

LWM-10



Project: EIR Defined Regional Project (Single Pass with SWTP)

17-Jun-09

	Regional Project	CAW- North Marina Project	CAW-Moss Landing	Common Components (Terminal Res, 2 ASR Wells, 9 mgd ASR pump station, Monterey Pipeline, Valley Greens PS)
Capital Costs				
Intake Facilities (Wells and Pipeline)	\$ 10,300,000	\$ 20,000,000	\$ 2,800,000	\$ -
Desalination Plant (includes contractor O&P)	\$ 64,400,000	\$ 80,600,000	\$ 96,400,000	\$ -
SWTP	\$ 26,000,000	\$ -	\$ -	\$ -
Product Water Delivery (including Additional ASR and PS capacity)	\$ 39,100,000	\$ 25,200,000	\$ 41,400,000	\$ -
Common Components (Terminal Res, 2 ASR Wells, 9 mgd ASR pump station, Monterey Pipeline, Valley Greens PS)	\$ -	\$ -	\$ -	\$ 37,700,000
Contractor's Overhead and Profit (excluding Desal)	\$ 13,400,000	\$ 10,900,000	\$ 11,200,000	included above
Base Construction Cost	\$ 153,200,000	\$ 136,700,000	\$ 151,800,000	\$ 37,700,000
Implementation Costs	\$ 36,300,000	\$ 30,700,000	\$ 27,700,000	\$ 11,300,000
ROW Easements and Land Acquisition	\$ -	\$ 1,000,000	\$ 3,300,000	\$ 3,900,000
Capital Costs (Excluding Contingency)	\$ 189,500,000	\$ 168,400,000	\$ 182,800,000	\$ 52,900,000
Project Contingency (20%)	\$ 37,900,000	\$ 33,700,000	\$ 36,600,000	\$ 10,600,000
Most Probably Capital Cost with Contingency	\$ 227,400,000	\$ 202,100,000	\$ 219,400,000	\$ 63,500,000
High End of Accuracy Range (+25%)	\$ 284,300,000	\$ 252,600,000	\$ 274,300,000	\$ 79,400,000
Low End of Accuracy Range (-15%)	\$ 193,300,000	\$ 171,800,000	\$ 186,500,000	\$ 54,000,000
Annual Costs				
Annual Cost of Repair and Replacement	\$ 1,900,000	\$ 1,600,000	\$ 1,700,000	\$ 80,000
Annual Cost of Power	\$ 3,600,000	\$ 4,500,000	\$ 3,500,000	\$ 330,000
Annual Cost of Chemicals	\$ 600,000	\$ 1,000,000	\$ 1,600,000	\$ 60,000
Annual Share of the SRDF	\$ 240,000	\$ -	\$ -	\$ -
Groundwater Monitoring Program	\$ 500,000	\$ 500,000	\$ -	\$ -
Annual WPCA User Charge for Flows to Outfall	\$ -	\$ -	\$ -	\$ -
Annual Labor Costs	\$ 3,000,000	\$ 2,500,000	\$ 2,500,000	\$ 100,000
Total Annual O&M	\$ 9,840,000	\$ 10,100,000	\$ 9,300,000	\$ 570,000
(excluding Implementation Allowances below)				
Grant Funding				
Net Capital Cost	\$ 227,400,000	\$ 202,100,000	\$ 219,400,000	\$ 63,500,000
Cost of Issuance	2.5%	2.5%	2.5%	2.5%
Capital Cost including cost of issuance	\$ 233,100,000	\$ 207,200,000	\$ 224,900,000	\$ 65,100,000
Annualized Construction Costs	\$ 15,400,000	\$ 19,400,000	\$ 21,000,000	\$ 6,100,000
Annual O&M Costs	\$ 9,840,000	\$ 10,100,000	\$ 9,300,000	\$ 570,000
Total Annualized Cost	\$ 25,240,000	\$ 29,500,000	\$ 30,300,000	\$ 6,670,000
Cost of Water (\$/AFY)	\$ 2,400	\$ 3,350	\$ 3,440	\$ 440
Annual Production, AFY	10,500	8,800	8,800	15,200

A/P Calculation

Cost Basis (Date)
Interest Rate
Time (Years)
A/P

Jan-09
5.15%
30
0.066168

Jan-09
8.55%
30
0.093476

Jan-09
8.55%
30
0.093476

Jan-09
8.55%
30
0.093476

Project: Project: EIR Defined Regional Project (Single Pass with SWTP)
Component: Product Water Delivery

Date: June 17, 2009
 Project Number:
 Prepared by: Ryan Alameda

Estimate Type: Conceptual Design

Process Cost Summary by Division

Spec. Division	Subtotal	Notes
Pipelines	\$ 30,170,000	
Additional Product Water Delivery Needed by SWTP	\$ 8,560,000	
11 - Equipment	\$ -	
15 - Mechanical	\$ -	
16 - Electrical	\$ -	
17- I&C	\$ -	
RAW CONSTRUCTION COST	\$ 38,730,000	
Mobilization/Demobilization	1% \$ 390,000	
Contractors Overhead and Profit	18% \$ 6,970,000	
Construction Cost	\$ 46,090,000	
Implementation (Program Management, Design, CEQA, Legal, CM)	30% \$ 13,830,000	

Spec. Division	Item	Size	Units	Quantity	Unit	Unit Cost	Total Cost	Notes
							\$ 30,170,000	
Pipelines	Product Water Delivery							
	North of Reservation Road	36 inch		16,000 LF	\$	376.92	\$ 6,030,000	CAW unit cost J94
	Reservation Road to Seaside Pipeline	36 inch		30,000 LF	\$	370.00	\$ 11,100,000	CAW unit cost J98
	Seaside Pipeline to Terminal	36 inch		13,000 LF	\$	669.23	\$ 8,700,000	CAW unit cost J102
	MCWD Tie in pipeline	24 inch		14,000 LF	\$	246.72	\$ 3,450,000	CAW unit cost J99
	Bore & Jack at Hwy 1			500 ft	\$	1,786.00	\$ 890,000	CAW unit cost J19
							\$ 8,560,000	
Additional Product Water Delivery Needed by SWTP								
	Additional Seaside ASR Wells			3	EA	\$ 1,690,000	\$ 5,070,000	CAW unit cost (J126) minus 18% O&P
	Well head facilities			3	EA	\$ 930,000	\$ 2,790,000	CAW unit cost (J128) minus 18% O&P
	Add 5 mgd to ASR pump station	5	MG	1	EA	\$ 140,566	\$ 700,000	CAW unit Cost (J116) (increased from 9 to 14 mgd)
16 - Electrical							\$ -	included in cost above
17 - I&C							\$ -	included in cost above

WPCA OUTFALL CAPACITY CHARGE (for brine to outfall)				
Item	Quantity	Units	Unit Cost	Total Cost
Not Applicable				\$ -

EASEMENT AND LAND ACQUISITION						
Item	Size	Units	Quantity	Unit	Unit Cost	Total Cost
\$ -						

ANNUAL O&M COSTS				
	Amount	Unit	Value	Cost
Repair and Replacement Cost				
			Total Consumables	\$ 110,000
	ASR Wells and Pump Station			\$ 110,000 See Regional O&M Tab
Power Costs				
			Total Power	\$ 384,000
	Product Water Pump Station	3,848,603	kw-hr/yr	\$ 373,000 See Regional O&M Tab
	Additional ASR Pump Station for SWTP	114,976	kw-hr/yr	\$ 11,000 See Regional O&M Tab
Chemicals				
			Total Chemicals	\$ 40,000 Assumes proportional increase in chemicals from Seaside ASR
WPCA User Fee for brine flows to Outfall				
Not Applicable \$ -				
Labor Costs				
\$ 5,000 Assumes proportional increase in labor from Seaside ASR				
TOTAL ANNUAL O&M COSTS				\$ 539,000

Project: Project: EIR Defined Regional Project (Single Pass with SWTP)
Component: Desalination Intake Facilities

Date: June 17, 2009
 Project Number:
 Prepared by: RMC

Estimate Type: Conceptual Design

Process Cost Summary

Spec. Division	Subtotal	Notes
2 - Sitework	\$ 7,850,000	
3 - Concrete	\$ 460,000	
5 - Metals	\$ -	
11 - Equipment	\$ 1,500,000	
15 - Mechanical	\$ -	
16 - Electrical	\$ 380,000	
17- I&C	\$ -	
RAW CONSTRUCTION COST \$ 10,190,000		
Mobilization/Demobilization	1% \$ 100,000	
Contractors Overhead and Profit	18% \$ 1,830,000	
Construction Cost	\$ 12,120,000	
Implementation (Program Management, Design, CEQA, Legal, CM)	30% \$ 3,640,000	

Spec. Division	Item	Size	Units	Quantity	Unit	Unit Cost	Total Cost	Notes
Intake Wells and Pipeline \$ 7,850,000								
Intake Wells	Vertical Wells	18	in	6	EA	\$ 540,000	\$ 3,240,000	Estimate from GeoScience 020209
	Well development and water disposal			6	EA	\$ 160,000	\$ 960,000	CAW unit cost (J14)
Pipelines	Bore & Jack at Hwy 1 Intake Water			500	ft	\$ 1,786.00	\$ 890,000	CAW unit cost (J19)
		36	in	13,000	ft	\$ 212.50	\$ 2,760,000	CAW unit cost (J18)

Structures \$ 460,000								
Intake Well Head Structures								Based on a 18' x 18' x 10' underground vault
Structural Excavation	435	CY		6	EA	\$ 35	\$ 91,000	
Base Slab	18	CY		6	EA	\$ 800	\$ 86,000	
Walls	27	CY		6	EA	\$ 1,200	\$ 194,000	
Elevated Slab	12			6	EA	\$ 1,200	\$ 86,000	

Included in Structures \$ -

Equipment \$ 1,500,000								
Intake Well Pumps	250	HP		6	total	\$ 250,000	\$ 1,500,000	CAW unit cost J15

Mechanical \$ -

Electrical \$ 380,000

Electrical Allowance Assumes 25% of Div 11 \$ 380,000 CAW unit Cost J17

17 - I&C \$ -
included in electrical

EASEMENT AND LAND ACQUISITION

Item	Size	Units	Quantity	Unit	Unit Cost	Total Cost
\$ -						

ANNUAL O&M COSTS

	Amount	Unit	Value	Cost
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Repair and Replacement Cost			Total Consumables	\$ 50,000
Equipment Consumables	\$ 1,500,000		3%	\$ 45,000
Structures	\$ 460,000		1%	\$ 5,000

Power Costs			Total Power Costs	\$ 710,000
Intake Wells	6,043,770	kw-hr/yr		\$ 710,000 See Regional O&M Tab

Groundwater Monitoring Program See Regional Desal Tab

Chemicals

WPCA User Fee for flows to headworks				Total Annual User Fee	\$ -
Flow Charge	Average Annual Flow	mgd	(490796.29*Average Annual Flow)	\$ -	From MRWPCA as of July 2008
BOD Charge	Average BOD Concentration	mg/l	(456.45*Avg Flow*Avg BOD conc)	\$ -	From MRWPCA as of July 2008
TSS Charge	Average TSS Concentration	mg/l	(181.04*Avg Flow*Avg TSS conc)	\$ -	From MRWPCA as of July 2008

WPCA User Fee for brine flows to Outfall
 Costs under development by MRWPCA \$ -

Labor Costs Total Labor Costs \$ -

TOTAL ANNUAL O&M COSTS \$ 760,000

Project: Project: EIR Defined Regional Project (Single Pass with SWTP)
Component: Regional Desalination Plant

Date: June 17, 2009
 Project Number:
 Prepared by: RMC

Estimate Type: Conceptual Design

Process Cost Summary by Division

Spec. Division	Subtotal	Notes
2 - Sitework	\$ 1,480,000	
3 - Concrete	\$ 5,180,000	
5 - Metals	\$ -	
11 - Equipment	\$ 33,720,000	
15 - Mechanical	\$ -	
16 - Electrical	\$ 10,100,000	
17- I&C	\$ -	
RAW CONSTRUCTION COST \$ 50,480,000		
Mobilization/Demobilization	1% \$ 500,000	
Contractors Overhead and Profit	10% \$ 5,050,000	
Construction Cost	\$ 56,030,000	
Design Build Engineering	15% \$ 8,400,000	
Construction Cost + Design Build	\$ 64,430,000	
Implementation (Program Management, Design, CEQA, Legal, CM)	15% \$ 9,660,000	

Spec. Division	Item	Size	Units	Quantity	Unit	Unit Cost	Total Cost	Notes	
2 - Sitework									
	Sitework and Yard piping	5.0	acres	219,107	sf	\$ 5.00	\$ 1,100,000	CAW unit cost (J78)	
	Brine Disposal	36	in	2500	ft	\$ 150.00	\$ 380,000	CAW unit cost (J20)	
3 - Structures									
Desalination Facility									
	RO Building (incl lab and office)			24,000	SF	\$ 179	\$ 4,300,000	CAW unit costs J42	
	Post Treatment & Disinfection			600	SF	\$ 133	\$ 80,000	CAW unit costs J37	
	Chemical Storage			6,000	SF	\$ 133	\$ 800,000	CAW unit costs J37	
5 - Metals									
	Misc. Metals	Included in Div 3							\$ -
11 - Equipment									
Pretreatment									
	Cartridge Filters	5	micron	8	EA	\$ 75,000	\$ 600,000	Vendor Quote (Filtrek April 2009) (plus 25% install)	
RO Process Equipment									
		10	mgd				\$ 21,600,000	CAW unit cost for MLPP (minus 10% O&P)	
Disinfection									
	UV Disinfection--MPHO Unit			4	EA	\$ 76,000	\$ 300,000	Vendor Quote (Trojan UV March 2009) (plus 25% install)	
Chemical Handling									
Threshold Inhibitor System									
	Metering Pumps	0.5	HP	4	EA	\$ 8,000	\$ 30,000	Vendor Quote (Watson-Marlow 2008)	
	HDPE Storage Tank	6000	GAL	1	EA	\$ 55,300	\$ 60,000	Palo Alto Bid Summary	
Sulfuric Acid Chemical Feed System									
	Steel Storage Tank	15000	GAL	2	EA	\$ 1.00	\$ 30,000		
	Metering Pumps	0.75	HP	3	EA	\$ 8,000	\$ 20,000	Vendor Quote (Watson-Marlow 2008)	
NaOCL Feed System									
	FRP tank	4500	GAL	2	EA	\$ 41,475	\$ 80,000	Based on scaled HDPE tank cost	
	Metering Pumps	0.5	HP	2	EA	\$ 8,000	\$ 20,000	Vendor Quote (Watson-Marlow 2008)	
Lime Feeding and Storage									
	Lime Silo and Slaker			1	EA	\$ 400,000	\$ 400,000	Vendor Quote (RDP Technologies April 2009)	
	Lime Saturator			1	EA	\$ 250,000	\$ 250,000	Vendor Quote (Degremont March 2009)	
Carbon Dioxide									
	CO2 Feed and Storage	18	Tons	1	EA	\$ 325,000	\$ 330,000	Vendor Quote and Trussell April 2009	
Clearwells									
		2.5	MG	2	EA	\$ 1.50	\$ 7,500,000	CAW unit Cost J71	
Product Water Pump Station									
		10	mgd	1	EA	\$ 2,500,000	\$ 2,500,000	CAW unit cost from (J72)	

Spec. Division	Item	Size	Units	Quantity	Unit	Unit Cost	Total Cost	Notes	
15 - Mechanical									
16 - Electrical									
	Electrical Allowance	25% of plant construction cost					25%	\$ 10,100,000	CAW unit Cost F80
17 - I&C									
	I&C Allowance								\$ -

WPCA CAPACITY CHARGE (for flows to headworks)						Total Cost
Item	Quantity	Units	Unit Cost			\$
Wastestream to WPCA						
Average Annual Flow Rate		gpd	(flow in gpd)*9.8883			\$ -
BOD concentration		mg/l	round((flow in gpd)/1000000)*8.34*(BOD in mg/L,2)*1066.6			\$ -
TSS concentration		mg/l	round((flow in gpd)/1000000)*8.34*(TSS in mg/L,2)*988.43			\$ -
EASEMENT AND LAND ACQUISITION						
Item	Size	Units	Quantity	Unit	Unit Cost	Total Cost

ANNUAL O&M COSTS						Amount	Unit	Value	Cost
Repair and Replacement Costs									
						Total Consumables		\$ 1,434,000	
	Equipment Consumables		\$ 43,220,000			3%	\$ 1,297,000	CAW assumes 3% from O&M estimate	
	Facilities		\$ 5,180,000			1%	\$ 52,000	CAW assumes 1% from O&M estimate	
	Cartridge Filter Replacement						\$ 85,000	Trussell Estimate (April 2009)	
Power Costs									
						Total Power Costs		\$ 2,372,000	
	Treatment		21,658,972	kw-hr/yr			\$ 2,232,000	See Regional O&M Tab	
	Brine Disposal			kw-hr/yr			\$ -	See Regional O&M Tab	
	UV Disinfection		76,447	kw-hr/yr			\$ 8,000	See Regional O&M Tab	
	Misc Facility Power Use		1,314,000	kw-hr/yr			\$ 132,000	See Regional O&M Tab	
Groundwater Monitoring Program									
							\$ 500,000	\$ 500,000	
Chemicals									
						Total Chemicals		\$ 464,000	From Chemical Usage Tab
	Threshold Inhibitor	Dosage	consumption	cost/lbs			\$ 1.45	\$ 180,000	See Regional O&M Tab
	Remineralization (Lime)	3	mg/l	122,610	lbs/yr		\$ 0.15	\$ 90,000	See Regional O&M Tab
	Remineralization (CO2)	30	mg/l	613,169	lbs/yr		\$ 0.20	\$ 40,000	See Regional O&M Tab
	Chlorination (Chlorine Gas)	10	mg/l	204,390	lbs/yr		\$ 0.20	\$ 4,000	See Regional O&M Tab
	Misc Chemicals	1	mg/l	20,439	lbs/yr		\$ 1.00	\$ 150,000	See Regional O&M Tab
		3	mg/l	152,046	lbs/yr				

WPCA User Fee for flows to headworks						Total Annual User Fee
	Flow Charge	Average Annual Flow	mgd	(490796.29*Avg Annual Flow)		\$ -
	BOD Charge	Average BOD Concentration	mg/l	(456.45*Avg Flow*Avg BOD conc)		\$ -
	TSS Charge	Average TSS Concentration	mg/l	(181.04*Avg Flow*Avg TSS conc)		\$ -
WPCA User Fee for brine flows to Outfall						
Costs under development by MRWPCA						
Labor Costs						Total Labor Costs
						\$ 2,448,000
						See Regional O&M Tab

TOTAL ANNUAL O&M COSTS						Total
						\$ 7,218,000

Project: Project: EIR Defined Regional Project (Single Pass with SWTP)
Component: Common Components

Date: June 17, 2009
 Project Number:
 Prepared by: Ryan Alameda

Estimate Type: Conceptual Design

Process Cost Summary by Division

Spec. Division	Subtotal	Notes
Pipelines	\$ -	
Structures	\$ -	
11 - Equipment	\$ -	
Common Product Water Delivery Components	\$ 37,700,000	
16 - Electrical	\$ -	
17- I&C	\$ -	
RAW CONSTRUCTION COST	\$ 37,700,000	
Mobilization/Demobilization	0% \$ -	- included in costs below
Contractors Overhead and Profit	0% \$ -	- included in costs below
Construction Cost	\$ 37,700,000	
Implementation (Program Management, Design, CEQA, Legal, CM)	30% \$ 11,310,000	

Spec. Division	Item	Size	Units	Quantity	Unit	Unit Cost	Total Cost	Notes
Pipelines							\$ -	
Structures								
11-Equipment							\$ -	
Common Product Water Delivery Components							\$ 37,700,000	
Terminal Reservoir						\$ 10,500,000	\$ 10,500,000	CAW unit costs (J115)
ASR Pump Station						\$ 1,500,000	\$ 1,500,000	CAW unit costs (J116)
Earthwork, sitework, and piping						\$ 2,600,000	\$ 2,600,000	CAW unit costs (J117)
ASR System						\$ 10,000,000	\$ 10,000,000	CAW unit costs (J138)
Monterey Pipeline						\$ 12,800,000	\$ 12,800,000	CAW unit costs (J106-J107)
Valley Greens Pump station						\$ 300,000	\$ 300,000	CAW unit costs (J109)
16 - Electrical							\$ -	Included in cost above
17 - I&C							\$ -	

WPCA OUTFALL CAPACITY CHARGE (for brine to outfall)

Item	Quantity	Units	Unit Cost	Total Cost
Not Applicable				\$ -

EASEMENT AND LAND ACQUISITION

Item	Size	Units	Quantity	Unit	Unit Cost	Total Cost
						\$ 3,900,000
Pipelines in TAMC ROW (to Monterey Bike Path)	33,000 SF		42	Easement \$	\$ 1,400,000	CAW Unit Cost J118
Terminal Reservoir	80,000 SF		13	Purchase \$	\$ 1,000,000	CAW Unit Cost J119
ASR Well Sites	2 EA		400,000	Lease \$	\$ 800,000	CAW Unit Cost J120
Pipelines in Bike Path	11,000 LF		45	Easement \$	\$ 500,000	CAW Unit Cost J121
Pipelines through Presidio	3,000 LF		17	Easement \$	\$ 50,000	CAW Unit Cost J122
Valley Greens Pump Station	9,000 SF		20	Purchase \$	\$ 180,000	CAW Unit Cost J123

ANNUAL O&M COSTS

	Amount	Unit	Value	Cost
Repair and Replacement Cost			Total Consumables	\$ 80,000
Equipment Consumables				\$ 80,000 See Regional O&M Tab (Offsite Facilities)
Power Costs			Total Power	\$326,000
ASR System	2,743,250	kw-hr/yr		\$ 298,000 See Regional O&M Tab
Valley Greens Pump Station	196,771	kw-hr/yr		\$ 28,000 See Regional O&M Tab
Chemicals			Total Chemicals	\$ 61,000
WPCA User Fee for brine flows to Outfall				\$ -
Not Applicable				\$ -
Labor Costs				\$ 101,000 See Regional O&M Tab
TOTAL ANNUAL O&M COSTS				\$ 568,000

Operations Cost Estimate (2009 Dollars)				Labor	Rate
Project: EIR Defined Regional Project (Single Pass with SWTP)					
Project Component	Units	Summer Quantity	Winter Quantity		
BIRP Output	afy	0	3,300	Plant Operator	\$ 50
ASR Well Injection (CR)	afy	0	1,300	Operations Foreman	\$ 55
ASR Well Injection (SWTP)	afy	0	1,490	Utility Worker	\$ 45
Seaside Wells Production	afy	1,500	0	Utility Foreman	\$ 50
ASR Well Extraction	afy	2,790	0	Lab & Admin	\$ 45
Desal Water	afy	4,260	3,260	Ops Supervisor	\$ 69
SWTP Production	afy	0	1,490		
Sand City Desalination Production	afy	150	150		
Total System Production	afy	8,700	8,200		
System Demand	afy	8,700	8,200		

Facility	PG&E Avg. Power Rates	
	Summer	Winter
Desal and SWTP	\$ 0.120	\$ 0.080
ASR PS	\$ 0.142	\$ 0.100
ASR Wells	\$ 0.103	\$ 0.093
Valley Greens PS	\$ 0.142	\$ 0.100
Seaside Wells	\$ 0.142	\$ 0.100
Segunda PS	\$ 0.142	\$ 0.100
Vertical Wells	\$ 0.137	\$ 0.093

Updated Rates

Energy calcs DO NOT incorporate power factor (85%-90%).

Assumptions	
RO Recovery	50%
Pretreatment Eff.	100%

RO System	Summer (AF)	Summer (gpm)	Winter (AF)	Winter (gpm)
Pretreatment Feed	8,520	10,563	6,520	8,084
1st Pass Feed	8,520	10,563	6,520	8,084
1st Pass Production	4,260	5,282	3,260	4,042
2nd Pass Percentage	0%	0%	0%	0%
2nd Pass Feed	0	0	0	0
2nd Pass Production	0	0	0	0
Total Desal Production	4,260	5,282	3,260	4,042

OPERATION & MAINTENANCE (O & M) COSTS			
DESALINATION FACILITIES			
<i>Seawater Feed and Brine Disposal</i>			
<u>Vertical Wells</u>			
Summer Average Flow		10,563 gpm	
Winter Average Flow		8,084 gpm	
Total Head		295 ft	
Vertical Wells Summer Energy	3,423,731 kw-hrs	\$ 0.14 /kw-hrs	\$470,000
Vertical Wells Winter Energy	2,620,038 kw-hrs	\$ 0.09 /kw-hrs	\$240,000
Subtotal Seawater Inlet PS			\$710,000
<i>Desalination Plant</i>			
<u>Pretreatment Process</u>			
Summer Annual Flow (Applied)		10,563 gpm	
Winter Annual Flow (Applied)		8,084 gpm	
Summer Annual Flow (Production)		10,563 gpm	
Winter Annual Flow (Production)		8,084 gpm	
<u>Mixing</u>			
Summer Energy	0 kw-hrs	\$ 0.12 /kw-hrs	\$0
Winter Energy	0 kw-hrs	\$ 0.08 /kw-hrs	\$0
SUBTOTAL POWER			\$0
<u>Cartridge Filter</u>			
Lift for Pressure Media Filtration		0 ft	
Summer Energy	0 kw-hrs	\$ 0.12 /kw-hrs	\$0
Winter Energy	0 kw-hrs	\$ 0.08 /kw-hrs	\$0
SUBTOTAL POWER			\$0
Threshold Inhibitor Consumption	3 mg/L 122,610 lbs/yr	\$ 1.45 lbs.	\$180,000
Materials	Filter Element Replacement	1 LS	\$85,000
Subtotal Pretreatment			\$265,000
<u>Reverse Osmosis Process</u>			
Single Pass, 850 psi		11 mgd	-
Summer Annual Flow (Applied-1st Pass)		8,520 afy	
Winter Annual Flow (Applied-1st Pass)		6,520 afy	
Summer Annual Permeate Production (1st Pass)		4260 afy	
Winter Annual Permeate Production (1st Pass)		3260 afy	
Summer Annual Brine Production (1st Pass)		4,260 afy	
Winter Annual Brine Production (1st Pass)		3,260 afy	
<u>Filtrate Forwarding Pump (First Pass)</u>			
Summer Energy	1,265,583 kw-hrs	\$ 0.12 /kw-hrs	\$150,000
Winter Energy	968,498 kw-hrs	\$ 0.08 /kw-hrs	\$77,000
<u>High Pressure Pump (First Pass)</u>			
Summer Energy	10,757,453 kw-hrs	\$ 0.12 /kw-hrs	\$1,300,000
Winter Energy	8,232,229 kw-hrs	\$ 0.08 /kw-hrs	\$660,000
<u>Energy Recovery Booster Pump (First Pass)</u>			
Summer Energy	246,542 kw-hrs	\$ 0.12 /kw-hrs	\$30,000
Winter Energy	188,668 kw-hrs	\$ 0.08 /kw-hrs	\$15,000
SUBTOTAL POWER (First Pass)			\$2,232,000
Summer Second Pass Feed		0 afy	
Winter Second Pass Feed		0 afy	
<u>Second Pass Booster Pump</u>			
Summer Energy	0 kw-hrs	\$ 0.12 /kw-hrs	\$0
Winter Energy	0 kw-hrs	\$ 0.08 /kw-hrs	\$0
SUBTOTAL POWER (Second Pass)			\$0
SUBTOTAL POWER (1st and 2nd)			\$2,232,000
Misc. Chemicals Consumption	3 mg/L 152,046 lbs/yr	\$ 1.00 lbs.	\$150,000
Materials	Membrane Replacement	1 LS	\$0
Subtotal Reverse Osmosis			\$2,382,000
<u>Post Treatment Process</u>			
Remineralization (Lime) Consumption	30 mg/L 613,169 lbs/yr	\$ 0.15 lbs.	\$92,000
Remineralization (CO2) Consumption	10 mg/L 204,390 lbs/yr	\$ 0.20 lbs.	\$41,000
Chlorination (Chlorine Gas) Consumption	1.0 mg/L 20,439 lbs/yr	\$ 0.20 lbs.	\$4,000
UV Disinfection Summer Energy	1.3 Kw/mgd 43,307 Kw-hrs	\$ 0.12	\$5,000
UV Disinfection Winter Energy	33,141 Kw-hrs	\$ 0.08	\$3,000

			Subtotal Post Treatment	\$145,000
Labor and Miscellaneous				
	Misc. Facility Power Usage		150 kw	
	Summer Energy	657,000 kw-hrs	\$ 0.12 /kw-hrs	\$79,000
	Winter Energy	657,000 kw-hrs	\$ 0.08 /kw-hrs	\$53,000
	SUBTOTAL POWER	1,314,000 kw-hrs		\$132,000
Labor				
	Plant Operator (8)	16,000 hrs	\$ 50 hr	\$800,000
	Operations Foreman (2)	4,000 hrs	\$ 55 hr	\$220,000
	Utility Worker (3)	6,000 hrs	\$ 45 hr	\$270,000
	Utility Foreman	2,000 hrs	\$ 50 hr	\$100,000
	Operations Supervisor	2,000 hrs	\$ 69 hr	\$140,000
	Operations Supervisor	2,000 hrs	\$ 69 hr	\$140,000
	Plant Manager	2,000 hrs	\$ 69 hr	\$140,000
	Admin Assistance (on-site)	2,000 hrs	\$ 35 hr	\$70,000
	Admin Assistance (off-site)	2,000 hrs	\$ 35 hr	\$70,000
	SCADA Supervisor	2,000 hrs	\$ 55 hr	\$110,000
	Lab Water Quality Specialist	2,000 hrs	\$ 55 hr	\$110,000
	Lab Assistant	2,000 hrs	\$ 45 hr	\$90,000
Water Treatment Misc. Expenses				
	Contract Services, Disposal, Security, etc.		\$ 25 /AF	\$188,000
			Subtotal Misc.	\$2,448,000
SUBTOTAL DESALINATION FACILITIES O&M				\$6,090,000

Product Water Delivery				
Desalinated Water Pump Station				
	Summer Average Flow		4,260 afy	
	Winter Average Flow		3,260 afy	
	Lift		285 ft	
	Summer Energy	1,561,433 kw-hrs	\$ 0.12 /kw-hrs	\$190,000
	Winter Energy	1,194,900 kw-hrs	\$ 0.08 /kw-hrs	\$96,000
		2,756,333 kw-hrs	Subtotal DWPS	\$286,000
Valley Greens Pump Station				
	Summer Annual Flow		1,700 afy	
	Winter Annual Flow		0 afy	
	Lift		90 ft	
	Summer Energy	196,771 kw-hrs	\$ 0.14 /kw-hrs	\$28,000
	Winter Energy	0 kw-hrs	\$ 0.10 /kw-hrs	\$0
		196,771 hrs	Subtotal VGPS	\$28,000
Labor				
	Operators	500 hrs	\$ 50 hr	\$25,000
SUBTOTAL DESALINATED WATER CONVEYANCE O&M				\$340,000

SWTP

SWTP	Winter (AF)	Winter (gpm)
SWTP Flow Rate	2,980	3,695

SWTP Feed				
SRDF Pumps				
	Summer Average Flow		0 gpm	
	Winter Average Flow		3,695 gpm	
	Total Head		160 ft	
	Summer Energy	0 kw-hrs	\$ 0.14 /kw-hrs	\$0
	Winter Energy	649,493 kw-hrs	\$ 0.09 /kw-hrs	\$60,000
		649,493 kw-hrs	Subtotal SRDF PS	\$60,000
SWTP Energy Requirements				
Component	Total KW at peak operation	Average Power Consumption		
Coagulation/Flocculation				
Flash Mixer	6	9,930		
Coagulation Tank Mixer	9	14,895		
Injection Tank Mixer	9	14,895		
Maturation tank mixer	15	24,825		
Settling tank scraper	3	4,965		
Microsand recycle	30	49,650		
Polymer Metering Pump	3	4,965		
Ferric Metering pump	3	4,965		
MF Membranes				
Feed Pumps	112	186,188		
Reverse Flush Pumps	60	5,000		
Compressor	37	3,000		
CIP Pumps	37	20		
UV Disinfection				
	15	24,825		
Residuals Treatment				
Treated wash water pump station	3.7	16,000		
One - Half meter filter press	4	16,000		
Totals		380,123	\$ 0.09 /kw-hrs	\$35,000
Subtotal SWTP Power Cost				\$ 95,000

SWTP Chemicals						
Chemical	Dosage	unit	Average Flow rate, mgd	Total Quantity	Unit Cost	Total Annual Cost
Ferric chloride	2.5	mg/l	5.4	41,095	\$ 0.75	\$31,000
Anionic polymer	0.2	lb/mgd	5.4	3,288	\$ 3.92	\$13,000
CIP - Citric Acid	0.045	mg/l	5.4	732	\$ 0.75	\$1,000
Disinfection - NaOCl	1	mg/l	5.4	16,438	\$ 0.38	\$6,000
pH Adjustment - NaOH	3	mg/l	5.4	49,314	\$ 0.17	\$8,000
Residuals Treatment	0.2	lb/mgd	0.54	329	\$ 3.92	\$1,000
Totals						\$60,000

SWTP Product Water Delivery				
SWTP Water pump station				
	Summer Average Flow		0 afy	
	Winter Average Flow		2,980 afy	
	Lift		285 ft	
	Summer Energy	0 kw-hrs	\$ 0.12 /kw-hrs	\$0
	Winter Energy	1,092,270 kw-hrs	\$ 0.08 /kw-hrs	\$87,000
		1,092,270 kw-hrs	Subtotal DWPS	\$87,000
ASR Pump Station for SWTP				
	Summer Annual Flow		0 afy	
	Winter Annual Flow		1,490 afy	
	Lift		60 ft	
	Summer Energy	0 kw-hrs	\$ 0.14 /kw-hrs	\$0
	Winter Energy	114,976 kw-hrs	\$ 0.10 /kw-hrs	\$11,000
		114,976 kw-hrs	Subtotal ASRPS	\$11,000

Labor and Miscellaneous			
Misc. Facility Power Usage		75 kw	
Summer Energy	0 kw-hrs	\$ 0.12 /kw-hrs	\$0
Winter Energy	328,500 kw-hrs	\$ 0.08 /kw-hrs	\$26,000
SUBTOTAL POWER	328,500 kw-hrs		\$26,000
Labor			
Plant Operator (4)	4,000 hrs	\$ 50 hr	\$200,000
Operations Foreman (1)	1,000 hrs	\$ 55 hr	\$55,000
Utility Worker (2)	1,500 hrs	\$ 45 hr	\$68,000
Utility Foreman	1,000 hrs	\$ 50 hr	\$50,000
Operations Supervisor	1,000 hrs	\$ 69 hr	\$69,000
Operations Supervisor	0 hrs (shared with Desal)	\$ 69 hr	
Plant Manager	0 hrs (shared with Desal)	\$ 69 hr	
Admin Assistance (on-site)	0 hrs (shared with Desal)	\$ 35 hr	
Admin Assistance (off-site)	0 hrs (shared with Desal)	\$ 35 hr	
SCADA Supervisor	0 hrs (shared with Desal)	\$ 55 hr	
Lab Water Quality Specialist	0 hrs (shared with Desal)	\$ 55 hr	
Lab Assistant	1,000 hrs	\$ 45 hr	\$45,000
Water Treatment Misc. Expenses			
Contract Services, Disposal, Security, etc.		\$ 25 /AF	\$75,000
		Subtotal Labor	\$562,000
		SUBTOTAL SWTP O&M	\$850,000
ASR SYSTEM			
Segunda Pump Station			
Summer Annual Flow		600 afy	
Winter Annual Flow		1,900 afy	
Lift		280 ft	
Summer Energy	216,062 kw-hrs	\$ 0.14 /kw-hrs	\$31,000
Winter Energy	760,218 kw-hrs	\$ 0.10 /kw-hrs	\$76,000
Labor (Operators)	200 hrs	\$ 50 hr	\$10,000
		Subtotal SPS	\$117,000
Begonia Iron Removal Plant			
Summer Annual Flow		0 afy	
Winter Annual Flow (Excess for ASR)		1,300 afy	
Annual Chem Cost		\$ 27 /AF	\$35,000
Annual Labor		\$ 42 /AF	\$55,000
Annual Power		\$ 10 /AF	\$13,000
Source Well Lift		420 ft	
Summer Source Well Energy	0 kw-hrs	\$ 0.14 /kw-hrs	\$0
Winter Source Well Energy	780,224 kw-hrs	\$ 0.10 /kw-hrs	\$78,000
Source Well Labor		\$ 20 /AF	\$26,000
		Subtotal BIRP	\$207,000
Seaside ASR Wells			
Summer Annual Flow		2,790 afy	
Winter Annual Flow		0 afy	
Lift		330 ft	
Summer Energy	986,747 kw-hrs	\$ 0.10 /kw-hrs	\$100,000
Winter Energy	0 kw-hrs	\$ 0.09 /kw-hrs	\$0
Labor (Operators)	200 hrs	\$ 50 hr	\$10,000
Chlorination (NaOCl)	1 mg/L	lbs.	
Consumption	7,583 lbs/yr	\$ 1.00 lbs.	\$8,000
De-Chlorination (NaHSO3)	1 mg/L	lbs.	
Consumption	7,583 lbs/yr	\$ 2.40 lbs.	\$18,000
		Subtotal ASR	\$136,000
		SUBTOTAL SEGUNDA-ASR SYSTEM O&M	\$460,000
TOTAL O & M COSTS			\$7,740,000
REPAIR & REPLACEMENT (R & R) COSTS = MECHANICAL, ELECTRICAL, I&C, ETC.			
Desalination Facilities			
<i>See Detailed estimate for R&R costs</i>			
SWTP Facilities			
<i>See Detailed estimate for R&R costs</i>			
Offsite Facilities			
ASR Wells			
Pumps		3.0%	\$39,000
Facility		1.0%	\$22,000
ASR PS			
Pumps		3.0%	\$5,000
Facility		1.0%	\$1,000
Valley Greens PS			
Pumps		3.0%	\$5,000
Facility		1.0%	\$1,000
TOTAL R & R COSTS			\$80,000
TOTAL O & M COSTS WITH R & R COSTS			\$7,820,000



Project: Regional Project (Partial Second Pass with SWTP)

17-Jun-09

	Regional Project	CAW- North Marina Project	CAW- Moss Landing	Common Components (Terminal Res, 2 ASR Wells, 9 mgd ASR pump station, Monterey Pipeline, Valley Greens PS)
Capital Costs				
Intake Facilities (Wells and Pipeline)	\$ 10,700,000	\$ 20,000,000	\$ 2,800,000	\$ -
Desalination Plant (includes contractor O&P)	\$ 81,100,000	\$ 80,600,000	\$ 96,400,000	\$ -
SWTP	\$ 26,000,000	\$ -	\$ -	\$ -
Product Water Delivery (including Additional ASR and PS capacity)	\$ 39,100,000	\$ 25,200,000	\$ 41,400,000	\$ -
Common Components (Terminal Res, 2 ASR Wells, 9 mgd ASR pump station, Monterey Pipeline, Valley Greens PS)	\$ -	\$ -	\$ -	\$ 37,700,000
Contractor's Overhead and Profit (excluding Desal)	\$ 13,500,000	\$ 10,900,000	\$ 11,200,000	included above
Base Construction Cost	\$ 170,400,000	\$ 136,700,000	\$ 151,800,000	\$ 37,700,000
Implementation Costs	\$ 38,900,000	\$ 30,700,000	\$ 27,700,000	\$ 11,300,000
ROW Easements and Land Acquisition	\$ -	\$ 1,000,000	\$ 3,300,000	\$ 3,900,000
Capital Costs (Excluding Contingency)	\$ 209,300,000	\$ 168,400,000	\$ 182,800,000	\$ 52,900,000
Project Contingency (20%)	\$ 41,900,000	\$ 33,700,000	\$ 36,600,000	\$ 10,600,000
Most Probably Capital Cost with Contingency	\$ 251,200,000	\$ 202,100,000	\$ 219,400,000	\$ 63,500,000
High End of Accuracy Range (+25%)	\$ 314,000,000	\$ 252,600,000	\$ 274,300,000	\$ 79,400,000
Low End of Accuracy Range (-15%)	\$ 213,500,000	\$ 171,800,000	\$ 186,500,000	\$ 54,000,000
Annual Costs				
Annual Cost of Repair and Replacement	\$ 2,300,000	\$ 1,600,000	\$ 1,700,000	\$ 80,000
Annual Cost of Power	\$ 4,500,000	\$ 4,500,000	\$ 3,500,000	\$ 330,000
Annual Cost of Chemicals	\$ 500,000	\$ 1,000,000	\$ 1,600,000	\$ 60,000
Annual Share of the SRDF	\$ 240,000	\$ -	\$ -	\$ -
Groundwater Monitoring Program	\$ 500,000	\$ 500,000	\$ -	\$ -
Annual WPCA User Charge for Flows to Outfall	\$ -	\$ -	\$ -	\$ -
Annual Labor Costs	\$ 3,000,000	\$ 2,500,000	\$ 2,500,000	\$ 100,000
Total Annual O&M	\$ 11,040,000	\$ 10,100,000	\$ 9,300,000	\$ 570,000
(excluding Implementation Allowances below)				
Grant Funding				
Net Capital Cost	\$ 251,200,000	\$ 202,100,000	\$ 219,400,000	\$ 63,500,000
Cost of Issuance	2.5%	2.5%	2.5%	2.5%
Capital Cost including cost of issuance	\$ 257,500,000	\$ 207,200,000	\$ 224,900,000	\$ 65,100,000
Annualized Construction Costs	\$ 17,000,000	\$ 19,400,000	\$ 21,000,000	\$ 6,100,000
Annual O&M Costs	\$ 11,040,000	\$ 10,100,000	\$ 9,300,000	\$ 570,000
Total Annualized Cost	\$ 28,040,000	\$ 29,500,000	\$ 30,300,000	\$ 6,670,000
Cost of Water (\$/AFY)	\$ 2,670	\$ 3,350	\$ 3,440	\$ 440
Annual Production, AFY	10,500	8,800	8,800	15,200

A/P Calculation

Cost Basis (Date)

Interest Rate

Time (Years)

A/P

Jan-09

5.15%

30

0.066168

Jan-09

8.55%

30

0.093476

Jan-09

8.55%

30

0.093476

Jan-09

8.55%

30

0.093476

Project: Project: Regional Project (Partial Second Pass with SWTP)
Component: Salinas River Surface Water Treatment Plant

Date: June 17, 2009
 Project Number:
 Prepared by: Ryan Alameda

Estimate Type: Conceptual Design

Process Cost Summary by Division

Spec. Division	Subtotal	Notes
2 - Sitework	\$ 330,000	
3 - Concrete	\$ 2,990,000	
5 - Metals	\$ -	
11 - Equipment	\$ 17,590,000	
15 - Mechanical	\$ 880,000	
16 - Electrical	\$ 3,900,000	
17- I&C	\$ -	
RAW CONSTRUCTION COST	\$ 25,690,000	
Mobilization/Demobilization	1% \$ 260,000	
Contractors Overhead and Profit	18% \$ 4,620,000	
Construction Cost	\$ 30,570,000	
Implementation (Program Management, Design, CEQA, Legal, CM)	30% \$ 9,170,000	

Spec. Division	Item	Size	Units	Quantity	Unit	Unit Cost	Total Cost	Notes
2 - Sitework								\$ 330,000
	Treatment Plant Site Work			50,000	sf	\$ 5.00	\$ 250,000	CAW unit cost (J60).
	Pipelines							
	CSIP pipe to SWTP	30	inch	500	LF	\$ 150.00	\$ 80,000	CAW unit costs (J20)
3 - Structures								\$ 2,990,000
	Actiflo Basins	690	CY			\$ 1,200	\$ 830,000	
	Chemical Storage			5,000	SF	\$ 133	\$ 670,000	CAW unit cost (J37)
	Filter Building			8,000	SF	\$ 133	\$ 1,060,000	CAW unit cost (J37)
	UV disinfection			3,200	SF	\$ 133	\$ 430,000	CAW unit cost (J37)
5 - Metals								\$ -
11 - Equipment								\$ 17,590,000
	Pretreatment							
	Actiflo	4	MGD	5	EA	\$ 882,000	\$ 4,410,000	Vendor Quote (Kruger March 2008)
	Strainers			8	ea	\$ 44,800	\$ 360,000	Vendor Quote (Trussell March 2008)
	Ferric storage tank	6,500	gal	2	ea	\$ 30,800	\$ 60,000	Trussell March 2008
	Ferric Metering Pumps			3	ea	\$ 8,000	\$ 20,000	vendor quote from desal
	Polymer Storage	2,000	gal	2	ea	\$ 9,500	\$ 20,000	Trussell March 2008
	Polymer Metering Pumps			3	ea	\$ 8,000	\$ 20,000	vendor quote from desal
	MF							
	MF system - 4 trains , pumps, C	2.0	MGD	8	EA	\$ 980,000	\$ 7,840,000	Trussell March 2008
	Disinfection							
	UV disinfection system	3.1	mgd	6	ea	\$ 88,000	\$ 530,000	Trussell March 2008
	UV disinfection system installati	35	%	6	EA	\$ 30,800	\$ 180,000	Trussell March 2008
	Validation testing			1	ls	\$ 25,000	\$ 30,000	Trussell March 2008
	Hypochlorite tanks	2,000	gal	2	ea	\$ 9,500	\$ 20,000	Trussell March 2008
	Hypochlorite pumps			4	ea	\$ 8,000	\$ 30,000	Trussell March 2008
	Hypochlorite piping and fittings			1	ls	\$ 20,000	\$ 20,000	Trussell March 2009
	pH Adjustment							
	NaOH tanks	2,000	gal	2	ea	\$ 9,500	\$ 20,000	Trussell March 2008
	NaOH pumps			4	ea	\$ 8,000	\$ 30,000	Trussell March 2008
	NaOH piping and fittings			1	ls	\$ 20,000	\$ 20,000	Trussell March 2009
	Residuals Handling							
	Treated wash water pump station			1	EA	\$ 50,000	\$ 50,000	CAW Moss Landing Estimate
	One - Half meter filter press			1	EA	\$ 300,000	\$ 300,000	CAW Moss Landing Estimate
	Canopy			1	EA	\$ 100,000	\$ 100,000	CAW Moss Landing Estimate
	Dewatered solids storage			1	EA	\$ 30,000	\$ 30,000	CAW Moss Landing Estimate
	Product Water Pump Station	14	mgd	1	EA	\$ 250,000	\$ 3,500,000	CAW unit cost from (J72)
15 - Mechanical								\$ 880,000
	Misc. Mechanical					5%	\$ 880,000	
16 - Electrical								\$ 3,900,000
	Electrical Allowance					25%	\$ 3,900,000	CAW unit Cost F62
17 - I&C								\$ -
	I&C Allowance						\$ -	included in electrical

WPCA CAPACITY CHARGE (for flows to headworks)					Total Cost
Item	Quantity	Units	Unit Cost		\$
Waste stream to WPCA					
Maximum Day Flow Rate	0	gpd	(flow in gpd)*9.8883		\$ -
BOD concentration	0	mg/l	round((flow in gpd)/1000000)*8.34*(BOD in mg/L)*1066.6,2)		\$ -
TSS concentration	0	mg/l	round((flow in gpd)/1000000)*8.34*(TSS in mg/L)*988.43,2)		\$ -

EASEMENT AND LAND ACQUISITION						Total Cost
Item	Size	Units	Quantity	Unit	Unit Cost	\$
\$ -						

ANNUAL O&M COSTS						Amount	Unit	Value	Cost
Repair and Replacement Cost									
Equipment Consumables						\$ 21,490,000		1.5%	\$ 322,000
Facilities						\$ 2,990,000		0.5%	\$ 15,000
Power Costs									
Intake Pumps						649,493	kw-hr/yr		\$ 60,000
Treatment						380,123	kw-hr/yr		\$ 35,351
Miscellaneous Power Usage						328,500	kw-hr/yr		\$ 26,000
Chemicals									
Ferric chloride						2.5	mg/l	41,095	\$ 31,000
Anionic polymer						0.2	lb/mgd	3,288	\$ 13,000
CIP - Citric Acid						0.045	mg/l	732	\$ 1,000
Disinfection - NaOCl						1	mg/l	16,438	\$ 6,000
pH Adjustment - NaOH						3	mg/l	49,314	\$ 8,000
Residuals Treatment						0.2	lb/mgd	329	\$ 1,000
MCWRA SRDF Use									\$ 240,000
									MCWRA estimate was 400,000 for 5,000 AFY yield. Prorated to 2,980 AFY
WPCA User Fee for flows to headworks									\$ -
Flow Charge						Average Daily Flow (4.5 mgd)	mgd	(490796.29*Average Annual Flow)	\$ -
BOD Charge						Average BOD Concentration	mg/l	(456.45*Avg Flow*Avg BOD conc)	\$ -
TSS Charge						Average TSS Concentration	mg/l	(181.04*Avg Flow*Avg TSS conc)	\$ -
Labor Costs									\$ 562,000
									See Regional O&M Tab (H297)
TOTAL ANNUAL O&M COSTS									\$ 1,320,351

Project: Project: Regional Project (Partial Second Pass with SWTP)
Component: Product Water Delivery

Date: June 17, 2009
 Project Number:
 Prepared by: Ryan Alameda

Estimate Type: Conceptual Design

Process Cost Summary by Division

Spec. Division	Subtotal	Notes
Pipelines	\$ 30,170,000	
Additional Product Water Delivery Needed by SWTP	\$ 8,560,000	
11 - Equipment	\$ -	
15 - Mechanical	\$ -	
16 - Electrical	\$ -	
17- I&C	\$ -	
RAW CONSTRUCTION COST	\$ 38,730,000	
Mobilization/Demobilization	1% \$ 390,000	
Contractors Overhead and Profit	18% \$ 6,970,000	
Construction Cost	\$ 46,090,000	
Implementation (Program Management, Design, CEQA, Legal, CM)	30% \$ 13,830,000	

Spec. Division	Item	Size	Units	Quantity	Unit	Unit Cost	Total Cost	Notes
Pipelines							\$ 30,170,000	
Pipelines	Product Water Delivery							
	North of Reservation Road	36 inch		16,000 LF	\$	376.92	\$ 6,030,000	CAW unit cost J94
	Reservation Road to Seaside Pipeline	36 inch		30,000 LF	\$	370.00	\$ 11,100,000	CAW unit cost J98
	Seaside Pipeline to Terminal	36 inch		13,000 LF	\$	669.23	\$ 8,700,000	CAW unit cost J102
	MCWD Tie in pipeline	24 inch		14,000 LF	\$	246.72	\$ 3,450,000	CAW unit cost J99
	Bore & Jack at Hwy 1			500 ft	\$	1,786.00	\$ 890,000	CAW unit cost J19
	Additional Product Water Delivery Needed by SWTP						\$ 8,560,000	
	Additional Seaside ASR Wells							
	Test Wells			3	EA	\$ 1,690,000	\$ 5,070,000	CAW unit cost (J126) minus 18% O&P
	Well head facilities			3	EA	\$ 930,000	\$ 2,790,000	CAW unit cost (J128) minus 18% O&P
	Add 5 mgd to ASR pump station	5	MG	1	EA	\$ 140,566	\$ 700,000	CAW unit Cost (J116) (increased from 9 to 14 mgd)
16 - Electrical							\$ -	included in cost above
17 - I&C							\$ -	included in cost above

WPCA OUTFALL CAPACITY CHARGE (for brine to outfall)				
Item	Quantity	Units	Unit Cost	Total Cost
Not Applicable				\$ -

EASEMENT AND LAND ACQUISITION						
Item	Size	Units	Quantity	Unit	Unit Cost	Total Cost
						\$ -

ANNUAL O&M COSTS				
	Amount	Unit	Value	Cost
Repair and Replacement Cost			Total Consumables	\$ 110,000
ASR Wells and Pump Station				\$ 110,000 See Regional O&M Tab
Power Costs			Total Power	\$ 384,000
Product Water Pump Station	3,848,603	kw-hr/yr		\$ 373,000 See Regional O&M Tab
Additional ASR Pump Station for SWTP	114,976	kw-hr/yr		\$ 11,000 See Regional O&M Tab
Chemicals			Total Chemicals	\$ 40,000 Assumes proportional increase in chemicals from Seaside ASR
WPCA User Fee for brine flows to Outfall				\$ -
Not Applicable				\$ -
Labor Costs				\$ 5,000 Assumes proportional increase in labor from Seaside ASR
TOTAL ANNUAL O&M COSTS				\$ 539,000

Project: Project: Regional Project (Partial Second Pass with SWTP)
Component: Desalination Intake Facilities

Date: June 17, 2009
 Project Number:
 Prepared by: RMC

Estimate Type: Conceptual Design

Process Cost Summary

Spec. Division	Subtotal	Notes
2 - Sitework	\$ 7,850,000	
3 - Concrete	\$ 460,000	
5 - Metals	\$ -	
11 - Equipment	\$ 1,800,000	
15 - Mechanical	\$ -	
16 - Electrical	\$ 450,000	
17 - I&C	\$ -	
RAW CONSTRUCTION COST \$ 10,560,000		
Mobilization/Demobilization	1% \$ 110,000	
Contractors Overhead and Profit	18% \$ 1,900,000	
Construction Cost	\$ 12,570,000	
Implementation (Program Management, Design, CEQA, Legal, CM)	30% \$ 3,770,000	

Spec. Division	Item	Size	Units	Quantity	Unit	Unit Cost	Total Cost	Notes
Intake Wells and Pipeline								\$ 7,850,000
Intake Wells	Vertical Wells	18	in	6	EA	\$ 540,000	\$ 3,240,000	Estimate from GeoScience 020209
	Well development and water disposal			6	EA	\$ 160,000	\$ 960,000	CAW unit cost (J14)
Pipelines	Bore & Jack at Hwy 1 Intake Water			500	ft	\$ 1,786.00	\$ 890,000	CAW unit cost (J19)
		36	in	13,000	ft	\$ 212.50	\$ 2,760,000	CAW unit cost (J18)

Structures								\$ 460,000
Intake Well Head Structures								Based on a 18' x 18' x 10' underground vault
	Structural Excavation	435	CY	6	EA	\$ 35	\$ 91,000	
	Base Slab	18	CY	6	EA	\$ 800	\$ 86,000	
	Walls	27	CY	6	EA	\$ 1,200	\$ 194,000	
	Elevated Slab	12		6	EA	\$ 1,200	\$ 86,000	

Included in Structures

Equipment								\$ 1,800,000
Intake Well Pumps		300	HP	6	total	\$ 300,000	\$ 1,800,000	CAW unit cost J15 (increased cost proportional to hp increase)

Mechanical \$ -

Electrical								\$ 450,000	
Electrical Allowance	Assumes 25% of Div 11							\$ 450,000	CAW unit Cost J17

17 - I&C included in electrical \$ -

EASEMENT AND LAND ACQUISITION							Total Cost
Item	Size	Units	Quantity	Unit	Unit Cost		\$ -

ANNUAL O&M COSTS				Amount	Unit	Value	Cost
Repair and Replacement Cost						Total Consumables	\$ 59,000
	Equipment Consumables			\$ 1,800,000		3%	\$ 54,000
	Structures			\$ 460,000		1%	\$ 5,000

Power Costs				Amount	Unit	Value	Cost
	Intake Wells			7,469,348	kw-hr/yr	Total Power Costs	\$ 880,000
See Regional O&M Tab							

Groundwater Monitoring Program See Regional Desal Tab

Chemicals							
WPCA User Fee for flows to headworks				Total Annual User Fee		\$ -	
Flow Charge	Average Annual Flow			mgd	(490796.29*Average Annual Flow)	\$ -	From MRWPCA as of July 2008
BOD Charge	Average BOD Concentration			mg/l	(456.45*Avg Flow*Avg BOD conc)	\$ -	From MRWPCA as of July 2008
TSS Charge	Average TSS Concentration			mg/l	(181.04*Avg Flow*Avg TSS conc)	\$ -	From MRWPCA as of July 2008

WPCA User Fee for brine flows to Outfall
 Costs under development by MRWPCA \$ -

Labor Costs Total Labor Costs \$ - included in desal cost

TOTAL ANNUAL O&M COSTS \$ 939,000

Project: Project: Regional Project (Partial Second Pass with SWTP)
Component: Regional Desalination Plant

Date: June 17, 2009
 Project Number:
 Prepared by: RMC

Estimate Type: Conceptual Design

Process Cost Summary by Division

Spec. Division	Subtotal	Notes
2 - Sitework	\$ 1,480,000	
3 - Concrete	\$ 6,610,000	
5 - Metals	\$ -	
11 - Equipment	\$ 42,720,000	
15 - Mechanical	\$ -	
16 - Electrical	\$ 12,700,000	
17- I&C	\$ -	
RAW CONSTRUCTION COST \$ 63,510,000		
Mobilization/Demobilization	1% \$ 640,000	
Contractors Overhead and Profit	10% \$ 6,350,000	
Construction Cost	\$ 70,500,000	
Design Build Engineering	15% \$ 10,580,000	
Construction Cost + Design Build	\$ 81,080,000	
Implementation (Program Management, Design, CEQA, Legal, CM)	15% \$ 12,160,000	

Spec. Division	Item	Size	Units	Quantity	Unit	Unit Cost	Total Cost	Notes	
2 - Sitework									
	Sitework and Yard piping	5.0	acres	219,107	sf	\$ 5.00	\$ 1,100,000	CAW unit cost (J78)	
	Brine Disposal	36	in	2500	ft	\$ 150.00	\$ 380,000	CAW unit cost (J20)	
3 - Structures									
Desalination Facility									
	RO Building (incl lab and office)			32,000	SF	\$ 179	\$ 5,730,000	CAW unit costs J42	
	Post Treatment & Disinfection			600	SF	\$ 133	\$ 80,000	CAW unit costs J37	
	Chemical Storage			6,000	SF	\$ 133	\$ 800,000	CAW unit costs J37	
5 - Metals									
	Misc. Metals	Included in Div 3							
11 - Equipment									
Pretreatment									
	Cartridge Filters	5	micron	8	EA	\$ 75,000	\$ 600,000	Vendor Quote (Filtrek April 2009) (plus 25% install)	
RO Process Equipment (First Pass)									
		10	mgd	1	EA	\$ 25,116,279	\$ 25,120,000	CAW unit cost for MLPP (minus 10% O&P) Changed recovery from 50% to 43%	
RO System (Partial Second Pass)									
	Second Pass Pumps	450	HP	4	EA	\$ 112,500	\$ 450,000	Vendor Quote (Sulzer April 2009) (plus 25% install)	
	Second Pass Membranes			3	EA	\$ 1,600,000	\$ 4,800,000	Vendor Quotes and Trussell (April 2009)	
	Second Pass Flush Pump	20	HP	2	EA	\$ 25,000	\$ 50,000	RMC Estimate based on previous projects	
	Second Pass Break Tank			150	CY	\$ 1,200	\$ 180,000	RMC Estimate based on previous projects	
Disinfection									
	UV Disinfection--MPHO Unit			4	EA	\$ 76,000	\$ 300,000	Vendor Quote (Trojan UV March 2009) (plus 25% install)	
Chemical Handling									
Threshold Inhibitor System									
	Metering Pumps	0.5	HP	4	EA	\$ 8,000	\$ 30,000	Vendor Quote (Watson-Marlow 2008)	
	HDPE Storage Tank	6000	GAL	1	EA	\$ 55,300	\$ 60,000	Palo Alto Bid Summary	
Sulfuric Acid Chemical Feed System									
	Steel Storage Tank	15000	GAL	2	EA	\$ 1.00	\$ 30,000	RMC Estimate based on previous projects	
	Metering Pumps	0.75	HP	3	EA	\$ 8,000	\$ 20,000	Vendor Quote (Watson-Marlow 2008)	
NaOCL Feed System									
	FRP tank	4500	GAL	2	EA	\$ 41,475	\$ 80,000	Based on scaled HDPE tank cost	
	Metering Pumps	0.5	HP	2	EA	\$ 8,000	\$ 20,000	Vendor Quote (Watson-Marlow 2008)	
Lime Feeding and Storage									
	Lime Silo and Slaker			1	EA	\$ 400,000	\$ 400,000	Vendor Quote (RDP Technologies April 2009)	
	Lime Saturator			1	EA	\$ 250,000	\$ 250,000	Vendor Quote (Degremont March 2009)	
Carbon Dioxide									
	CO2 Feed and Storage	18	Tons	1	EA	\$ 325,000	\$ 330,000	Vendor Quote and Trussell April 2009	
Clearwells									
		2.5	MG	2	EA	\$ 1.50	\$ 7,500,000	CAW unit Cost J71	
Product Water Pump Station									
		10	mgd	1	EA	\$ 2,500,000	\$ 2,500,000	CAW unit cost from (J72)	
15 - Mechanical									
16 - Electrical									
Electrical Allowance 25% of plant construction cost							25%	\$ 12,700,000	CAW unit Cost F80
17 - I&C									
I&C Allowance									included in electrical

WPCA CAPACITY CHARGE (for flows to headworks)

Item	Quantity	Units	Unit Cost	Total Cost
Wastestream to WPCA				
Average Annual Flow Rate		gpd	(flow in gpd)*9.8883	\$ - From MRWPCA as of July 2008
BOD concentration		mg/l	round((flow in gpd)/1000000)*8.34*(BOD in mg/L,2)*1066.6	\$ - From MRWPCA as of July 2008
TSS concentration		mg/l	round((flow in gpd)/1000000)*8.34*(TSS in mg/L,2)*988.43	\$ - From MRWPCA as of July 2008

EASEMENT AND LAND ACQUISITION

Item	Size	Units	Quantity	Unit	Unit Cost	Total Cost
-						

ANNUAL O&M COSTS

	Amount	Unit	Value	Cost
Repair and Replacement Costs				
Total Consumables				\$ 1,796,000
Equipment Consumables	\$ 54,820,000		3%	\$ 1,645,000
Facilities	\$ 6,610,000		1%	\$ 66,000
Cartridge Filter Replacement				\$ 85,000
Total Power Costs				\$ 3,140,000
Treatment	29,033,148	kw-hr/yr		\$ 3,000,000
Brine Disposal		kw-hr/yr		\$ -
UV Disinfection	76,447	kw-hr/yr		\$ 8,000
Mics Facility Power Use	1,314,000	kw-hr/yr		\$ 132,000
Groundwater Monitoring Program				\$ 500,000
Chemicals				\$ 404,000
Total Chemicals				From Chemical Usage Tab
Threshold Inhibitor	Dosage 3 mg/l	consumption 141,909 lbs/yr	cost/lbs 1.45	\$ 210,000
Remineralization (Lime)	30 mg/l	613,048 lbs/yr	0.15	\$ 90,000
Remineralization (CO2)	10 mg/l	204,349 lbs/yr	0.20	\$ 40,000
Chlorination (Chlorine Gas)	1 mg/l	20,435 lbs/yr	0.20	\$ 4,000
Misc Chemicals	3 mg/l	61,305 lbs/yr	1.00	\$ 60,000
WPCA User Fee for flows to headworks				
Flow Charge	Average Annual Flow	mgd	(490796.29*Avg Annual Flow)	\$ -
BOD Charge	Average BOD Concentration	mg/l	(456.45*Avg Flow*Avg BOD conc)	\$ -
TSS Charge	Average TSS Concentration	mg/l	(181.04*Avg Flow*Avg TSS conc)	\$ -
WPCA User Fee for brine flows to Outfall				
Costs under development by MRWPCA				\$ -
Labor Costs				\$ 2,448,000
Total Labor Costs				See Regional O&M Tab
TOTAL ANNUAL O&M COSTS				\$ 8,288,000

Project: Project: Regional Project (Partial Second Pass with SWTP)
Component: Common Components

Date: June 17, 2009
 Project Number:
 Prepared by: Ryan Alameda

Estimate Type: Conceptual Design

Process Cost Summary by Division

Spec. Division	Subtotal	Notes
Pipelines	\$ -	
Structures	\$ -	
11 - Equipment	\$ -	
Common Product Water Delivery Components	\$ 37,700,000	
16 - Electrical	\$ -	
17- I&C	\$ -	
RAW CONSTRUCTION COST	\$ 37,700,000	
Mobilization/Demobilization	0% \$ -	- included in costs below
Contractors Overhead and Profit	0% \$ -	- included in costs below
Construction Cost	\$ 37,700,000	
Implementation (Program Management, Design, CEQA, Legal, CM)	30% \$ 11,310,000	

Spec. Division	Item	Size	Units	Quantity	Unit	Unit Cost	Total Cost	Notes
Pipelines							\$ -	
Structures								
11-Equipment							\$ -	
Common Product Water Delivery Components							\$ 37,700,000	
Terminal Reservoir						\$ 10,500,000	\$ 10,500,000	CAW unit costs (J115)
ASR Pump Station						\$ 1,500,000	\$ 1,500,000	CAW unit costs (J116)
Earthwork, sitework, and piping						\$ 2,600,000	\$ 2,600,000	CAW unit costs (J117)
ASR System						\$ 10,000,000	\$ 10,000,000	CAW unit costs (J138)
Monterey Pipeline						\$ 12,800,000	\$ 12,800,000	CAW unit costs (J106-J107)
Valley Greens Pump station						\$ 300,000	\$ 300,000	CAW unit costs (J109)
16 - Electrical							\$ -	Included in cost above
17 - I&C							\$ -	

WPCA OUTFALL CAPACITY CHARGE (for brine to outfall)

Item	Quantity	Units	Unit Cost	Total Cost
Not Applicable				\$ -

EASEMENT AND LAND ACQUISITION

Item	Size	Units	Quantity	Unit	Unit Cost	Total Cost
						\$ 3,900,000
Pipelines in TAMC ROW (to Monterey Bike Path)	33,000 SF		42	Easement \$	\$ 1,400,000	CAW Unit Cost J118
Terminal Reservoir	80,000 SF		13	Purchase \$	\$ 1,000,000	CAW Unit Cost J119
ASR Well Sites	2 EA		400,000	Lease \$	\$ 800,000	CAW Unit Cost J120
Pipelines in Bike Path	11,000 LF		45	Easement \$	\$ 500,000	CAW Unit Cost J121
Pipelines through Presidio	3,000 LF		17	Easement \$	\$ 50,000	CAW Unit Cost J122
Valley Greens Pump Station	9,000 SF		20	Purchase \$	\$ 180,000	CAW Unit Cost J123

ANNUAL O&M COSTS

	Amount	Unit	Value	Cost
Repair and Replacement Cost			Total Consumables	\$ 80,000
Equipment Consumables				\$ 80,000 See Regional O&M Tab (Offsite Facilities)
Power Costs			Total Power	\$326,000
ASR System	2,743,250	kw-hr/yr		\$ 298,000 See Regional O&M Tab
Valley Greens Pump Station	196,771	kw-hr/yr		\$ 28,000 See Regional O&M Tab
Chemicals			Total Chemicals	\$ 61,000
WPCA User Fee for brine flows to Outfall				\$ -
Not Applicable				\$ -
Labor Costs				\$ 101,000 See Regional O&M Tab
TOTAL ANNUAL O&M COSTS				\$ 568,000

Operations Cost Estimate (2009 Dollars)				Labor	Rate
Project: Regional Project (Partial Second Pass with SWTP)					
Project Component	Units	Summer Quantity	Winter Quantity		
BIRP Output	afy	0	3,300	Plant Operator	\$ 50
ASR Well Injection (CR)	afy	0	1,300	Operations Foreman	\$ 55
ASR Well Injection (SWTP)	afy	0	1,490	Utility Worker	\$ 45
Seaside Wells Production	afy	1,500	0	Utility Foreman	\$ 50
ASR Well Extraction	afy	2,790	0	Lab & Admin	\$ 45
Desal Water	afy	4,260	3,260	Ops Supervisor	\$ 69
SWTP Production	afy	0	1,490		
Sand City Desalination Production	afy	150	150		
Total System Production	afy	8,700	8,200	Facility	PG&E Avg. Power Rates
System Demand	afy	8,700	8,200		Summer Winter
				Desal and SWTP	\$ 0.120 \$ 0.080
				ASR PS	\$ 0.142 \$ 0.100
				ASR Wells	\$ 0.103 \$ 0.093
				Valley Greens PS	\$ 0.142 \$ 0.100
				Seaside Wells	\$ 0.142 \$ 0.100
				Segunda PS	\$ 0.142 \$ 0.100
				Vertical Wells	\$ 0.137 \$ 0.093

Updated Rates

Energy calcs DO NOT incorporate power factor (85%-90%).

Assumptions	
First Pass Recovery	45%
Second Pass Recovery	90%
Overall Recovery	43%
Pretreatment Eff.	100%

RO System	Summer (AF)	Summer (gpm)	Winter (AF)	Winter (gpm)
Pretreatment Feed	9,861	12,226	7,546	9,356
1st Pass Feed	9,861	12,226	7,546	9,356
1st Pass Production	4,438	5,502	3,396	4,210
2nd Pass Percentage	40%	40%	40%	40%
2nd Pass Feed	1,775	2,201	1,358	1,684
2nd Pass Production	1,598	1,981	1,223	1,516
Total Desal Production	4,260	5,282	3,260	4,042

OPERATION & MAINTENANCE (O & M) COSTS			
DESALINATION FACILITIES			
Seawater Feed and Brine Disposal			
Vertical Wells			
Summer Average Flow		12,226 gpm	
Winter Average Flow		9,356 gpm	
Total Head		315 ft	
Vertical Wells Summer Energy	4,231,306 kw-hrs	\$ 0.14 /kw-hrs	\$580,000
Vertical Wells Winter Energy	3,238,042 kw-hrs	\$ 0.09 /kw-hrs	\$300,000
		Subtotal Seawater Inlet PS	\$880,000
Desalination Plant			
Pretreatment Process			
Summer Annual Flow (Applied)		12,226 gpm	
Winter Annual Flow (Applied)		9,356 gpm	
Summer Annual Flow (Production)		5,282 gpm	
Winter Annual Flow (Production)		4,042 gpm	
Mixing			
Summer Energy	0 kw-hrs	\$ 0.12 /kw-hrs	\$0
Winter Energy	0 kw-hrs	\$ 0.08 /kw-hrs	\$0
SUBTOTAL POWER	0 kw-hrs		\$0
Cartridge Filter			
Lift for Pressure Media Filtration		0 ft	
Summer Energy	0 kw-hrs	\$ 0.12 /kw-hrs	\$0
Winter Energy	0 kw-hrs	\$ 0.08 /kw-hrs	\$0
SUBTOTAL POWER	0 kw-hrs		\$0
Threshold Inhibitor Consumption	3 mg/L 141,909 lbs/yr	\$ 1.45 lbs.	\$210,000
Materials	Filter Element Replacement	1 LS	\$90,000
		Subtotal Pretreatment	\$300,000
Reverse Osmosis Process			
Single Pass, 850 psi			
Summer Annual Flow (Applied-1st Pass)		12,226 gpm	
Winter Annual Flow (Applied-1st Pass)		9,356 gpm	
Summer Annual Permeate Production (1st Pass)		5,502 gpm	5580
Winter Annual Permeate Production (1st Pass)		4,210 gpm	
Summer Annual Brine Production (1st Pass)		6,724 gpm	
Winter Annual Brine Production (1st Pass)		5,146 gpm	
Filtrate Forwarding Pump (First Pass)			
Summer Energy	1,370,238 kw-hrs	\$ 0.12 /kw-hrs	\$160,000
Winter Energy	1,048,586 kw-hrs	\$ 0.08 /kw-hrs	\$84,000
High Pressure Pump (First Pass)			
Summer Energy	13,017,263 kw-hrs	\$ 0.12 /kw-hrs	\$1,600,000
Winter Energy	9,961,568 kw-hrs	\$ 0.08 /kw-hrs	\$800,000
Energy Recovery Booster Pump (First Pass)			
Summer Energy	678,268 kw-hrs	\$ 0.12 /kw-hrs	\$81,000
Winter Energy	519,050 kw-hrs	\$ 0.08 /kw-hrs	\$42,000
SUBTOTAL POWER (First Pass)	26,594,973 kw-hrs		\$2,767,000
Summer Second Pass Feed		2,201 gpm	
Winter Second Pass Feed		1,684 gpm	
Second Pass Booster Pump			
Summer Energy	1,381,200 kw-hrs	\$ 0.12 /kw-hrs	\$170,000
Winter Energy	1,056,975 kw-hrs	\$ 0.08 /kw-hrs	\$85,000
SUBTOTAL POWER (Second Pass)	2,438,175 kw-hrs		\$255,000
SUBTOTAL POWER (1st and 2nd)	29,033,148 kw-hrs		\$3,000,000
Misc. Chemicals Consumption	3 mg/L 61,305 lbs/yr	\$ 1.00 lbs.	\$61,000
		Subtotal Reverse Osmosis	\$3,061,000
Post Treatment Process			
Remineralization (Lime) Consumption	30 mg/L 613,048 lbs/yr	\$ 0.15 lbs.	\$92,000
Remineralization (CO2) Consumption	10 mg/L 204,349 lbs/yr	\$ 0.20 lbs.	\$41,000
Chlorination (Chlorine Gas) Consumption	1.0 mg/L 20,435 lbs/yr	\$ 0.20 lbs.	\$4,000
UV Disinfection Summer Energy	1.3 Kw/mgd 43,307 Kw-hrs	\$ 0.12	\$5,000
Winter Energy	33,141 Kw-hrs	\$ 0.08	\$3,000

			Subtotal Post Treatment	\$145,000
Labor and Miscellaneous				
	Misc. Facility Power Usage		150 kw	
	Summer Energy	657,000 kw-hrs	\$ 0.12 /kw-hrs	\$79,000
	Winter Energy	657,000 kw-hrs	\$ 0.08 /kw-hrs	\$53,000
	SUBTOTAL POWER	1,314,000 kw-hrs		\$132,000
Labor				
	Plant Operator (8)	16,000 hrs	\$ 50 hr	\$800,000
	Operations Foreman (2)	4,000 hrs	\$ 55 hr	\$220,000
	Utility Worker (3)	6,000 hrs	\$ 45 hr	\$270,000
	Utility Foreman	2,000 hrs	\$ 50 hr	\$100,000
	Operations Supervisor	2,000 hrs	\$ 69 hr	\$140,000
	Operations Supervisor	2,000 hrs	\$ 69 hr	\$140,000
	Plant Manager	2,000 hrs	\$ 69 hr	\$140,000
	Admin Assistance (on-site)	2,000 hrs	\$ 35 hr	\$70,000
	Admin Assistance (off-site)	2,000 hrs	\$ 35 hr	\$70,000
	SCADA Supervisor	2,000 hrs	\$ 55 hr	\$110,000
	Lab Water Quality Specialist	2,000 hrs	\$ 55 hr	\$110,000
	Lab Assistant	2,000 hrs	\$ 45 hr	\$90,000
Water Treatment Misc. Expenses				
	Contract Services, Disposal, Security, etc.		\$ 25 /AF	\$188,000
			Subtotal Misc.	\$2,448,000
SUBTOTAL DESALINATION FACILITIES O&M				\$6,970,000

Product Water Delivery				
Desalinated Water Pump Station				
	Summer Average Flow		4,260 afy	
	Winter Average Flow		3,260 afy	
	Lift		285 ft	
	Summer Energy	1,561,433 kw-hrs	\$ 0.12 /kw-hrs	\$190,000
	Winter Energy	1,194,900 kw-hrs	\$ 0.08 /kw-hrs	\$96,000
		2,756,333 kw-hrs	Subtotal DWPS	\$286,000
Valley Greens Pump Station				
	Summer Annual Flow		1,700 afy	
	Winter Annual Flow		0 afy	
	Lift		90 ft	
	Summer Energy	196,771 kw-hrs	\$ 0.14 /kw-hrs	\$28,000
	Winter Energy	0 kw-hrs	\$ 0.10 /kw-hrs	\$0
		196,771 hrs	Subtotal VGPS	\$28,000
Labor				
	Operators	500 hrs	\$ 50 hr	\$25,000
SUBTOTAL DESALINATED WATER CONVEYANCE O&M				\$340,000

SWTP

SWTP	Winter (AF)	Winter (gpm)
SWTP Flow Rate	2,980	3,695

SWTP Feed				
SRDF Pumps				
	Summer Average Flow		0 gpm	
	Winter Average Flow		3,695 gpm	
	Total Head		160 ft	
	Summer Energy	0 kw-hrs	\$ 0.14 /kw-hrs	\$0
	Winter Energy	649,493 kw-hrs	\$ 0.09 /kw-hrs	\$60,000
		649,493 kw-hrs	Subtotal SRDF PS	\$60,000
SWTP Energy Requirements				
Component	Total KW at peak operation	Average Power Consumption		
Coagulation/Flocculation				
Flash Mixer	6	9,930		
Coagulation Tank Mixer	9	14,895		
Injection Tank Mixer	9	14,895		
Maturation tank mixer	15	24,825		
Settling tank scraper	3	4,965		
Microsand recycle	30	49,650		
Polymer Metering Pump	3	4,965		
Ferric Metering pump	3	4,965		
MF Membranes				
Feed Pumps	112	186,188		
Reverse Flush Pumps	60	5,000		
Compressor	37	3,000		
CIP Pumps	37	20		
UV Disinfection				
	15	24,825		
Residuals Treatment				
Treated wash water pump station	3.7	16,000		
One - Half meter filter press	4	16,000		
Totals		380,123	\$ 0.09 /kw-hrs	\$35,351
Subtotal SWTP Power Cost \$				95,351

SWTP Chemicals						
Chemical	Dosage	unit	Average Flow rate, mgd	Total Quantity	Unit Cost	Total Annual Cost
Ferric chloride	2.5	mg/l	5.4	41,095	\$ 0.75	\$31,000
Anionic polymer	0.2	lb/mgd	5.4	3,288	\$ 3.92	\$13,000
CIP - Citric Acid	0.045	mg/l	5.4	732	\$ 0.75	\$1,000
Disinfection - NaOCl	1	mg/l	5.4	16,438	\$ 0.38	\$6,000
pH Adjustment - NaOH	3	mg/l	5.4	49,314	\$ 0.17	\$8,000
Residuals Treatment	0.2	lb/mgd	0.54	329	\$ 3.92	\$1,000
Totals						\$60,000

SWTP Product Water Delivery				
SWTP Water pump station				
	Summer Average Flow		0 afy	
	Winter Average Flow		2,980 afy	
	Lift		285 ft	
	Summer Energy	0 kw-hrs	\$ 0.12 /kw-hrs	\$0
	Winter Energy	1,092,270 kw-hrs	\$ 0.08 /kw-hrs	\$87,000
		1,092,270 kw-hrs	Subtotal DWPS	\$87,000
ASR Pump Station for SWTP				
	Summer Annual Flow		0 afy	
	Winter Annual Flow		1,490 afy	
	Lift		60 ft	
	Summer Energy	0 kw-hrs	\$ 0.14 /kw-hrs	\$0
	Winter Energy	114,976 kw-hrs	\$ 0.10 /kw-hrs	\$11,000
		114,976 kw-hrs	Subtotal ASRPS	\$11,000
Labor and Miscellaneous				
	Misc. Facility Power Usage		75 kw	
	Summer Energy	0 kw-hrs	\$ 0.12 /kw-hrs	\$0

Winter Energy	328,500 kw-hrs	\$ 0.08 /kw-hrs	\$26,000
SUBTOTAL POWER	328,500 kw-hrs		\$26,000
Labor			
Plant Operator (4)	4,000 hrs	\$ 50 hr	\$200,000
Operations Foreman (1)	1,000 hrs	\$ 55 hr	\$55,000
Utility Worker (2)	1,500 hrs	\$ 45 hr	\$68,000
Utility Foreman	1,000 hrs	\$ 50 hr	\$50,000
Operations Supervisor	1,000 hrs	\$ 69 hr	\$69,000
Operations Supervisor	0 hrs (shared with Desal)	\$ 69 hr	
Plant Manager	0 hrs (shared with Desal)	\$ 69 hr	
Admin Assistance (on-site)	0 hrs (shared with Desal)	\$ 35 hr	
Admin Assistance (off-site)	0 hrs (shared with Desal)	\$ 35 hr	
SCADA Supervisor	0 hrs (shared with Desal)	\$ 55 hr	
Lab Water Quality Specialist	0 hrs (shared with Desal)	\$ 55 hr	
Lab Assistant	1,000 hrs	\$ 45 hr	\$45,000
Water Treatment Misc. Expenses			
Contract Services, Disposal, Security, etc.		\$ 25 /AF	\$75,000
		Subtotal Labor	\$562,000
		SUBTOTAL SWTP O&M	\$850,000
ASR SYSTEM			
Segunda Pump Station			
Summer Annual Flow		600 afy	
Winter Annual Flow		1,900 afy	
Lift		280 ft	
Summer Energy	216,062 kw-hrs	\$ 0.14 /kw-hrs	\$31,000
Winter Energy	760,218 kw-hrs	\$ 0.10 /kw-hrs	\$76,000
Labor (Operators)	200 hrs	\$ 50 hr	\$10,000
		Subtotal SPS	\$117,000
Begonia Iron Removal Plant			
Summer Annual Flow		0 afy	
Winter Annual Flow (Excess for ASR)		1,300 afy	
Annual Chem Cost		\$ 27 /AF	\$35,000
Annual Labor		\$ 42 /AF	\$55,000
Annual Power		\$ 10 /AF	\$13,000
Source Well Lift		420 ft	
Summer Source Well Energy	0 kw-hrs	\$ 0.14 /kw-hrs	\$0
Winter Source Well Energy	780,224 kw-hrs	\$ 0.10 /kw-hrs	\$78,000
Source Well Labor		\$ 20 /AF	\$26,000
		Subtotal BIRP	\$207,000
Seaside ASR Wells			
Summer Annual Flow		2,790 afy	
Winter Annual Flow		0 afy	
Lift		330 ft	
Summer Energy	986,747 kw-hrs	\$ 0.10 /kw-hrs	\$100,000
Winter Energy	0 kw-hrs	\$ 0.09 /kw-hrs	\$0
Labor (Operators)	200 hrs	\$ 50 hr	\$10,000
Chlorination (NaOCl)	1 mg/L	lbs.	
Consumption	7,583 lbs/yr	\$ 1.00 lbs.	\$8,000
De-Chlorination (NaHSO3)	1 mg/L	lbs.	
Consumption	7,583 lbs/yr	\$ 2.40 lbs.	\$18,000
		Subtotal ASR	\$136,000
		SUBTOTAL SEGUNDA-ASR SYSTEM O&M	\$460,000
TOTAL O & M COSTS			\$8,620,000
REPAIR & REPLACEMENT (R & R) COSTS = MECHANICAL, ELECTRICAL, I&C, ETC.			
Desalination Facilities			
<i>See Detailed estimate for R&R costs</i>			
SWTP Facilities			
<i>See Detailed estimate for R&R costs</i>			
Offsite Facilities			
ASR Wells			
Pumps		3.0%	\$39,000
Facility		1.0%	\$22,000
ASR PS			
Pumps		3.0%	\$5,000
Facility		1.0%	\$1,000
Valley Greens PS			
Pumps		3.0%	\$5,000
Facility		1.0%	\$1,000
TOTAL R & R COSTS			\$80,000
TOTAL O & M COSTS WITH R & R COSTS			\$8,700,000



Project: Regional Project (Partial Second Pass No SWTP)

17-Jun-09

	Regional Project	CAW- North Marina Project	CAW- Moss Landing	Common Components (Terminal Res, 2 ASR Wells, 9 mgd ASR pump station, Monterey Pipeline, Valley Greens PS)
Capital Costs				
Intake Facilities (Wells and Pipeline)	\$ 10,700,000	\$ 20,000,000	\$ 2,800,000	\$ -
Desalination Plant (includes contractor O&P)	\$ 81,100,000	\$ 80,600,000	\$ 96,400,000	\$ -
SWTP	\$ -	\$ -	\$ -	\$ -
Product Water Delivery (including Additional ASR and PS capacity)	\$ 30,500,000	\$ 25,200,000	\$ 41,400,000	\$ -
Common Components (Terminal Res, 2 ASR Wells, 9 mgd ASR pump station, Monterey Pipeline, Valley Greens PS)	\$ -	\$ -	\$ -	\$ 37,700,000
Contractor's Overhead and Profit (excluding Desal)	\$ 7,300,000	\$ 10,900,000	\$ 11,200,000	included above
Base Construction Cost	\$ 129,600,000	\$ 136,700,000	\$ 151,800,000	\$ 37,700,000
Implementation Costs	\$ 26,700,000	\$ 30,700,000	\$ 27,700,000	\$ 11,300,000
ROW Easements and Land Acquisition	\$ -	\$ 1,000,000	\$ 3,300,000	\$ 3,900,000
Capital Costs (Excluding Contingency)	\$ 156,300,000	\$ 168,400,000	\$ 182,800,000	\$ 52,900,000
Project Contingency (20%)	\$ 31,300,000	\$ 33,700,000	\$ 36,600,000	\$ 10,600,000
Most Probably Capital Cost with Contingency	\$ 187,600,000	\$ 202,100,000	\$ 219,400,000	\$ 63,500,000
High End of Accuracy Range (+25%)	\$ 234,500,000	\$ 252,600,000	\$ 274,300,000	\$ 79,400,000
Low End of Accuracy Range (-15%)	\$ 159,500,000	\$ 171,800,000	\$ 186,500,000	\$ 54,000,000
Annual Costs				
Annual Cost of Repair and Replacement	\$ 1,900,000	\$ 1,600,000	\$ 1,700,000	\$ 80,000
Annual Cost of Power	\$ 5,800,000	\$ 4,500,000	\$ 3,500,000	\$ 330,000
Annual Cost of Chemicals	\$ 600,000	\$ 1,000,000	\$ 1,600,000	\$ 60,000
Annual Share of the SRDF	\$ -	\$ -	\$ -	\$ -
Groundwater Monitoring Program	\$ 500,000	\$ 500,000	\$ -	\$ -
Annual WPCA User Charge for Flows to Outfall	\$ -	\$ -	\$ -	\$ -
Annual Labor Costs	\$ 2,500,000	\$ 2,500,000	\$ 2,500,000	\$ 100,000
Total Annual O&M	\$ 11,300,000	\$ 10,100,000	\$ 9,300,000	\$ 570,000
(excluding Implementation Allowances below)				
Grant Funding				
Net Capital Cost	\$ 187,600,000	\$ 202,100,000	\$ 219,400,000	\$ 63,500,000
Cost of Issuance	2.5%	2.5%	2.5%	2.5%
Capital Cost including cost of issuance	\$ 192,300,000	\$ 207,200,000	\$ 224,900,000	\$ 65,100,000
Annualized Construction Costs	\$ 12,700,000	\$ 19,400,000	\$ 21,000,000	\$ 6,100,000
Annual O&M Costs	\$ 11,300,000	\$ 10,100,000	\$ 9,300,000	\$ 570,000
Total Annualized Cost	\$ 24,000,000	\$ 29,500,000	\$ 30,300,000	\$ 6,670,000
Cost of Water (\$/AFY)	\$ 2,290	\$ 3,350	\$ 3,440	\$ 440
Annual Production, AFY	10,500	8,800	8,800	15,200

A/P Calculation

Cost Basis (Date)	Jan-09	Jan-09	Jan-09	Jan-09
Interest Rate	5.15%	8.55%	8.55%	8.55%
Time (Years)	30	30	30	30
A/P	0.066168	0.093476	0.093476	0.093476

Project: Project: Regional Project (Partial Second Pass No SWTP)
Component: Product Water Delivery

Date: June 17, 2009
 Project Number:
 Prepared by: Ryan Alameda

Estimate Type: Conceptual Design

Process Cost Summary by Division

Spec. Division	Subtotal	Notes
Pipelines	\$ 30,170,000	
Additional Product Water Delivery Needed by SWTP	\$ -	
11 - Equipment	\$ -	
15 - Mechanical	\$ -	
16 - Electrical	\$ -	
17- I&C	\$ -	
RAW CONSTRUCTION COST	\$ 30,170,000	
Mobilization/Demobilization	1% \$ 300,000	
Contractors Overhead and Profit	18% \$ 5,430,000	
Construction Cost	\$ 35,900,000	
Implementation (Program Management, Design, CEQA, Legal, CM)	30% \$ 10,770,000	

Spec. Division	Item	Size	Units	Quantity	Unit	Unit Cost	Total Cost	Notes
Pipelines							\$ 30,170,000	
Pipelines	Product Water Delivery							
	North of Reservation Road	36 inch		16,000 LF	\$	376.92	\$ 6,030,000	CAW unit cost J94
	Reservation Road to Seaside Pipeline	36 inch		30,000 LF	\$	370.00	\$ 11,100,000	CAW unit cost J98
	Seaside Pipeline to Terminal	36 inch		13,000 LF	\$	669.23	\$ 8,700,000	CAW unit cost J102
	MCWD Tie in pipeline	24 inch		14,000 LF	\$	246.72	\$ 3,450,000	CAW unit cost J99
	Bore & Jack at Hwy 1			500 ft	\$	1,786.00	\$ 890,000	CAW unit cost J19

Additional Product Water Delivery Needed by SWTP	\$ -
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16 - Electrical	\$ -	included in cost above
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17 - I&C	\$ -	included in cost above
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WPCA OUTFALL CAPACITY CHARGE (for brine to outfall)

Item	Quantity	Units	Unit Cost	Total Cost
Not Applicable				\$ -

EASEMENT AND LAND ACQUISITION

Item	Size	Units	Quantity	Unit	Unit Cost	Total Cost
						\$ -

ANNUAL O&M COSTS

Amount	Unit	Value	Cost
Repair and Replacement Cost		Total Consumables	\$ -

Power Costs	Amount	Unit	Value	Cost
Pump Station	3,848,603	Kw-hrs	Total Power	\$ 380,000
				\$ 380,000

Chemicals	Total Chemicals	\$ -
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WPCA User Fee for brine flows to Outfall	\$ -
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Not Applicable	\$ -
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Labor Costs	\$ -
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TOTAL ANNUAL O&M COSTS	\$ 380,000
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Project: Project: Regional Project (Partial Second Pass No SWTP)
Component: Desalination Intake Facilities

Date: June 17, 2009
 Project Number:
 Prepared by: RMC

Estimate Type: Conceptual Design

Process Cost Summary

Spec. Division	Subtotal	Notes
2 - Sitework	\$ 7,850,000	
3 - Concrete	\$ 460,000	
5 - Metals	\$ -	
11 - Equipment	\$ 1,800,000	
15 - Mechanical	\$ -	
16 - Electrical	\$ 450,000	
17 - I&C	\$ -	
RAW CONSTRUCTION COST \$ 10,560,000		
Mobilization/Demobilization	1% \$ 110,000	
Contractors Overhead and Profit	18% \$ 1,900,000	
Construction Cost	\$ 12,570,000	
Implementation (Program Management, Design, CEQA, Legal, CM)	30% \$ 3,770,000	

Spec. Division	Item	Size	Units	Quantity	Unit	Unit Cost	Total Cost	Notes
Intake Wells and Pipeline								\$ 7,850,000
Intake Wells	Vertical Wells	18	in	6	EA	\$ 540,000	\$ 3,240,000	Estimate from GeoScience 020209
	Well development and water disposal			6	EA	\$ 160,000	\$ 960,000	CAW unit cost (J14)
Pipelines	Bore & Jack at Hwy 1 Intake Water			500	ft	\$ 1,786.00	\$ 890,000	CAW unit cost (J19)
		36	in	13,000	ft	\$ 212.50	\$ 2,760,000	CAW unit cost (J18)

Structures								\$ 460,000
Intake Well Head Structures								Based on a 18' x 18' x 10' underground vault
	Structural Excavation	435	CY	6	EA	\$ 35	\$ 91,000	
	Base Slab	18	CY	6	EA	\$ 800	\$ 86,000	
	Walls	27	CY	6	EA	\$ 1,200	\$ 194,000	
	Elevated Slab	12		6	EA	\$ 1,200	\$ 86,000	

Included in Structures

Equipment								\$ 1,800,000
Intake Well Pumps		300	HP	6	total	\$ 300,000	\$ 1,800,000	CAW unit cost J15 (increased cost proportional to hp increase)

Mechanical \$ -

Electrical								\$ 450,000	
Electrical Allowance	Assumes 25% of Div 11							\$ 450,000	CAW unit Cost J17

17 - I&C included in electrical \$ -

EASEMENT AND LAND ACQUISITION							Total Cost
Item	Size	Units	Quantity	Unit	Unit Cost		\$ -

ANNUAL O&M COSTS				Amount	Unit	Value	Cost
Repair and Replacement Cost						Total Consumables	\$ 59,000
	Equipment Consumables			\$ 1,800,000		3%	\$ 54,000
	Structures			\$ 460,000		1%	\$ 5,000

Power Costs				Amount	Unit	Value	Cost
	Intake Wells			10,429,276	kw-hr/yr	Total Power Costs	\$ 1,190,000
See Regional O&M Tab							

Groundwater Monitoring Program See Regional Desal Tab

Chemicals							
WPCA User Fee for flows to headworks							
	Flow Charge	Average Annual Flow			mgd	Total Annual User Fee	\$ -
	BOD Charge	Average BOD Concentration			mg/l	(490796.29*Average Annual Flow)	\$ -
	TSS Charge	Average TSS Concentration			mg/l	(456.45*Avg Flow*Avg BOD conc)	\$ -
						(181.04*Avg Flow*Avg TSS conc)	\$ -
From MRWPCA as of July 2008							

WPCA User Fee for brine flows to Outfall
 Costs under development by MRWPCA \$ -

Labor Costs Total Labor Costs \$ - included in desal cost

TOTAL ANNUAL O&M COSTS							\$ 1,249,000
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Project: Project: Regional Project (Partial Second Pass No SWTP)
Component: Regional Desalination Plant

Date: June 17, 2009
 Project Number:
 Prepared by: RMC

Estimate Type: Conceptual Design

Process Cost Summary by Division

Spec. Division	Subtotal	Notes
2 - Sitework	\$ 1,480,000	
3 - Concrete	\$ 6,610,000	
5 - Metals	\$ -	
11 - Equipment	\$ 42,720,000	
15 - Mechanical	\$ -	
16 - Electrical	\$ 12,700,000	
17- I&C	\$ -	
RAW CONSTRUCTION COST \$ 63,510,000		
Mobilization/Demobilization	1% \$ 640,000	
Contractors Overhead and Profit	10% \$ 6,350,000	
Construction Cost	\$ 70,500,000	
Design Build Engineering	15% \$ 10,580,000	
Construction Cost + Design Build	\$ 81,080,000	
Implementation (Program Management, Design, CEQA, Legal, CM)	15% \$ 12,160,000	

Spec. Division	Item	Size	Units	Quantity	Unit	Unit Cost	Total Cost	Notes	
2 - Sitework									
	Sitework and Yard piping	5.0	acres	219,107	sf	\$ 5.00	\$ 1,100,000	CAW unit cost (J78)	
	Brine Disposal	36	in	2500	ft	\$ 150.00	\$ 380,000	CAW unit cost (J20)	
3 - Structures									
Desalination Facility									
	RO Building (incl lab and office)			32,000	SF	\$ 179	\$ 5,730,000	CAW unit costs J42	
	Post Treatment & Disinfection			600	SF	\$ 133	\$ 80,000	CAW unit costs J37	
	Chemical Storage			6,000	SF	\$ 133	\$ 800,000	CAW unit costs J37	
5 - Metals									
	Misc. Metals	Included in Div 3							
11 - Equipment									
Pretreatment									
	Cartridge Filters	5	micron	8	EA	\$ 75,000	\$ 600,000	Vendor Quote (Filtrek April 2009) (plus 25% install)	
RO Process Equipment (First Pass)									
		10	mgd	1	EA	\$ 25,116,279	\$ 25,120,000	CAW unit cost for MLPP (minus 10% O&P) Changed recovery from 50% to 43%	
RO System (Partial Second Pass)									
	Second Pass Pumps	450	HP	4	EA	\$ 112,500	\$ 450,000	Vendor Quote (Sulzer April 2009) (plus 25% install)	
	Second Pass Membranes			3	EA	\$ 1,600,000	\$ 4,800,000	Vendor Quotes and Trussell (April 2009)	
	Second Pass Flush Pump	20	HP	2	EA	\$ 25,000	\$ 50,000	RMC Estimate based on previous projects	
	Second Pass Break Tank			150	CY	\$ 1,200	\$ 180,000	RMC Estimate based on previous projects	
Disinfection									
	UV Disinfection--MPHO Unit			4	EA	\$ 76,000	\$ 300,000	Vendor Quote (Trojan UV March 2009) (plus 25% install)	
Chemical Handling									
Threshold Inhibitor System									
	Metering Pumps	0.5	HP	4	EA	\$ 8,000	\$ 30,000	Vendor Quote (Watson-Marlow 2008)	
	HDPE Storage Tank	6000	GAL	1	EA	\$ 55,300	\$ 60,000	Palo Alto Bid Summary	
Sulfuric Acid Chemical Feed System									
	Steel Storage Tank	15000	GAL	2	EA	\$ 1.00	\$ 30,000	RMC Estimate based on previous projects	
	Metering Pumps	0.75	HP	3	EA	\$ 8,000	\$ 20,000	Vendor Quote (Watson-Marlow 2008)	
NaOCL Feed System									
	FRP tank	4500	GAL	2	EA	\$ 41,475	\$ 80,000	Based on scaled HDPE tank cost	
	Metering Pumps	0.5	HP	2	EA	\$ 8,000	\$ 20,000	Vendor Quote (Watson-Marlow 2008)	
Lime Feeding and Storage									
	Lime Silo and Slaker			1	EA	\$ 400,000	\$ 400,000	Vendor Quote (RDP Technologies April 2009)	
	Lime Saturator			1	EA	\$ 250,000	\$ 250,000	Vendor Quote (Degremont March 2009)	
Carbon Dioxide									
	CO2 Feed and Storage	18	Tons	1	EA	\$ 325,000	\$ 330,000	Vendor Quote and Trussell April 2009	
Clearwells									
		2.5	MG	2	EA	\$ 1.50	\$ 7,500,000	CAW unit Cost J71	
Product Water Pump Station									
		10	mgd	1	EA	\$ 2,500,000	\$ 2,500,000	CAW unit cost from (J72)	
15 - Mechanical									
16 - Electrical									
Electrical Allowance 25% of plant construction cost							25%	\$ 12,700,000	CAW unit Cost F80
17 - I&C									
I&C Allowance								-	included in electrical

WPCA CAPACITY CHARGE (for flows to headworks)

Item	Quantity	Units	Unit Cost	Total Cost
Wastestream to WPCA				
Average Annual Flow Rate		gpd	(flow in gpd)*9.8883	\$ - From MRWPCA as of July 2008
BOD concentration		mg/l	round((flow in gpd)/1000000)*8.34*(BOD in mg/L,2)*1066.6	\$ - From MRWPCA as of July 2008
TSS concentration		mg/l	round((flow in gpd)/1000000)*8.34*(TSS in mg/L,2)*988.43	\$ - From MRWPCA as of July 2008

EASEMENT AND LAND ACQUISITION

Item	Size	Units	Quantity	Unit	Unit Cost	Total Cost
-						

ANNUAL O&M COSTS

	Amount	Unit	Value	Cost
Repair and Replacement Costs				
Total Consumables				\$ 1,796,000
Equipment Consumables	\$ 54,820,000		3%	\$ 1,645,000
Facilities	\$ 6,610,000		1%	\$ 66,000
Cartridge Filter Replacement				\$ 85,000
Total Power Costs				\$ 4,242,000
Treatment	40,538,306	kw-hr/yr		\$ 4,100,000
Brine Disposal		kw-hr/yr		\$ -
UV Disinfection	106,742	kw-hr/yr		\$ 10,000
Mics Facility Power Use	1,314,000	kw-hr/yr		\$ 132,000
Groundwater Monitoring Program				\$ 500,000
Chemicals				\$ 576,000
Total Chemicals				\$ 576,000
Threshold Inhibitor	Dosage 3 mg/l	consumption 198,145 lbs/yr	cost/lbs 1.45	\$ 290,000
Remineralization (Lime)	30 mg/l	855,985 lbs/yr	0.15	\$ 130,000
Remineralization (CO2)	10 mg/l	285,328 lbs/yr	0.20	\$ 60,000
Chlorination (Chlorine Gas)	1 mg/l	28,533 lbs/yr	0.20	\$ 6,000
Misc Chemicals	3 mg/l	85,598 lbs/yr	1.00	\$ 90,000
WPCA User Fee for flows to headworks				
Flow Charge	Average Annual Flow	mgd	(490796.29*Avg Annual Flow)	\$ -
BOD Charge	Average BOD Concentration	mg/l	(456.45*Avg Flow*Avg BOD conc)	\$ -
TSS Charge	Average TSS Concentration	mg/l	(181.04*Avg Flow*Avg TSS conc)	\$ -
WPCA User Fee for brine flows to Outfall				
Costs under development by MRWPCA				\$ -
Labor Costs				\$ 2,522,500
Total Labor Costs				\$ 2,522,500
TOTAL ANNUAL O&M COSTS				\$ 9,636,500

Project: Project: Regional Project (Partial Second Pass No SWTP)
Component: Common Components

Date: June 17, 2009
 Project Number:
 Prepared by: Ryan Alameda

Estimate Type: Conceptual Design

Process Cost Summary by Division

Spec. Division	Subtotal	Notes
Pipelines	\$ -	
Structures	\$ -	
11 - Equipment	\$ -	
Common Product Water Delivery Components	\$ 37,700,000	
16 - Electrical	\$ -	
17- I&C	\$ -	
RAW CONSTRUCTION COST	\$ 37,700,000	
Mobilization/Demobilization	0% \$ -	- included in costs below
Contractors Overhead and Profit	0% \$ -	- included in costs below
Construction Cost	\$ 37,700,000	
Implementation (Program Management, Design, CEQA, Legal, CM)	30% \$ 11,310,000	

Spec. Division	Item	Size	Units	Quantity	Unit	Unit Cost	Total Cost	Notes
Pipelines							\$ -	
Structures								
11-Equipment							\$ -	
Common Product Water Delivery Components							\$ 37,700,000	
Terminal Reservoir						\$ 10,500,000	\$ 10,500,000	CAW unit costs (J115)
ASR Pump Station						\$ 1,500,000	\$ 1,500,000	CAW unit costs (J116)
Earthwork, sitework, and piping						\$ 2,600,000	\$ 2,600,000	CAW unit costs (J117)
ASR System						\$ 10,000,000	\$ 10,000,000	CAW unit costs (J138)
Monterey Pipeline						\$ 12,800,000	\$ 12,800,000	CAW unit costs (J106-J107)
Valley Greens Pump station						\$ 300,000	\$ 300,000	CAW unit costs (J109)
16 - Electrical							\$ -	Included in cost above
17 - I&C							\$ -	

WPCA OUTFALL CAPACITY CHARGE (for brine to outfall)

Item	Quantity	Units	Unit Cost	Total Cost
Not Applicable				\$ -

EASEMENT AND LAND ACQUISITION

Item	Size	Units	Quantity	Unit	Unit Cost	Total Cost
						\$ 3,900,000
Pipelines in TAMC ROW (to Monterey Bike Path)	33,000 SF		42	Easement \$	\$ 1,400,000	CAW Unit Cost J118
Terminal Reservoir	80,000 SF		13	Purchase \$	\$ 1,000,000	CAW Unit Cost J119
ASR Well Sites	2 EA		400,000	Lease \$	\$ 800,000	CAW Unit Cost J120
Pipelines in Bike Path	11,000 LF		45	Easement \$	\$ 500,000	CAW Unit Cost J121
Pipelines through Presidio	3,000 LF		17	Easement \$	\$ 50,000	CAW Unit Cost J122
Valley Greens Pump Station	9,000 SF		20	Purchase \$	\$ 180,000	CAW Unit Cost J123

ANNUAL O&M COSTS

	Amount	Unit	Value	Cost
Repair and Replacement Cost			Total Consumables	\$ 80,000
Equipment Consumables				\$ 80,000 See Regional O&M Tab (Offsite Facilities)
Power Costs			Total Power	\$326,000
ASR System	2,743,250	kw-hr/yr		\$ 298,000 See Regional O&M Tab
Valley Greens Pump Station	196,771	kw-hr/yr		\$ 28,000 See Regional O&M Tab
Chemicals			Total Chemicals	\$ 61,000
WPCA User Fee for brine flows to Outfall				\$ -
Not Applicable				\$ -
Labor Costs				\$ 101,000 See Regional O&M Tab
TOTAL ANNUAL O&M COSTS				\$ 568,000

Operations Cost Estimate (2009 Dollars)				Labor	Rate
Project: Regional Project (Partial Second Pass No SWTP)					
Project Component	Units	Summer Quantity	Winter Quantity		
BIRP Output	afy	0	3,300	Plant Operator	\$ 50
ASR Well Injection (CR)	afy	0	1,300	Operations Foreman	\$ 55
ASR Well Injection (SWTP)	afy	0	0	Utility Worker	\$ 45
Seaside Wells Production	afy	1,500	0	Utility Foreman	\$ 50
ASR Well Extraction	afy	2,790	0	Lab & Admin	\$ 45
Desal Water	afy	5,050	5,450	Ops Supervisor	\$ 69
SWTP Production	afy	0	0		
Sand City Desalination Production	afy	150	150		
Total System Production	afy	9,490	8,900	Facility	PG&E Avg. Power Rates
System Demand	afy	9,490	8,900		Summer Winter
				Desal and SWTP	\$ 0.120 \$ 0.080
				ASR PS	\$ 0.142 \$ 0.100
				ASR Wells	\$ 0.103 \$ 0.093
				Valley Greens PS	\$ 0.142 \$ 0.100
				Seaside Wells	\$ 0.142 \$ 0.100
				Segunda PS	\$ 0.142 \$ 0.100
				Vertical Wells	\$ 0.137 \$ 0.093

Updated Rates

Energy calcs DO NOT incorporate power factor (85%-90%).

Assumptions	
First Pass Recovery	45%
Second Pass Recovery	90%
Overall Recovery	43%
Pretreatment Eff.	100%

RO System	Summer (AF)	Summer (gpm)	Winter (AF)	Winter (gpm)
Pretreatment Feed	11,690	14,493	12,616	15,641
1st Pass Feed	11,690	14,493	12,616	15,641
1st Pass Production	5,260	6,522	5,677	7,039
2nd Pass Percentage	40%	40%	40%	40%
2nd Pass Feed	2,104	2,609	2,271	2,815
2nd Pass Production	1,894	2,348	2,044	2,534
Total Desal Production	5,050	6,261	5,450	6,757

OPERATION & MAINTENANCE (O & M) COSTS			
DESALINATION FACILITIES			
Seawater Feed and Brine Disposal			
Vertical Wells			
Summer Average Flow		14,493 gpm	
Winter Average Flow		15,641 gpm	
Total Head		315 ft	
Vertical Wells Summer Energy	5,015,985 kw-hrs	\$ 0.14 /kw-hrs	\$690,000
Vertical Wells Winter Energy	5,413,291 kw-hrs	\$ 0.09 /kw-hrs	\$500,000
Subtotal Seawater Inlet PS			\$1,190,000
Desalination Plant			
Pretreatment Process			
Summer Annual Flow (Applied)		14,493 gpm	
Winter Annual Flow (Applied)		15,641 gpm	
Summer Annual Flow (Production)		6,261 gpm	
Winter Annual Flow (Production)		6,757 gpm	
Mixing			
Summer Energy	0 kw-hrs	\$ 0.12 /kw-hrs	\$0
Winter Energy	0 kw-hrs	\$ 0.08 /kw-hrs	\$0
SUBTOTAL POWER			0 kw-hrs
Cartridge Filter			
Lift for Pressure Media Filtration		0 ft	
Summer Energy	0 kw-hrs	\$ 0.12 /kw-hrs	\$0
Winter Energy	0 kw-hrs	\$ 0.08 /kw-hrs	\$0
SUBTOTAL POWER			0 kw-hrs
Threshold Inhibitor Consumption	3 mg/L 198,145 lbs/yr	\$ 1.45 lbs.	\$290,000
Materials	Filter Element Replacement	1 LS	\$90,000
Subtotal Pretreatment			\$380,000
Reverse Osmosis Process			
Single Pass, 850 psi			
Summer Annual Flow (Applied-1st Pass)		14,493 gpm	
Winter Annual Flow (Applied-1st Pass)		15,641 gpm	
Summer Annual Permeate Production (1st Pass)		6,522 gpm	5580
Winter Annual Permeate Production (1st Pass)		7,039 gpm	
Summer Annual Brine Production (1st Pass)		7,971 gpm	
Winter Annual Brine Production (1st Pass)		8,603 gpm	
Filtrate Forwarding Pump (First Pass)			
Summer Energy	1,624,343 kw-hrs	\$ 0.12 /kw-hrs	\$190,000
Winter Energy	1,753,004 kw-hrs	\$ 0.08 /kw-hrs	\$140,000
High Pressure Pump (First Pass)			
Summer Energy	15,431,263 kw-hrs	\$ 0.12 /kw-hrs	\$1,900,000
Winter Energy	16,653,541 kw-hrs	\$ 0.08 /kw-hrs	\$1,330,000
Energy Recovery Booster Pump (First Pass)			
Summer Energy	804,050 kw-hrs	\$ 0.12 /kw-hrs	\$96,000
Winter Energy	867,737 kw-hrs	\$ 0.08 /kw-hrs	\$69,000
SUBTOTAL POWER (First Pass)			37,133,939 kw-hrs
Summer Second Pass Feed		2,609 gpm	
Winter Second Pass Feed		2,815 gpm	
Second Pass Booster Pump			
Summer Energy	1,637,338 kw-hrs	\$ 0.12 /kw-hrs	\$200,000
Winter Energy	1,767,028 kw-hrs	\$ 0.08 /kw-hrs	\$141,000
SUBTOTAL POWER (Second Pass)			3,404,367 kw-hrs
SUBTOTAL POWER (1st and 2nd)			40,538,306 kw-hrs
Misc. Chemicals Consumption	3 mg/L 85,598 lbs/yr	\$ 1.00 lbs.	\$86,000
Subtotal Reverse Osmosis			\$4,186,000
Post Treatment Process			
Remineralization (Lime) Consumption	30 mg/L 855,985 lbs/yr	\$ 0.15 lbs.	\$128,000
Remineralization (CO2) Consumption	10 mg/L 285,328 lbs/yr	\$ 0.20 lbs.	\$57,000
Chlorination (Chlorine Gas) Consumption	1.0 mg/L 28,533 lbs/yr	\$ 0.20 lbs.	\$6,000
UV Disinfection Summer Energy	1.3 Kw/mgd 51,338 Kw-hrs	\$ 0.12	\$6,000
UV Disinfection Winter Energy	55,404 Kw-hrs	\$ 0.08	\$4,000

			Subtotal Post Treatment	\$201,000
Labor and Miscellaneous				
	Misc. Facility Power Usage		150 kw	
	Summer Energy	657,000 kw-hrs	\$ 0.12 /kw-hrs	\$79,000
	Winter Energy	657,000 kw-hrs	\$ 0.08 /kw-hrs	\$53,000
	SUBTOTAL POWER	1,314,000 kw-hrs		\$132,000
Labor				
	Plant Operator (8)	16,000 hrs	\$ 50 hr	\$800,000
	Operations Foreman (2)	4,000 hrs	\$ 55 hr	\$220,000
	Utility Worker (3)	6,000 hrs	\$ 45 hr	\$270,000
	Utility Foreman	2,000 hrs	\$ 50 hr	\$100,000
	Operations Supervisor	2,000 hrs	\$ 69 hr	\$140,000
	Operations Supervisor	2,000 hrs	\$ 69 hr	\$140,000
	Plant Manager	2,000 hrs	\$ 69 hr	\$140,000
	Admin Assistance (on-site)	2,000 hrs	\$ 35 hr	\$70,000
	Admin Assistance (off-site)	2,000 hrs	\$ 35 hr	\$70,000
	SCADA Supervisor	2,000 hrs	\$ 55 hr	\$110,000
	Lab Water Quality Specialist	2,000 hrs	\$ 55 hr	\$110,000
	Lab Assistant	2,000 hrs	\$ 45 hr	\$90,000
Water Treatment Misc. Expenses				
	Contract Services, Disposal, Security, etc.		\$ 25 /AF	\$262,500
			Subtotal Misc.	\$2,522,500
			SUBTOTAL DESALINATION FACILITIES O&M	\$8,620,000
Product Water Delivery				
Desalinated Water Pump Station				
	Summer Average Flow		5,050 afy	
	Winter Average Flow		5,450 afy	
	Lift		285 ft	
	Summer Energy	1,850,995 kw-hrs	\$ 0.12 /kw-hrs	\$220,000
	Winter Energy	1,997,608 kw-hrs	\$ 0.08 /kw-hrs	\$160,000
		3,848,603 kw-hrs	Subtotal DWPS	\$380,000
Valley Greens Pump Station				
	Summer Annual Flow		1,700 afy	
	Winter Annual Flow		0 afy	
	Lift		90 ft	
	Summer Energy	196,771 kw-hrs	\$ 0.14 /kw-hrs	\$28,000
	Winter Energy	0 kw-hrs	\$ 0.10 /kw-hrs	\$0
		196,771 hrs	Subtotal VGPS	\$28,000
Labor				
	Operators	500 hrs	\$ 50 hr	\$25,000
			SUBTOTAL DESALINATED WATER CONVEYANCE O&M	\$440,000
ASR SYSTEM				
Segunda Pump Station				
	Summer Annual Flow		600 afy	
	Winter Annual Flow		1,900 afy	
	Lift		280 ft	
	Summer Energy	216,062 kw-hrs	\$ 0.14 /kw-hrs	\$31,000
	Winter Energy	760,218 kw-hrs	\$ 0.10 /kw-hrs	\$76,000
	Labor (Operators)	200 hrs	\$ 50 hr	\$10,000
			Subtotal SPS	\$117,000
Begonia Iron Removal Plant				
	Summer Annual Flow		0 afy	
	Winter Annual Flow (Excess for ASR)		1,300 afy	
	Annual Chem Cost		\$ 27 /AF	\$35,000
	Annual Labor		\$ 42 /AF	\$55,000
	Annual Power		\$ 10 /AF	\$13,000
	Source Well Lift		420 ft	
	Summer Source Well Energy	0 kw-hrs	\$ 0.14 /kw-hrs	\$0
	Winter Source Well Energy	780,224 kw-hrs	\$ 0.10 /kw-hrs	\$78,000
	Source Well Labor		\$ 20 /AF	\$26,000
			Subtotal BIRP	\$207,000
Seaside ASR Wells				
	Summer Annual Flow		2,790 afy	
	Winter Annual Flow		0 afy	
	Lift		330 ft	
	Summer Energy	986,747 kw-hrs	\$ 0.10 /kw-hrs	\$100,000
	Winter Energy	0 kw-hrs	\$ 0.09 /kw-hrs	\$0
	Labor (Operators)	200 hrs	\$ 50 hr	\$10,000
	Chlorination (NaOCl)	1 mg/L	lbs.	
	Consumption	7,583 lbs/yr	\$ 1.00 lbs.	\$8,000
	De-Chlorination (NaHSO3)	1 mg/L	lbs.	
	Consumption	7,583 lbs/yr	\$ 2.40 lbs.	\$18,000
			Subtotal ASR	\$136,000
			SUBTOTAL SEGUNDA-ASR SYSTEM O&M	\$460,000
TOTAL O & M COSTS				
\$9,520,000				
REPAIR & REPLACEMENT (R & R) COSTS = MECHANICAL, ELECTRICAL, I&C, ETC.				
Desalination Facilities				
<i>See Detailed estimate for R&R costs</i>				
SWTP Facilities				
<i>See Detailed estimate for R&R costs</i>				
Offsite Facilities				
ASR Wells				
	Pumps		3.0%	\$39,000
	Facility		1.0%	\$22,000
ASR PS				
	Pumps		3.0%	\$5,000
	Facility		1.0%	\$1,000
Valley Greens PS				
	Pumps		3.0%	\$5,000
	Facility		1.0%	\$1,000
TOTAL R & R COSTS				
\$80,000				
TOTAL O & M COSTS WITH R & R COSTS				
\$9,600,000				



Project: MCWD Project (Partial Second Pass No SWTP)

17-Jun-09



Capital Costs	
Intake Facilities (Wells and Pipeline)	\$ 5,900,000
Desalination Plant (includes contractor O&P)	\$ 24,400,000
SWTP	
Product Water Delivery (including Additional ASR and PS capacity)	\$ 8,500,000
Common Components (Terminal Res, 2 ASR Wells, 9 mgd ASR pump station, Monterey Pipeline, Valley Greens PS)	\$ -
Contractor's Overhead and Profit (excluding Desal)	\$ 2,600,000
Base Construction Cost	\$ 41,400,000
Implementation Costs	\$ 8,700,000
ROW Easements and Land Acquisition	\$ -
Capital Costs (Excluding Contingency)	\$ 50,100,000
Project Contingency (20%)	\$ 10,000,000
Most Probably Capital Cost with Contingency	\$ 60,100,000

High End of Accuracy Range (+25%)	\$ 75,100,000
Low End of Accuracy Range (-15%)	\$ 51,100,000

Annual Costs	
Annual Cost of Repair and Replacement	\$ 600,000
Annual Cost of Power	\$ 900,000
Annual Cost of Chemicals	\$ 100,000
Annual Share of the SRDF	
Groundwater Monitoring Program	\$ 500,000
Annual WPCA User Charge for Flows to Outfall	\$ -
Annual Labor Costs	\$ 900,000
Total Annual O&M	\$ 3,000,000

Annualized Costs	
Grant Funding	
Net Capital Cost	\$ 60,100,000
Cost of Issuance	2.5%
Capital Cost including cost of issuance	\$ 61,600,000
Annualized Construction Costs	\$ 4,100,000
Annual O&M Costs	\$ 3,000,000
Total Annualized Cost	\$ 7,100,000
Cost of Water (\$/AFY)	\$ 4,180
Annual Production, AFY	1,700

A/P Calculation
 Cost Basis (Date)
 Interest Rate
 Time (Years)
 A/P

Jan-09
 5.15%
 30
 0.066168

Project: Project: MCWD Project (Partial Second Pass No SWTP)
Component: Product Water Delivery

Date: June 17, 2009
 Project Number:
 Prepared by: Ryan Alameda

Estimate Type: Conceptual Design

Process Cost Summary by Division

Spec. Division	Subtotal	Notes
Pipelines	\$ 8,390,000	
Additional Product Water Delivery Needed by SWTP	\$ -	
11 - Equipment	\$ -	
15 - Mechanical	\$ -	
16 - Electrical	\$ -	
17- I&C	\$ -	
RAW CONSTRUCTION COST	\$ 8,390,000	
Mobilization/Demobilization	1% \$ 80,000	
Contractors Overhead and Profit	18% \$ 1,510,000	
Construction Cost	\$ 9,980,000	
Implementation (Program Management, Design, CEQA, Legal, CM)	30% \$ 2,990,000	

Spec. Division	Item	Size	Units	Quantity	Unit	Unit Cost	Total Cost	Notes
Pipelines							\$ 8,390,000	
Pipelines								
Product Water Delivery								
	North of Reservation Road	16 inch		16,000 LF	\$	167.52	\$ 2,700,000	CAW unit cost J94
	Reservation Road to MCWD Tie In	16 inch		15,000 LF	\$	164.48	\$ 2,500,000	CAW unit cost J98
	MCWD Tie in pipeline	16 inch		14,000 LF	\$	164.48	\$ 2,300,000	CAW unit cost J99
	Bore & Jack at Hwy 1			500 ft	\$	1,786.00	\$ 890,000	CAW unit cost J19
Additional Product Water Delivery Needed by SWTP							\$ -	
16 - Electrical							\$ -	included in cost above
17 - I&C							\$ -	included in cost above
WPCA OUTFALL CAPACITY CHARGE (for brine to outfall)								
	Item			Quantity	Units	Unit Cost		
	Not Applicable						\$ -	
EASEMENT AND LAND ACQUISITION								
	Item	Size	Units	Quantity	Unit	Unit Cost	Total Cost	
							\$ -	
ANNUAL O&M COSTS								
				Amount	Unit	Value	Cost	
Repair and Replacement Cost						Total Consumables	\$ -	
Power Costs	Product Water Pump Station			524,722	kw-hr/yr	Total Power	\$51,000	See Regional O&M Tab
							\$ 51,000	
Chemicals						Total Chemicals		
WPCA User Fee for brine flows to Outfall							\$ -	
Labor Costs								
TOTAL ANNUAL O&M COSTS							\$ 51,000	

Project: Project: MCWD Project (Partial Second Pass No SWTP)
Component: Desalination Intake Facilities

Date: June 17, 2009
 Project Number:
 Prepared by: RMC

Estimate Type: Conceptual Design

Process Cost Summary

Spec. Division	Subtotal	Notes
2 - Sitework	\$ 5,050,000	
3 - Concrete	\$ 150,000	
5 - Metals	\$ -	
11 - Equipment	\$ 500,000	
15 - Mechanical	\$ -	
16 - Electrical	\$ 130,000	
17- I&C	\$ -	
RAW CONSTRUCTION COST		
	\$ 5,830,000	
Mobilization/Demobilization	1% \$ 60,000	
Contractors Overhead and Profit	18% \$ 1,050,000	
Construction Cost	\$ 6,940,000	
Implementation (Program Management, Design, CEQA, Legal, CM)	30% \$ 2,080,000	

Spec. Division	Item	Size	Units	Quantity	Unit	Unit Cost	Total Cost	Notes
Intake Wells and Pipeline								\$ 5,050,000
Intake Wells	Vertical Wells	18	in	2	EA	\$ 540,000	\$ 1,080,000	Estimate from GeoScience 020209
	Well development and water disposal			2	EA	\$ 160,000	\$ 320,000	CAW unit cost (J14)
Pipelines	Bore & Jack at Hwy 1 Intake Water			500	ft	\$ 1,786.00	\$ 890,000	CAW unit cost (J19)
		24	in	13,000	ft	\$ 212.50	\$ 2,760,000	CAW unit cost (J18)

Structures								\$ 150,000
Intake Well Head Structures								Based on a 18' x 18' x 10' underground vault
	Structural Excavation	435	CY	2	EA	\$ 35	\$ 30,000	
	Base Slab	18	CY	2	EA	\$ 800	\$ 29,000	
	Walls	27	CY	2	EA	\$ 1,200	\$ 65,000	
	Elevated Slab	12		2	EA	\$ 1,200	\$ 29,000	

\$ -

Included in Structures

Equipment								\$ 500,000
Intake Well Pumps		250	HP	2	total	\$ 250,000	\$ 500,000	CAW unit cost J15

Mechanical \$ -

Electrical \$ 130,000

Electrical Allowance Assumes 25% of Div 11 \$ 130,000 CAW unit Cost J17

17 - I&C \$ -

included in electrical

EASEMENT AND LAND ACQUISITION								Total Cost
Item	Size	Units	Quantity	Unit	Unit Cost			
								\$ -

ANNUAL O&M COSTS

	Amount	Unit	Value	Cost
Repair and Replacement Cost			Total Consumables	\$ 17,000
Equipment Consumables	\$ 500,000		3%	\$ 15,000
Structures	\$ 150,000		1%	\$ 2,000

Power Costs					Total Power Costs	\$ 180,000
Intake Wells		1,608,142	kw-hr/yr		\$ 180,000	See Regional O&M Tab

Groundwater Monitoring Program See Regional Desal Tab

Chemicals

WPCA User Fee for flows to headworks				Total Annual User Fee	\$ -
Flow Charge	Average Annual Flow	mgd	(490796.29*Average Annual Flow)	\$ -	From MRWPCA as of July 2008
BOD Charge	Average BOD Concentration	mg/l	(456.45*Avg Flow*Avg BOD conc)	\$ -	From MRWPCA as of July 2008
TSS Charge	Average TSS Concentration	mg/l	(181.04*Avg Flow*Avg TSS conc)	\$ -	From MRWPCA as of July 2008

WPCA User Fee for brine flows to Outfall
 Costs under development by MRWPCA \$ -

Labor Costs Total Labor Costs \$ - included in desal cost

TOTAL ANNUAL O&M COSTS \$ 197,000

Project: Project: MCWD Project (Partial Second Pass No SWTP)
Component: Regional Desalination Plant

Date: June 17, 2009
 Project Number:
 Prepared by: RMC

Estimate Type: Conceptual Design

Process Cost Summary by Division

Spec. Division	Subtotal	Notes
2 - Sitework	\$ 1,030,000	
3 - Concrete	\$ 3,340,000	
5 - Metals	\$ -	
11 - Equipment	\$ 10,900,000	
15 - Mechanical	\$ -	
16 - Electrical	\$ 3,820,000	
17 - I&C	\$ -	
RAW CONSTRUCTION COST \$ 19,090,000		
Mobilization/Demobilization	1% \$ 190,000	
Contractors Overhead and Profit	10% \$ 1,910,000	
Construction Cost	\$ 21,190,000	
Design Build Engineering	15% \$ 3,180,000	
Construction Cost + Design Build	\$ 24,370,000	
Implementation (Program Management, Design, CEQA, Legal, CM)	15% \$ 3,660,000	

Spec. Division	Item	Size	Units	Quantity	Unit	Unit Cost	Total Cost	Notes	
2 - Sitework									
	Sitework and Yard piping	3.0	acres	130,680	sf	\$ 5.00	\$ 650,000	CAW unit cost (J78)	
	Brine Disposal	16	in	2500	ft	\$ 150.00	\$ 380,000	CAW unit cost (J20)	
3 - Structures									
Desalination Facility									
	RO Building (incl lab and office)			16,000	SF	\$ 179	\$ 2,860,000	CAW unit costs J42	
	Post Treatment & Disinfection			600	SF	\$ 133	\$ 80,000	CAW unit costs J37	
	Chemical Storage			3,000	SF	\$ 133	\$ 400,000	CAW unit costs J37	
5 - Metals									
	Misc. Metals	Included in Div 3							\$ -
11 - Equipment									
Pretreatment									
	Cartridge Filters	5	micron	3	EA	\$ 75,000	\$ 225,000	Vendor Quote (Filtrek April 2009) (plus 25% install)	
RO System (First and Partial Second Pass)									
		2.5	MGD			\$ 3,000,000	\$ 7,500,000	Scaled cost from Regional Project	
Disinfection									
	UV Disinfection--MPHO L	2.5	mgd			\$ 220,000	\$ 550,000		
Chemical Handling									
Threshold Inhibitor System									
	Metering Pumps	0.5	HP	3	EA	\$ 8,000	\$ 20,000	Vendor Quote (Watson-Marlow 2008)	
	HDPE Storage Tank	6000	GAL	1	EA	\$ 55,300	\$ 60,000	Palo Alto Bid Summary	
Sulfuric Acid Chemical Feed System									
	Steel Storage Tank	15000	GAL	1	EA	\$ 1.00	\$ 20,000	RMC Estimate based on previous projects	
	Metering Pumps	0.75	HP	3	EA	\$ 8,000	\$ 20,000	Vendor Quote (Watson-Marlow 2008)	
NaOCL Feed System									
	FRP tank	4500	GAL	1	EA	\$ 41,475	\$ 40,000	Based on scaled HDPE tank cost	
	Metering Pumps	0.5	HP	2	EA	\$ 8,000	\$ 20,000	Vendor Quote (Watson-Marlow 2008)	
Lime Feeding and Storage									
	Lime Silo and Slaker			1	EA	\$ 133,333	\$ 130,000	Scaled cost from Regional Project	
	Lime Saturator			1	EA	\$ 83,333	\$ 80,000	Scaled cost from Regional Project	
Carbon Dioxide									
	CO2 Feed and Storage	6	Tons	1	EA	\$ 108,333	\$ 110,000	Scaled cost from Regional Project	
Clearwells									
		0.5	MG	2	EA	\$ 1.50	\$ 1,500,000	CAW unit Cost J71	
Product Water Pump Station									
		2.5	mgd	1	EA	\$ 250,000	\$ 625,000	CAW unit cost from (J72)	
15 - Mechanical									
16 - Electrical									
	Electrical Allowance	25% of plant construction cost					25%	\$ 3,820,000	CAW unit Cost F80
17 - I&C									
	I&C Allowance	included in electrical							\$ -

WPCA CAPACITY CHARGE (for flows to headworks)					Total Cost
Item	Quantity	Units	Unit Cost		\$
Wastestream to WPCA					
Average Annual Flow Rate		gpd	$\text{round}(\text{flow in gpd}) \cdot 9.8883$		\$ -
BOD concentration		mg/l	$\text{round}(\text{flow in gpd} / 1000000) \cdot 8.34 \cdot (\text{BOD in mg/L}) \cdot 2 \cdot 1066.6$		\$ -
TSS concentration		mg/l	$\text{round}(\text{flow in gpd} / 1000000) \cdot 8.34 \cdot (\text{TSS in mg/L}) \cdot 2 \cdot 988.43$		\$ -

EASEMENT AND LAND ACQUISITION					Total Cost
Item	Size	Units	Quantity	Unit	Unit Cost
\$ -					

ANNUAL O&M COSTS					Cost
Item	Amount	Unit	Value		\$
Repair and Replacement Costs					553,000
Equipment Consumables	\$ 14,495,000		3%	\$ 435,000	CAW assumes 3% from O&M estimate
Facilities	\$ 3,340,000		1%	\$ 33,000	CAW assumes 1% from O&M estimate
Cartridge Filter Replacement				\$ 85,000	Trussell Estimate (April 2009)
Power Costs					690,000
Treatment	6,563,345	kw-hr/yr		\$ 600,000	See Regional O&M Tab
Brine Disposal		kw-hr/yr		\$ -	See Regional O&M Tab
UV Disinfection	17,282	kw-hr/yr		\$ 2,000	See Regional O&M Tab
Mics Facility Power Use	876,000	kw-hr/yr		\$ 88,000	See Regional O&M Tab
Groundwater Monitoring Program					500,000

Chemicals					Total Chemicals
Item	Dosage	consumption	Unit	Unit Cost	cost/lbs
\$ 91,000					
Threshold Inhibitor	3	mg/l	32,081	lbs/yr	\$ 1.45
Remineralization (Lime)	30	mg/l	138,588	lbs/yr	\$ 0.15
Remineralization (CO2)	10	mg/l	46,196	lbs/yr	\$ 0.20
Chlorination (Chlorine Gas)	1	mg/l	4,620	lbs/yr	\$ 0.20
Misc Chemicals	3	mg/l	13,859	lbs/yr	\$ 1.00

WPCA User Fee for flows to headworks					Total Annual User Fee
Item	Charge	Unit	Value		\$
Flow Charge	Average Annual Flow	mgd	(490796.29 * Average Annual Flow)		\$ -
BOD Charge	Average BOD Concentration	mg/l	(456.45 * Avg Flow * Avg BOD conc)		\$ -
TSS Charge	Average TSS Concentration	mg/l	(181.04 * Avg Flow * Avg TSS conc)		\$ -

WPCA User Fee for brine flows to Outfall					Total Labor Costs
Item	Amount	Unit	Value		\$
Costs under development by MRWPCA					\$ -
Labor Costs					892,500
TOTAL ANNUAL O&M COSTS					\$ 2,726,500

Operations Cost Estimate (2009 Dollars) Project: MCWD Project (Partial Second Pass No SWTP)				Labor	Rate
Project Component	Units	Summer Quantity	Winter Quantity		
BIRP Output	afy	0	0	Plant Operator	\$ 50
ASR Well Injection (CR)	afy	0	0	Operations Foreman	\$ 55
ASR Well Injection (SWTP)	afy	0	0	Utility Worker	\$ 45
Seaside Wells Production	afy	0	0	Utility Foreman	\$ 50
ASR Well Extraction	afy	0	0	Lab & Admin	\$ 45
Desal Water	afy	850	850	Ops Supervisor	\$ 69
SWTP Production	afy	0	0		
Sand City Desalination Production	afy	0	0		
Total System Production	afy	850	850	Facility	PG&E Avg. Power Rates
System Demand	afy	850	850		Summer Winter
				Desal and SWTP	\$ 0.120 \$ 0.080
				ASR PS	\$ 0.142 \$ 0.100
				ASR Wells	\$ 0.103 \$ 0.093
				Valley Greens PS	\$ 0.142 \$ 0.100
				Seaside Wells	\$ 0.142 \$ 0.100
				Segunda PS	\$ 0.142 \$ 0.100
				Vertical Wells	\$ 0.137 \$ 0.093
				Energy calcs DO NOT incorporate power factor (85%-90%).	

Assumptions	
First Pass Recovery	45%
Second Pass Recovery	90%
Overall Recovery	43%
Pretreatment Eff.	100%

RO System	Summer (AF)	Summer (gpm)	Winter (AF)	Winter (gpm)
Pretreatment Feed	1,968	2,439	1,968	2,439
1st Pass Feed	1,968	2,439	1,968	2,439
1st Pass Production	885	1,098	885	1,098
2nd Pass Percentage	40%	40%	40%	40%
2nd Pass Feed	354	439	354	439
2nd Pass Production	319	395	319	395
Total Desal Production	850	1,054	850	1,054

OPERATION & MAINTENANCE (O & M) COSTS			
DESALINATION FACILITIES			
Seawater Feed and Brine Disposal			
Vertical Wells			
Summer Average Flow		2,439 gpm	
Winter Average Flow		2,439 gpm	
Total Head		300 ft	
Vertical Wells Summer Energy	804,071 kw-hrs	\$ 0.14 /kw-hrs	\$110,000
Vertical Wells Winter Energy	804,071 kw-hrs	\$ 0.09 /kw-hrs	\$70,000
Subtotal Seawater Inlet PS			\$180,000
Desalination Plant			
Pretreatment Process			
Summer Annual Flow (Applied)		2,439 gpm	
Winter Annual Flow (Applied)		2,439 gpm	
Summer Annual Flow (Production)		1,054 gpm	
Winter Annual Flow (Production)		1,054 gpm	
Mixing			
Summer Energy	0 kw-hrs	\$ 0.12 /kw-hrs	\$0
Winter Energy	0 kw-hrs	\$ 0.08 /kw-hrs	\$0
SUBTOTAL POWER			0 kw-hrs
Cartridge Filter			
Lift for Pressure Media Filtration		0 ft	
Summer Energy	0 kw-hrs	\$ 0.12 /kw-hrs	\$0
Winter Energy	0 kw-hrs	\$ 0.08 /kw-hrs	\$0
SUBTOTAL POWER			0 kw-hrs
Threshold Inhibitor Consumption	3 mg/L 32,081 lbs/yr	\$ 1.45 lbs.	\$50,000
Materials	Filter Element Replacement	1 LS	\$90,000
Subtotal Pretreatment			\$140,000
Reverse Osmosis Process			
Single Pass, 950 psi			
Summer Annual Flow (Applied-1st Pass)		2,439 gpm	
Winter Annual Flow (Applied-1st Pass)		2,439 gpm	
Summer Annual Permeate Production (1st Pass)		1,098 gpm	5580
Winter Annual Permeate Production (1st Pass)		1,098 gpm	
Summer Annual Brine Production (1st Pass)		1,342 gpm	
Winter Annual Brine Production (1st Pass)		1,342 gpm	
Filtrate Forwarding Pump (First Pass)			
Summer Energy	273,404 kw-hrs	\$ 0.12 /kw-hrs	\$30,000
Winter Energy	273,404 kw-hrs	\$ 0.08 /kw-hrs	\$22,000
High Pressure Pump (First Pass)			
Summer Energy	2,597,341 kw-hrs	\$ 0.12 /kw-hrs	\$300,000
Winter Energy	2,597,341 kw-hrs	\$ 0.08 /kw-hrs	\$210,000
Energy Recovery Booster Pump (First Pass)			
Summer Energy	135,335 kw-hrs	\$ 0.12 /kw-hrs	\$16,000
Winter Energy	135,335 kw-hrs	\$ 0.08 /kw-hrs	\$11,000
SUBTOTAL POWER (First Pass)			6,012,162 kw-hrs
Summer Second Pass Feed		439 gpm	
Winter Second Pass Feed		439 gpm	
Second Pass Booster Pump			
Summer Energy	275,592 kw-hrs	\$ 0.12 /kw-hrs	\$30,000
Winter Energy	275,592 kw-hrs	\$ 0.08 /kw-hrs	\$22,000
SUBTOTAL POWER (Second Pass)			551,183 kw-hrs
SUBTOTAL POWER (1st and 2nd)			6,563,345 kw-hrs
Misc. Chemicals Consumption	3 mg/L 13,859 lbs/yr	\$ 1.00 lbs.	\$14,000
Subtotal Reverse Osmosis			\$614,000
Post Treatment Process			
Remineralization (Lime) Consumption	30 mg/L 138,588 lbs/yr	\$ 0.15 lbs.	\$21,000
Remineralization (CO2) Consumption	10 mg/L 46,196 lbs/yr	\$ 0.20 lbs.	\$9,000
Chlorination (Chlorine Gas) Consumption	1.0 mg/L 4,620 lbs/yr	\$ 0.20 lbs.	\$1,000
UV Disinfection Summer Energy	1.3 Kw/mgd 8,641 Kw-hrs	\$ 0.12	\$1,000
UV Disinfection Winter Energy	8,641 Kw-hrs	\$ 0.08	\$1,000

		Subtotal Post Treatment	\$33,000
<u>Labor and Miscellaneous</u>			
Misc. Facility Power Usage		100 kw	
Summer Energy	438,000 kw-hrs	\$ 0.12 /kw-hrs	\$53,000
Winter Energy	438,000 kw-hrs	\$ 0.08 /kw-hrs	\$35,000
SUBTOTAL POWER	876,000 kw-hrs		\$88,000
Labor			
Plant Operator (2)	4,000 hrs	\$ 50 hr	\$200,000
Operations Foreman (1)	2,000 hrs	\$ 55 hr	\$110,000
Utility Worker (1)	2,000 hrs	\$ 45 hr	\$90,000
Utility Foreman	2,000 hrs	\$ 50 hr	\$100,000
Operations Supervisor	2,000 hrs	\$ 69 hr	\$140,000
Operations Supervisor		\$ 69 hr	\$0
Plant Manager	2,000 hrs	\$ 69 hr	\$140,000
Admin Assistance (on-site)	2,000 hrs	\$ 35 hr	\$70,000
Admin Assistance (off-site)		\$ 35 hr	\$0
SCADA Supervisor		\$ 55 hr	\$0
Lab Water Quality Specialist		\$ 55 hr	\$0
Lab Assistant		\$ 45 hr	\$0
Water Treatment Misc. Expenses			
Contract Services, Disposal, Security, etc.		\$ 25 /AF	\$42,500
		Subtotal Misc.	\$892,500
SUBTOTAL DESALINATION FACILITIES O&M			\$1,950,000
Product Water Delivery			
<u>Desalinated Water Pump Station</u>			
Summer Average Flow		850 afy	
Winter Average Flow		850 afy	
Lift		240 ft	
Summer Energy	262,361 kw-hrs	\$ 0.12 /kw-hrs	\$30,000
Winter Energy	262,361 kw-hrs	\$ 0.08 /kw-hrs	\$21,000
	524,722 kw-hrs	Subtotal DWPS	\$51,000
Labor			
Operators	500 hrs	\$ 50 hr	\$25,000
SUBTOTAL DESALINATED WATER CONVEYANCE O&M			\$80,000