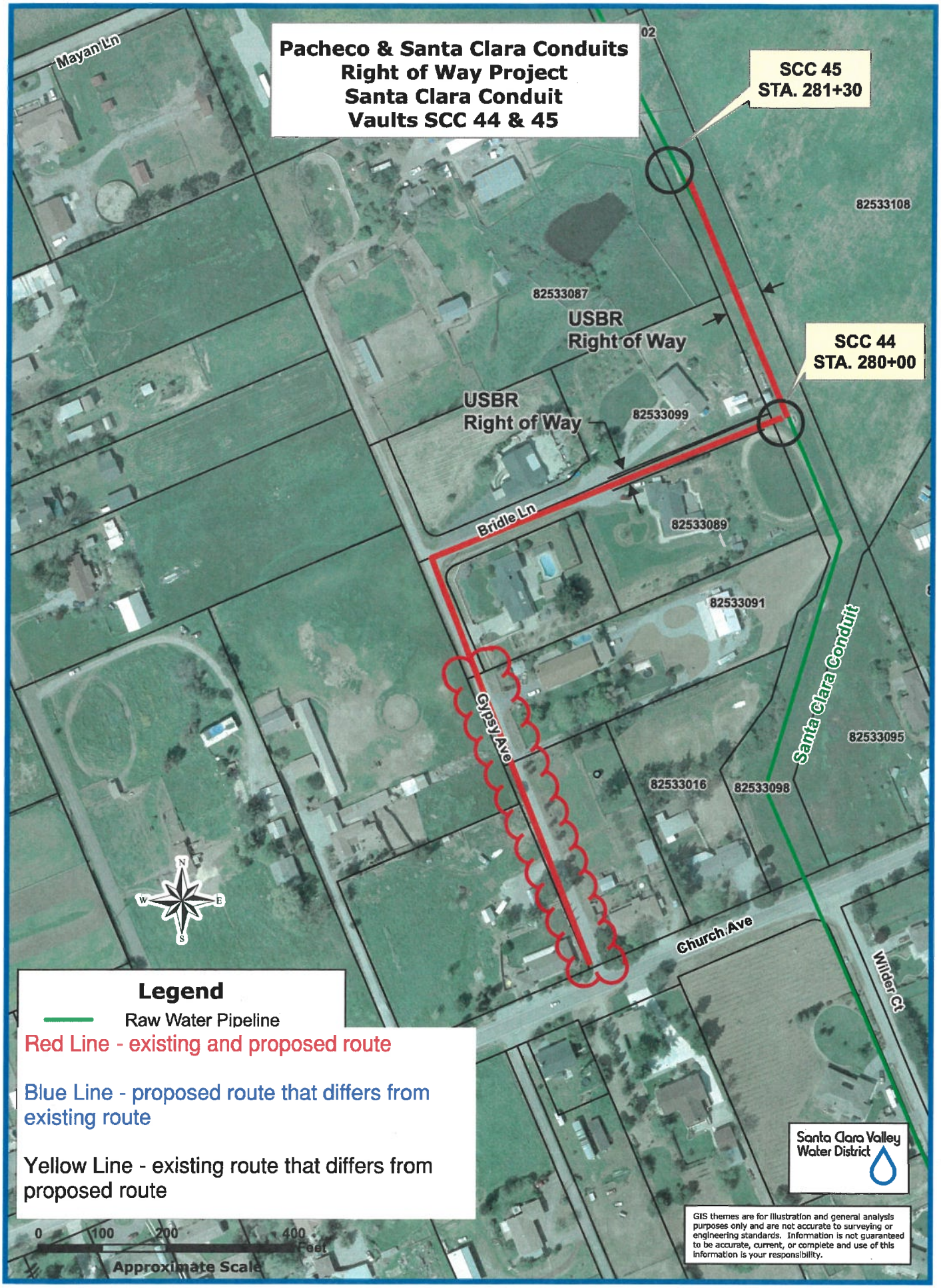
Pacheco & Santa Clara Conduits
Right of Way Project
Santa Clara Conduit
Vaults SCC 44 & 45
SCC 45
STA. 281+30
SCC 44
STA. 280+00
USBR
Right of Way
USBR
Right of Way
Mayan Ln
Bridle Ln
Gypsy Ave
Santa Clara Conduit
Church Ave
Wilder Ct
82533108
82533087
82533099
82533089
82533091
82533095
82533016
82533098
Legend
Raw Water Pipeline
Red Line - existing and proposed route
Blue Line - proposed route that differs from existing route
Yellow Line - existing route that differs from proposed route
0 100 200 400 Feet
Approximate Scale
Santa Clara Valley Water District
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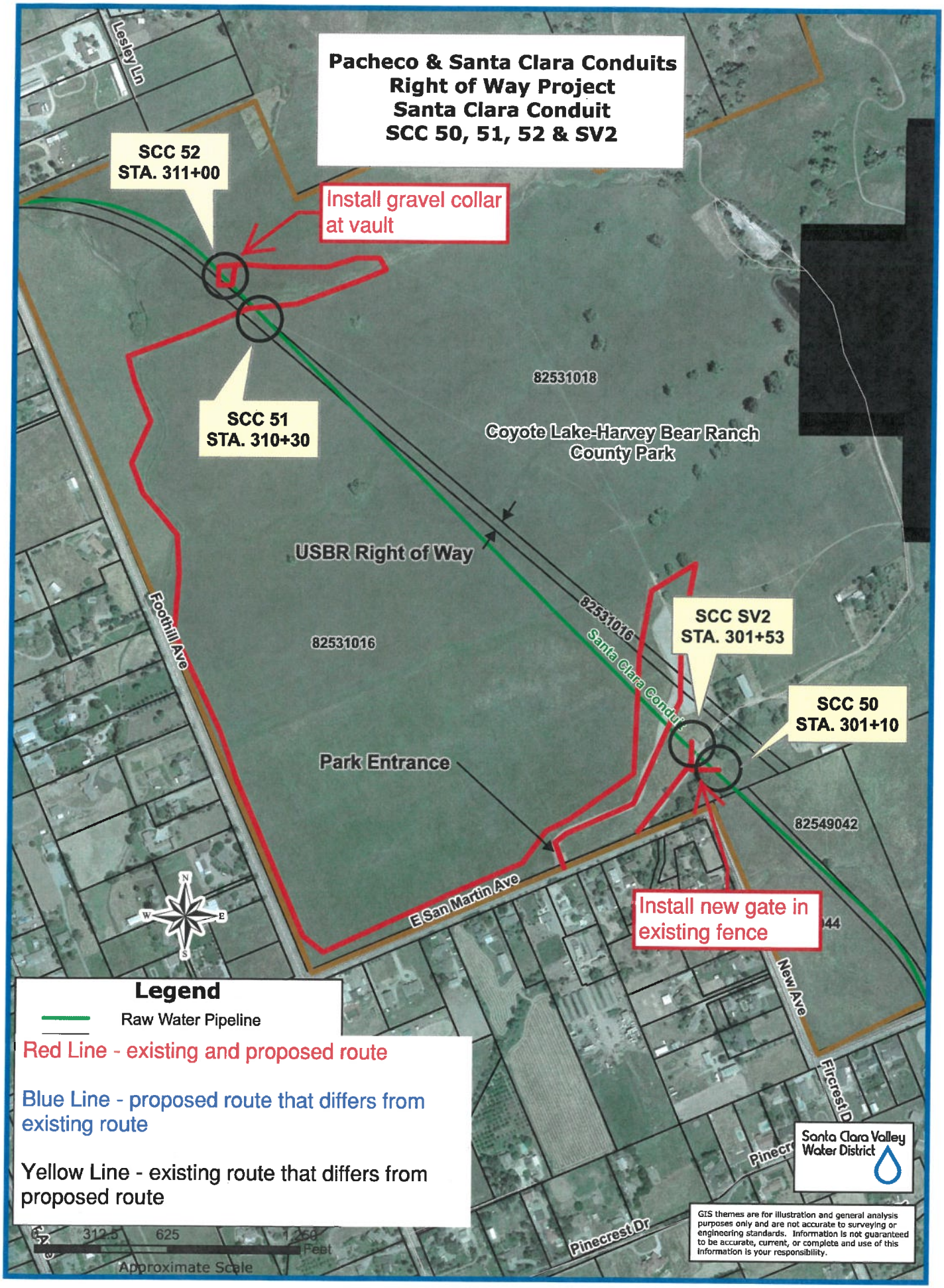
Pacheco & Santa Clara Conduits
Right of Way Project
Santa Clara Conduit
SCC 50, 51, 52 & SV2
SCC 52
STA. 311+00
Install gravel collar at vault
SCC 51
STA. 310+30
82531018
Coyote Lake-Harvey Bear Ranch County Park
USBR Right of Way
82531016
Santa Clara Conduit
SCC SV2
STA. 301+53
SCC 50
STA. 301+10
Park Entrance
82549042
Foothill Ave
Lesley Ln
E San Martin Ave
Install new gate in existing fence
New Ave
Pinecrest Dr
Legend
Raw Water Pipeline
Red Line - existing and proposed route
Blue Line - proposed route that differs from existing route
Yellow Line - existing route that differs from proposed route
312.5
625
1,250
Feet
Approximate Scale
Santa Clara Valley Water District
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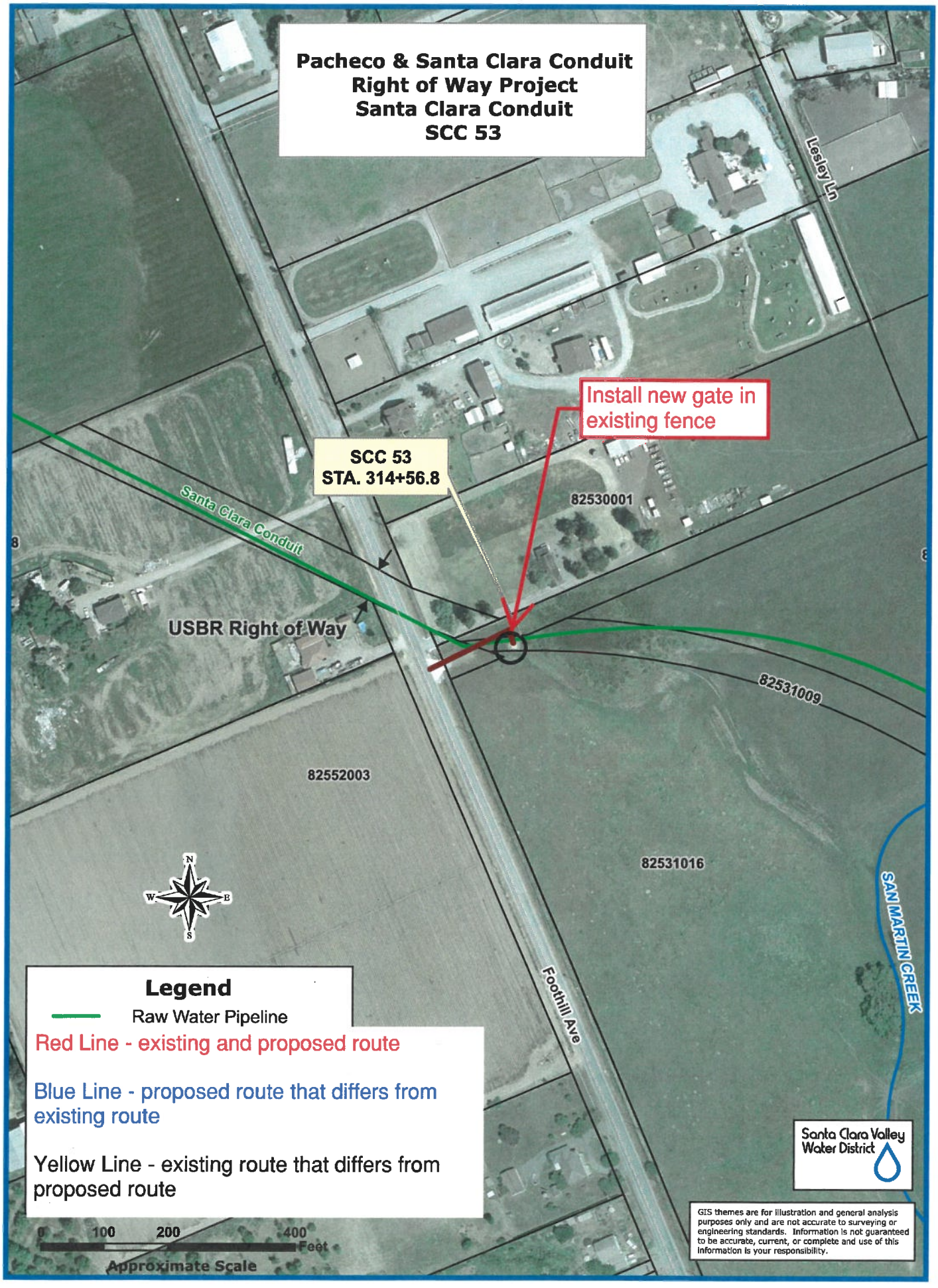
Pacheco & Santa Clara Conduit
Right of Way Project
Santa Clara Conduit
SCC 53
Lesley Ln
Install new gate in existing fence
SCC 53
STA. 314+56.8
Santa Clara Conduit
82530001
USBR Right of Way
82531009
82552003
82531016
SAN MARTIN CREEK
Foothill Ave
N
W
E
S
Legend
Raw Water Pipeline
Red Line - existing and proposed route
Blue Line - proposed route that differs from existing route
Yellow Line - existing route that differs from proposed route
0 100 200 400 Feet
Approximate Scale
Santa Clara Valley Water District
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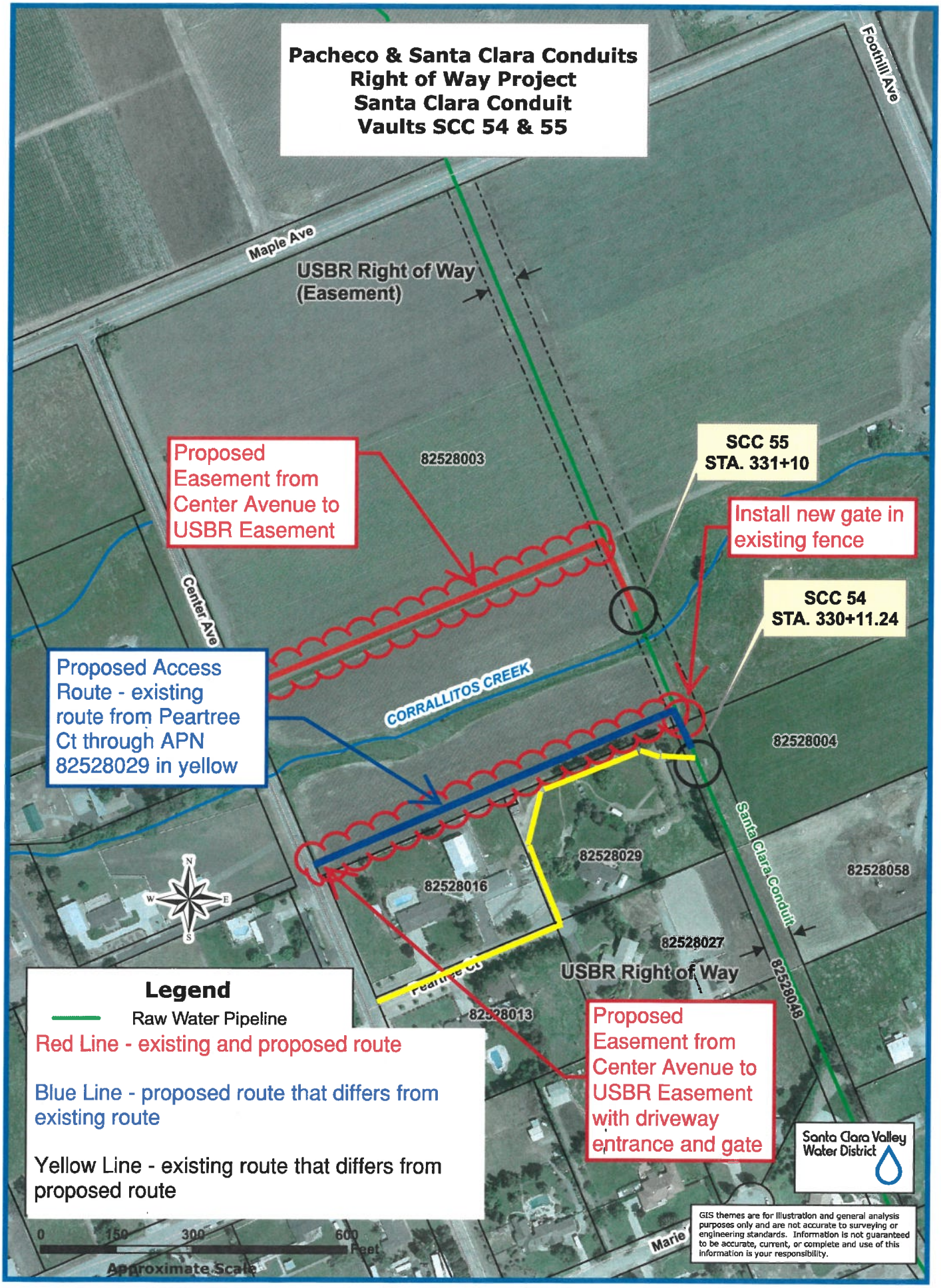
Pacheco & Santa Clara Conduits
Right of Way Project
Santa Clara Conduit
Vaults SCC 54 & 55
Foothill Ave
Maple Ave
USBR Right of Way
(Easement)
Proposed
Easement from
Center Avenue to
USBR Easement
82528003
SCC 55
STA. 331+10
Install new gate in
existing fence
SCC 54
STA. 330+11.24
Center Ave
Proposed Access
Route - existing
route from Peartree
Ct through APN
82528029 in yellow
CORRALLITOS CREEK
82528004
Santa Clara Conduit
82528029
82528058
82528016
82528027
USBR Right of Way
82528048
82528013
Proposed
Easement from
Center Avenue to
USBR Easement
with driveway
entrance and gate
Legend
Raw Water Pipeline
Red Line - existing and proposed route
Blue Line - proposed route that differs from existing route
Yellow Line - existing route that differs from proposed route
0
150
300
600
Feet
Approximate Scale
Santa Clara Valley Water District
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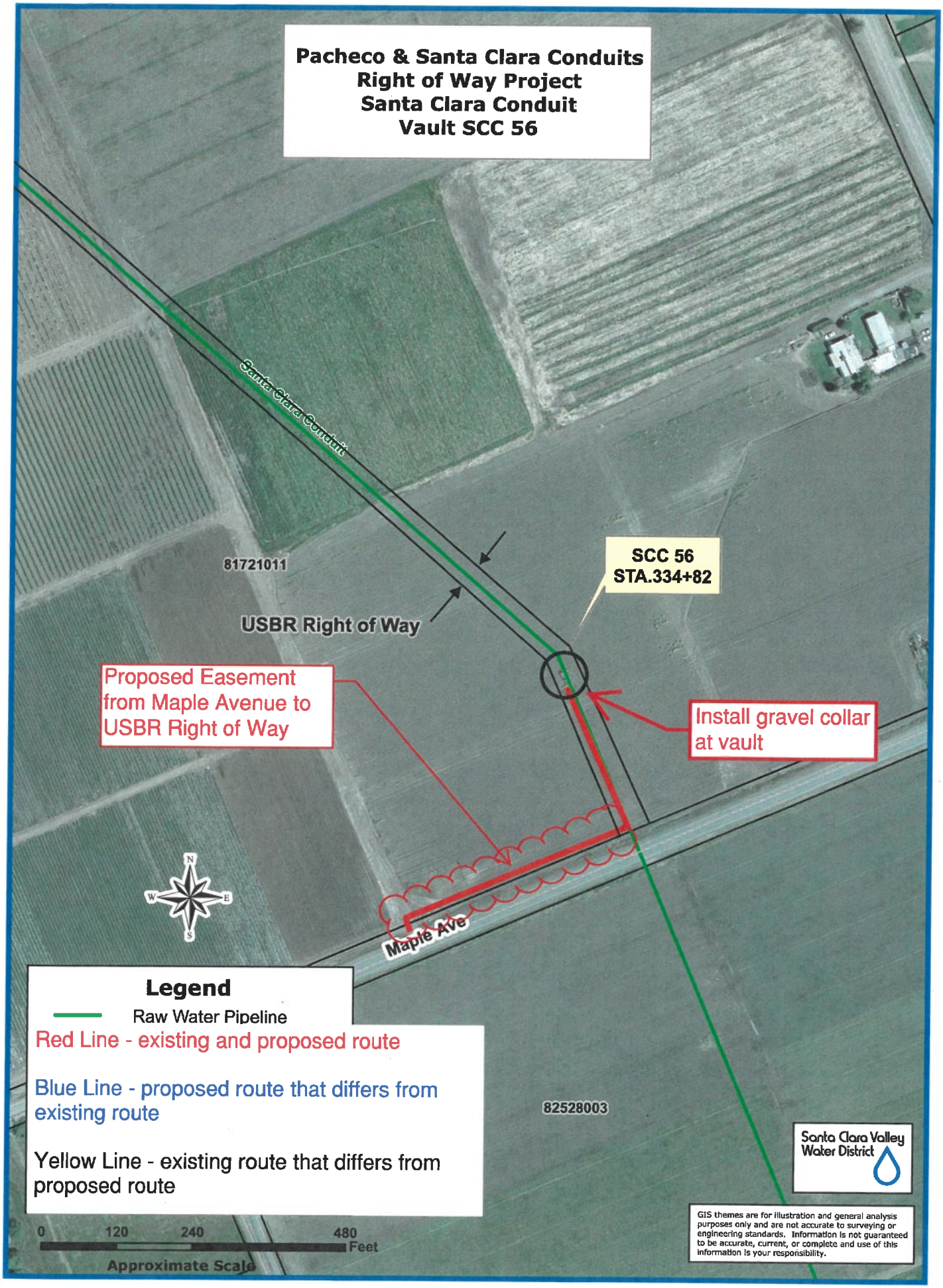
Pacheco & Santa Clara Conduits
Right of Way Project
Santa Clara Conduit
Vault SCC 56
Santa Clara Conduit
81721011
SCC 56
STA.334+82
USBR Right of Way
Proposed Easement from Maple Avenue to USBR Right of Way
Install gravel collar at vault
Maple Ave
82528003
Legend
Raw Water Pipeline
Red Line - existing and proposed route
Blue Line - proposed route that differs from existing route
Yellow Line - existing route that differs from proposed route
0 120 240 480 Feet
Approximate Scale
Santa Clara Valley Water District
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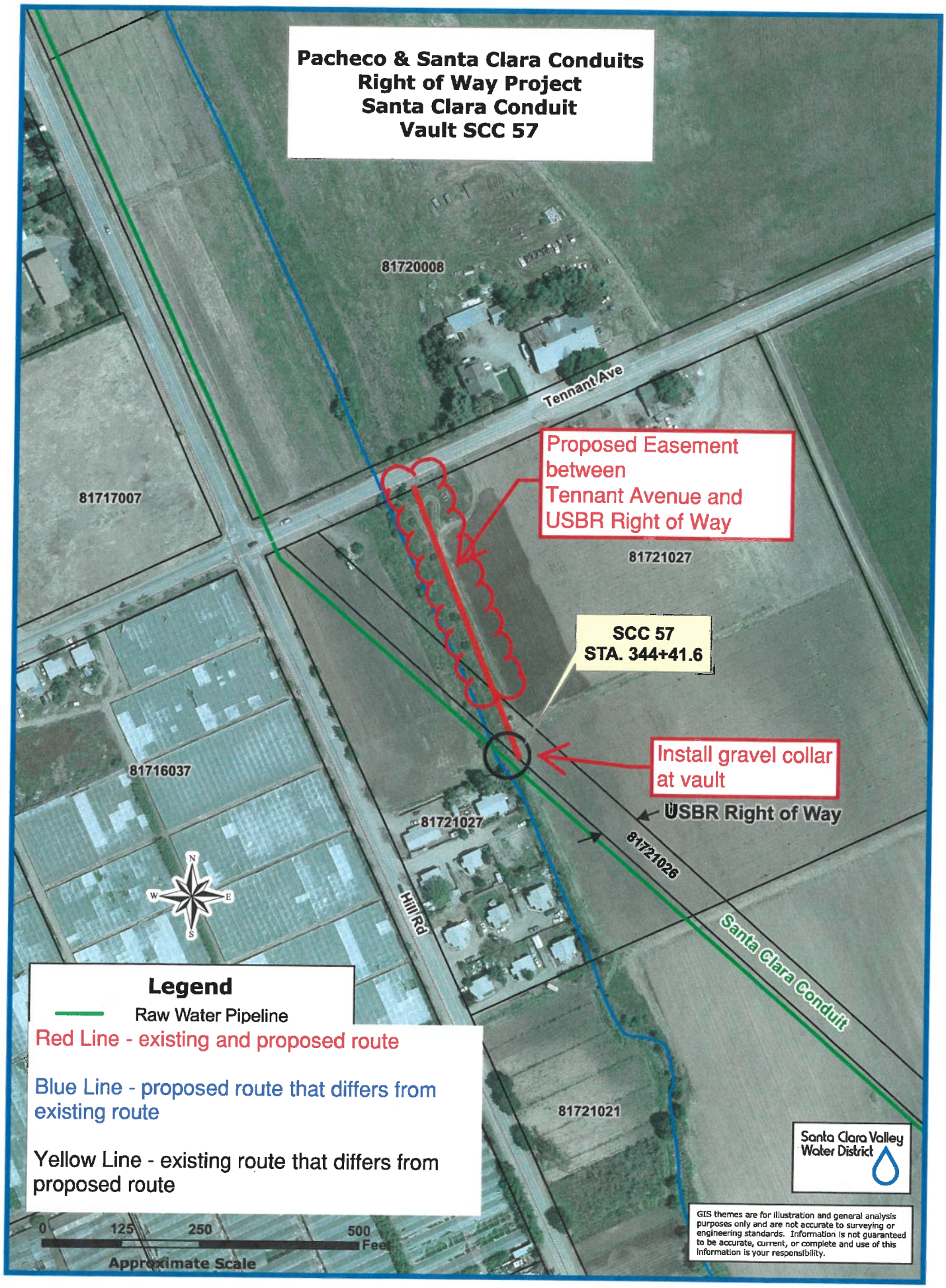
Pacheco & Santa Clara Conduits
Right of Way Project
Santa Clara Conduit
Vault SCC 57
81720008
Tennant Ave
Proposed Easement between Tennant Avenue and USBR Right of Way
81717007
81721027
SCC 57
STA. 344+41.6
Install gravel collar at vault
81716037
USBR Right of Way
81721027
81721026
Hill Rd
Santa Clara Conduit
81721021
Legend
Raw Water Pipeline
Red Line - existing and proposed route
Blue Line - proposed route that differs from existing route
Yellow Line - existing route that differs from proposed route
0
125
250
500
Feet
Approximate Scale
Santa Clara Valley Water District
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Pacheco & Santa Clara Conduits
Right of Way Project
Santa Clara Conduit
Vault SCC 60
Proposed Easement from Hendry Drive to USBR Easement
Existing route - park on Hill Road and hop fence
SCC 60
STA. 368+26.26
USBR Right of Way (Easement)
Proposed Access Route
Jean Ct
Hendry Dr
Hill Rd
Morgan Ave
Santa Clara Conduit
Shafer Ave
Lisa Ct
72803021
N
S
E
W
Legend
Raw Water Pipeline
Red Line - existing and proposed route
Blue Line - proposed route that differs from existing route
Yellow Line - existing route that differs from proposed route
0
100
200
400
Feet
Approximate Scale
Santa Clara Valley Water District
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