

APPENDIX D COSTS FOR PLANNED BUNDLE

Supplemental Information Related to Cost Estimates for Specific Implementation Actions Included in the Preferred Alternative (Planned Bundle) –

This appendix is an excerpt from Attachment A of the *Development of a Basin Plan Amendment for Salt and Boron in the Lower San Joaquin River (LSJR): Task 5 – Economic Analysis* Report by Larry Walker Associates (LWA) Team (October 5, 2015)

Table D-1. Estimated Annual Cost of Monitoring and Surveillance Program for Lower San Joaquin River Reach 83 Related to Compliance Assessment for Proposed Electrical Conductivity Water Quality Objective and Performance Goal

Task	Labor	Direct	Laboratory	Total	Notes
Preparation & Installation	\$ 9,840	\$ 32,000	\$ 200	\$ 42,040	Purchase of two sensors with telemetry
Monthly Maintenance & Sample Collection	\$ 23,520	\$ 1,800	\$ 2,250	\$ 27,570	Boron sample collection and sensor calibration
Data Review and Compilation	\$ 29,520	\$ 100	\$ -	\$ 29,620	
Annual Report	\$ 12,000	\$ 100	\$ -	\$ 12,100	
TOTAL	\$ 74,880	\$ 34,000	\$ 2,450	\$ 111,330	

Labor rate assumptions: Field
 Engineer @ \$150/hr Field
 Technician @ \$100/hr
 Monitoring Manager @ \$180/hr

Cost estimate developed by Brian Laurenson, P.E., Larry Walker Associates, July 13, 2015.

Table D-2. Nitrogen Application Rate for Sub Areas Used in WARMF Baseline Modeling

Fertilizer Category	lb/day	10% Reduction (lb/day)	Annual Reduction (Tons)/year
Ammonia as N	494,640	49,464	9,027
Nitrate as N	23,767	2,377	434
Total	518,407	51,841	9,461

Fertilizer Formulation	Ammonia	Nitrate	Urea	Cost/Ton	Nitrogen Compound	Local Use	Cost Portio
	%	%		\$	\$/Ton	%	\$/ton
Anhydrous	82			750	915	10	91
UN32	7.6	7.6	16.8	500	1,563	85	1,328
Am-Nitrate 34-0-0	17	17		550	1,618	5	81

1,500

Cost Reduction Estimate

Fertilizer Category	\$/year
Ammonia as N	13,545,020
Nitrate as N	650,826
Total	14,195,846

Annual cost savings as presented in Table 4 of Task 5 Memo **(\$14,200,000)**

Cost estimate developed by Mark J. Roberson, PhD, CPSS, Senior Soil & Water Scientist, Formation Environmental, August 26, 2015.

**Assumptions used in the estimation of costs to install and operate drip/microspray irrigation
in portions of select subareas currently not irrigated by this method (cotton NOT included)**

Total Acreage with Drip Potential

		Grasslands	Northwest	East Valley Floor	Total
Crop categories amenable to drip/micro		Acreage			
Almonds & Pistachios		3	0	0	3
Cotton		0	0	0	0
Cucurbits		16	0	0	16
Orchard (Other Deciduous)		22,172	32,492	73,496	128,160
Olives, citrus, and subtropicals (Subtropical Trees)		306	436	2	744
Vineyard		1,142	1,086	5,868	8,096
Total		23,639	34,014	79,366	137,019

Existing Drip/micro

	Portion Drip/Micr	Grasslands	Northwest	East Valley Floor	Total
Crop categories amenable to drip/micro	%	Acreage			
Almonds & Pistachios	62%	2	0	0	2
Cotton	0%	0	0	0	0
Cucurbits	25%	4	0	0	4
Orchard (Other Deciduous)	38%	8,513	12,475	28,218	49,206
Olives, citrus, and subtropicals (Subtropical Trees)	3%	10	14	0	25
Vineyard	95%	1,086	1,032	5,577	7,695
Total		9,614	13,522	33,796	56,932

2014 DWR Prop 84 acres (proportional to existing)

		Grasslands	Northwest	East Valley Floor	Total
Crop categories amenable to drip/micro		Acreage			
Almonds & Pistachios		0	0	0	0
Cotton		0	0	0	0
Cucurbits		0	0	0	0
Orchard (Other Deciduous)		791	1,159	2,621	3,953
Olives, citrus, and subtropicals (Subtropical Trees)		1	1	0	2
Vineyard		Prop 84 not applied to vineyard			
Total		792	1,160	2,621	4,574

Existing Plus DWR Prop 84 acres

		Grasslands	Northwest	East Valley Floor	Total
Crop categories amenable to drip/micro		Acreage			
Almonds & Pistachios		2	0	0	2
Cotton		0	0	0	0
Cucurbits		4	0	0	4
Orchard (Other Deciduous)		9,304	13,634	30,840	53,778
Olives, citrus, and subtropicals (Subtropical Trees)		11	16	0	27
Vineyard		1,086	1,032	5,577	7,695
Total		10,407	14,682	36,417	61,506

**Assumptions used in the estimation of costs to install and operate drip/microspray irrigation
in portions of select subareas currently not irrigated by this method (cotton NOT included)**

Additional Potential Acreage (assumes all acreage goes to 100%)

	Grasslands	Northwest	East Valley Floor	Total
Crop categories amenable to drip/micro	Acreage			
Almonds & Pistachios	1	0	0	1
Cotton	0	0	0	0
Cucurbits	12	0	0	12
Orchard (Other Deciduous)	12,868	18,858	42,656	74,382
Olives, citrus, and subtropicals (Subtropical Trees)	295	420	2	717
Vineyard	57	54	290	401
Total	13,233	19,332	42,949	75,513

Capital Cost (Based on Prop 84 capital, over seven-year life)

355 \$/acre/year

O&M Cost (Irrigated Lands Regulatory Program PEIS)

128 \$/acre/year

Total Annual Cost/Acre

483 \$/acre/year

	Grasslands	Northwest	East Valley Floor	Total
Crop categories amenable to drip/micro	Cost/Year			
Almonds & Pistachios	\$ 439	\$ -	\$ -	\$ 439
Cotton	\$ -	\$ -	\$ -	\$ -
Cucurbits	\$ 5,685	\$ -	\$ -	\$ 5,685
Orchard (Other Deciduous)	\$ 6,213,833	\$ 9,106,019	\$ 20,597,583	\$ 35,917,436
Olives, citrus, and subtropicals (Subtropical Trees)	\$ 142,414	\$ 202,759	\$ 1,041	\$ 346,213
Vineyard	\$ 27,296	\$ 25,953	\$ 140,235	\$ 193,485
Total	\$ 6,389,667	\$ 9,334,731	\$ 20,738,860	\$ 36,463,258

Annual O&M cost as presented in Table 4 of Task 5 Memo \$ 9,600,000

Capital cost as presented in Table 4 of Task 5 Memo \$ 26,800,000

Cost estimate developed by Mark J. Roberson, PhD, CPSS, Senior Soil & Water Scientist, Formation Environmental, August 26, 2015.

**Assumptions used in the estimation of costs to install and operate drip/microspray irrigation
in portions of select subareas currently not irrigated by this method (cotton included)**

Total Acreage with Drip Potential

		Grasslands	Northwest	East Valley Floor	Total
Crop categories amenable to drip/micro		Acreage			
Almonds & Pistachios		3	0	0	3
Cotton		92,562	16	0	92,578
Cucurbits		16	0	0	16
Orchard (Other Deciduous)		22,172	32,492	73,496	128,160
Olives, citrus, and subtropicals (Subtropical Trees)		306	436	2	744
Vineyard		1,142	1,086	5,868	8,096
Total		116,201	34,029	79,366	229,596

Existing Drip/micro

	Portion Drip/Micr	Grasslands	Northwest	East Valley Floor	Total
Crop categories amenable to drip/micro	%	Acreage			
Almonds & Pistachios	62%	2	0	0	2
Cotton	0%	0	0	0	0
Cucurbits	25%	4	0	0	4
Orchard (Other Deciduous)	38%	8,513	12,475	28,218	49,206
Olives, citrus, and subtropicals (Subtropical Trees)	3%	10	14	0	25
Vineyard	95%	1,086	1,032	5,577	7,695
Total		9,614	13,522	33,796	56,932

2014 DWR Prop 84 acres (proportional to existing)

		Grasslands	Northwest	East Valley Floor	Total
Crop categories amenable to drip/micro		Acreage			
Almonds & Pistachios		0	0	0	0
Cotton		0	0	0	0
Cucurbits		0	0	0	0
Orchard (Other Deciduous)		791	1,159	2,621	3,953
Olives, citrus, and subtropicals (Subtropical Trees)		1	1	0	2
Vineyard		Prop 84 not applied to vineyard			
Total		792	1,160	2,621	4,574

Existing Plus DWR Prop 84 acres

		Grasslands	Northwest	East Valley Floor	Total
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Almonds & Pistachios		2	0	0	2
Cotton		0	0	0	0
Cucurbits		4	0	0	4
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Total		10,407	14,682	36,417	61,506

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Additional Potential Acreage (assumes all acreage goes to 100%)

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Almonds & Pistachios	1	0	0	1
Cotton	92,562	16	0	92,578
Cucurbits	12	0	0	12
Orchard (Other Deciduous)	12,868	18,858	42,656	74,382
Olives, citrus, and subtropicals (Subtropical Trees)	295	420	2	717
Vineyard	57	54	290	401
Total	105,795	19,347	42,949	168,090

Capital Cost (Based on Prop 84 capital, over seven-year life)

355 \$/acre/year

O&M Cost (Irrigated Lands Regulatory Program PEIS)

128 \$/acre/year

Total Annual Cost/Acre

483 \$/acre/year

	Grasslands	Northwest	East Valley Floor	Total
Crop categories amenable to drip/micro	Cost/Year			
Almonds & Pistachios	\$ 439	\$ -	\$ -	\$ 439
Cotton	\$ 44,695,948	\$ 7,571	\$ -	\$ 44,703,519
Cucurbits	\$ 5,685	\$ -	\$ -	\$ 5,685
Orchard (Other Deciduous)	\$ 6,213,833	\$ 9,106,019	\$ 20,597,583	\$ 35,917,436
Olives, citrus, and subtropicals (Subtropical Trees)	\$ 142,414	\$ 202,759	\$ 1,041	\$ 346,213
Vineyard	\$ 27,296	\$ 25,953	\$ 140,235	\$ 193,485
Total	\$ 51,085,615	\$ 9,342,302	\$ 20,738,860	\$ 81,166,776

Annual O&M cost as presented in Table 4 of Task 5 Memo \$ 21,500,000

Capital cost as presented in Table 4 of Task 5 Memo \$ 59,700,000

Cost estimate developed by Mark J. Roberson, PhD, CPSS, Senior Soil & Water Scientist, Formation Environmental, August 26, 2015.

**Grassland Bypass Project
Project Funding from 1996 to 2015**

Project	Funding Program	Funding Source	Grant Funding	Loan Funding	District Funding	Total
Grassland Bypass Construction	SWRCB State Revolving Fund	California		\$ 600,000		\$ 600,000
Charleston D.D. Recirculation System	SWRCB State Revolving Fund	California	\$ 320,000			\$ 320,000
Charleston D.D. Recirculation System - CH-3					\$ 71,200	\$ 71,200
Firebaugh Canal W.D. Recirculation Systems					\$ 271,100	\$ 271,100
Pacheco W.D. Drainwater Recirculation System	SWRCB State Revolving Fund	California	\$ 1,375,000			\$ 1,375,000
Panoche W.D. Drainwater Recirculation System	SWRCB State Revolving Fund	California	\$ 4,228,000			\$ 4,228,000
Panoche D.D. Road Watering Project	Panoche D.D.	District			\$ 12,000	\$ 12,000
Reuse Land Purchase & Initial Development	Prop 13 (Directed Action)	California	\$ 17,500,000			\$ 17,500,000
2004-05 Development Project	USBR	Federal	\$ 970,000		\$ 95,900	\$ 1,065,900
GBP Operational Budget (FY 97 - FY 16)	Grassland Area Farmers	District			\$ 18,373,156	\$ 18,373,156
Halophyte Development Project	USBR	Federal	\$ 290,000		\$ 15,000	\$ 305,000
Grassland Integrated Drainage Management Proj.	Prop 13	California	\$ 987,200		\$ 246,800	\$ 1,234,000
PE-5 Pump Station	Panoche D.D.	District			\$ 13,200	\$ 13,200
Panoche D.D. SJRIP Reuse Development Project	SWRCB - Prop 50	California	\$ 389,500		\$ 94,800	\$ 484,300
SJRIP Reuse Expansion Project	USBR	Federal	\$ 890,000			\$ 890,000
USBR 1.65 Appropriations	USBR	Federal	\$ 1,650,000			\$ 1,650,000
USBR/CalFed Salinity Management Grant (2007/2008)	USBR	Federal	\$ 7,000,000			\$ 7,000,000
USBR/CalFed Salinity Management Grant (2009)	USBR	Federal	\$ 6,384,719			\$ 6,384,719
IRWM Grant: Reuse Land Purchase	SWRCB - Prop 50	California	\$ 10,915,870			\$ 10,915,870
IRWM Grant: Reuse Land Development	SWRCB - Prop 50	California	\$ 3,628,000			\$ 3,628,000
SJRIP Operations (FY 02 through FY 15)	Grassland Area Farmers	District			\$ 6,000,000	\$ 6,000,000
USBR SJR Salinity Management Program 2010	USBR	Federal	\$ 4,000,000			\$ 4,000,000
USBR SJR Salinity Management Program 2011	USBR	Federal	\$ 4,245,000			\$ 4,245,000
USBR SJR Salinity Management Program 2012	USBR	Federal	\$ 4,200,000			\$ 4,200,000
USBR SJR Salinity Management Program 2013	USBR	Federal	\$ 3,900,000			\$ 3,900,000
USBR SJR Salinity Management Program 2014	USBR	Federal	\$ 3,800,000			\$ 3,800,000
Algal-Bacterial Selenium Reduction Proj. (ABSR)	USBR/DWR/CalFed	Fed/Calif.	\$ 3,352,000		\$ 225,000	\$ 3,577,000
IRWM Grant: Salt Disposal Development	SWRCB - Prop 50	California	\$ 4,600,000			\$ 4,600,000
Panoche W.D. Ag Drainage Loan Project - Irr. Imprvmnts	SWRCB	California	\$ 1,800,000			\$ 1,800,000
Pacheco W.D. Acquisition of Improved Irrigation Equipment	SWRCB State Revolving Fund	California	\$ 737,500			\$ 737,500
Panoche D.D. Acquisition of Improved Irrigation Equipment	SWRCB State Revolving Fund	California	\$ 4,997,294			\$ 4,997,294
Firebaugh Canal W.D. Irrigation Improvement Funding Prg.	Firebaugh Canal W.D.	District			\$ 8,600,000	\$ 8,600,000
Firebaugh Canal W.D. Irrigation Improvement Funding Prg.	SWRCB State Revolving Fund	California	\$ 1,000,000			\$ 1,000,000
IRWM Grant: Ground Water Pumping	SWRCB - Prop 50	California	\$ 5,702,000		\$ 457,890	\$ 6,159,890
Distribution Facilities Improvement Grant	SWRCB - Prop 40/50	California	\$ 1,000,000			\$ 1,000,000
Firebaugh Canal W.D. Canal Lining Projects	Firebaugh Canal W.D./USBR	Federal/District	\$ 300,000		\$ 945,000	\$ 1,245,000
Firebaugh Canal W.D. Shaw Avenue Pipeline	Firebaugh Canal W.D.	District			\$ 205,000	\$ 205,000
Total:			\$ 85,704,289	\$ 15,057,794	\$ 35,626,046	\$ 136,388,129

IRWM: Integrated Regional Water Management Program, California Proposition 50.
 Local Funding: \$ 35,626,046
 State Funding (Grant) \$ 46,398,570
 State Funding (Loan) \$ 15,057,794
 Federal Funding (Grant) \$ 39,305,719
 \$ 136,388,129