Unit Price Derivations

General Notes on Unit Price Derivations

The unit price derivations shown on Figures F-1 through F-53 within this appendix present our detailed unit price derivations for the various embankment alternatives. As discussed elsewhere, we have assumed that all of the rock products will be produced at two sites near Coolidge Mountain. One site will use pit-run alluvial deposits to create all of the Type A and Type B sand/gravel and filter rock. A hard rock quarry will be developed to produce riprap.

Our logic to create the unit prices is discussed in detail below. This discussion includes cross-reference to the particular page where the costs are outlined in greater detail. The haul modes and distances are listed by alternatives below as well.

The cost information listed in the accompanying figures reflects the direct cost only. These costs were adjusted upward by a factor of 1.21 to reflect indirect costs (10%) plus contractor's margin (10%).

A 10% quantity increase factor was used for the embankments including the mid-Sea dam, mid-Sea barrier, north-Sea dam, south-Sea dam, perimeter dikes, and concentric ring dikes. The 10% increase to the quantity estimates was applied to account for such factors as consolidation of foundation materials during and following construction, and the variable nature of the seafloor and soft lacustrine material conditions, as well as the limited subsurface information available at the time of this study.

Bulking (swell) factors for trucking and barging of materials were considered and incorporated into the conversion factor of 1.62 ton/cubic yard for the Type A and Type B sand/gravel, as well as filter rock. A 50% "yield factor" was applied to the riprap quarry production which indicated that only 50% of the hard rock blasted in the quarry will be suitable for use as riprap.

<u>Sand and Gravel Fixed Costs:</u>

One common feature of each alternative is the need to establish a sand and gravel production facility. The fixed cost of the plant set up is distributed over a variable quantity basis depending upon which alternative is considered.

The sand/gravel fixed costs typically include the following items:

- Mobilization of the processing plant
- Purchase of the overland conveyor system
- Site preparation
- Setup of crusher plant
- Teardown
- Permits and engineering
- Clearing of the pit
- Reclamation
- Access to dam and barriers

- Construction of the conveyor load out system
- Setup and acquisition costs of tugs and barges

RipRap Fixed Cost:

The riprap fixed costs typically include the following items:

- Mobilization of the processing plant and equipment
- Developing quarry benches
- Pioneer drill/shoot
- Site preparation/grizzly
- Setup grizzly/screen
- Temporary haul road
- Construction of ramp/road
- Temporary haul bridge
- Purchase of tugs/barges
- Assembly of the tugs/barges

Sand/Gravel and Riprap Variable Costs:

The variable costs for the sand/gravel and riprap generally covers the following items:

- Production of the sand/gravel/riprap products
- Overhead
- Haul cost by barge
- Haul cost by truck
- Dressing the slope

Specialty Elements:

Unit costs for dredging, stone columns, slurry walls and wick drains were provided by specialty contractors as follows:

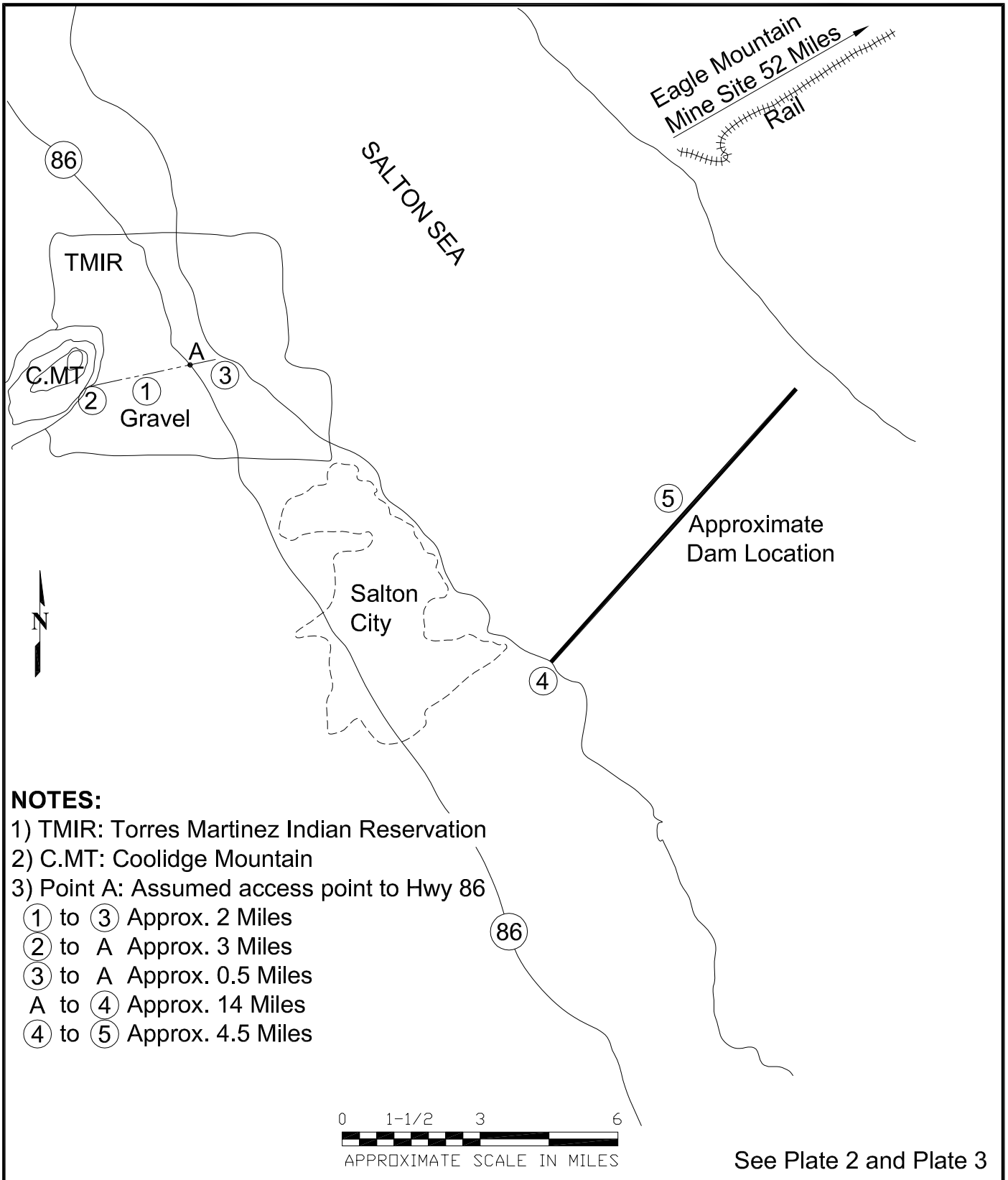
Element	Contractor	Contact	Phone Number
Dredging	Ross Island Sand & Gravel	Mr. Paul Godsil	503-239-5504
Stone Columns	Hayward Baker	Mr. Jack Kinley	805-218-7311
Slurry Wall	Bencor	Mr. Carlos Santori	214-912-5822
Wick Drain	Hayward Baker	Mr. Jack Kinley	805-218-7311

Habitat Enhancement Cost Estimate:

The unit price of $13,473 per acre was used for the habitat ponds in our cost estimate. This unit price consisted of a direct construction cost of $11,135 plus 10% for indirect costs and another 10% for contractor's profit. The direct construction cost was estimated based upon the embankment configuration provided on Figure 5.4 of the "Main" report.

The unit price derivations are provided on Figures F-51 and F-52. This derivation is applicable to the entire project alternatives associated with habitat pond construction.

It should be noted that the 10% quantity increase factor was not applied to the habitat pond estimate. Instead, a conservative layout was assumed for each 500 acres of habitat pond development. At the time of our cost estimation analysis, we felt that the required embankment length for each 500 acres of habitat pond was uncertain, and may vary significantly as concepts evolve during later stages of planning. We used a conservative embankment length of 18,800 lineal feet for each 500 acres of ponds in the cost estimates. This corresponds to four (4) 4,700-foot embankment sections per 500 acres.



NOTES:

1) TMIR: Torres Martinez Indian Reservation
2) C.MT: Coolidge Mountain
3) Point A: Assumed access point to Hwy 86

(1) to (3) Approx. 2 Miles
(2) to A Approx. 3 Miles
(3) to A Approx. 0.5 Miles
A to (4) Approx. 14 Miles
(4) to (5) Approx. 4.5 Miles

See Plate 2 and Plate 3

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SALTON SEA

SALTON SEA RESTORATION

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REVISED BY:
CHECKED BY:
PLATE

1

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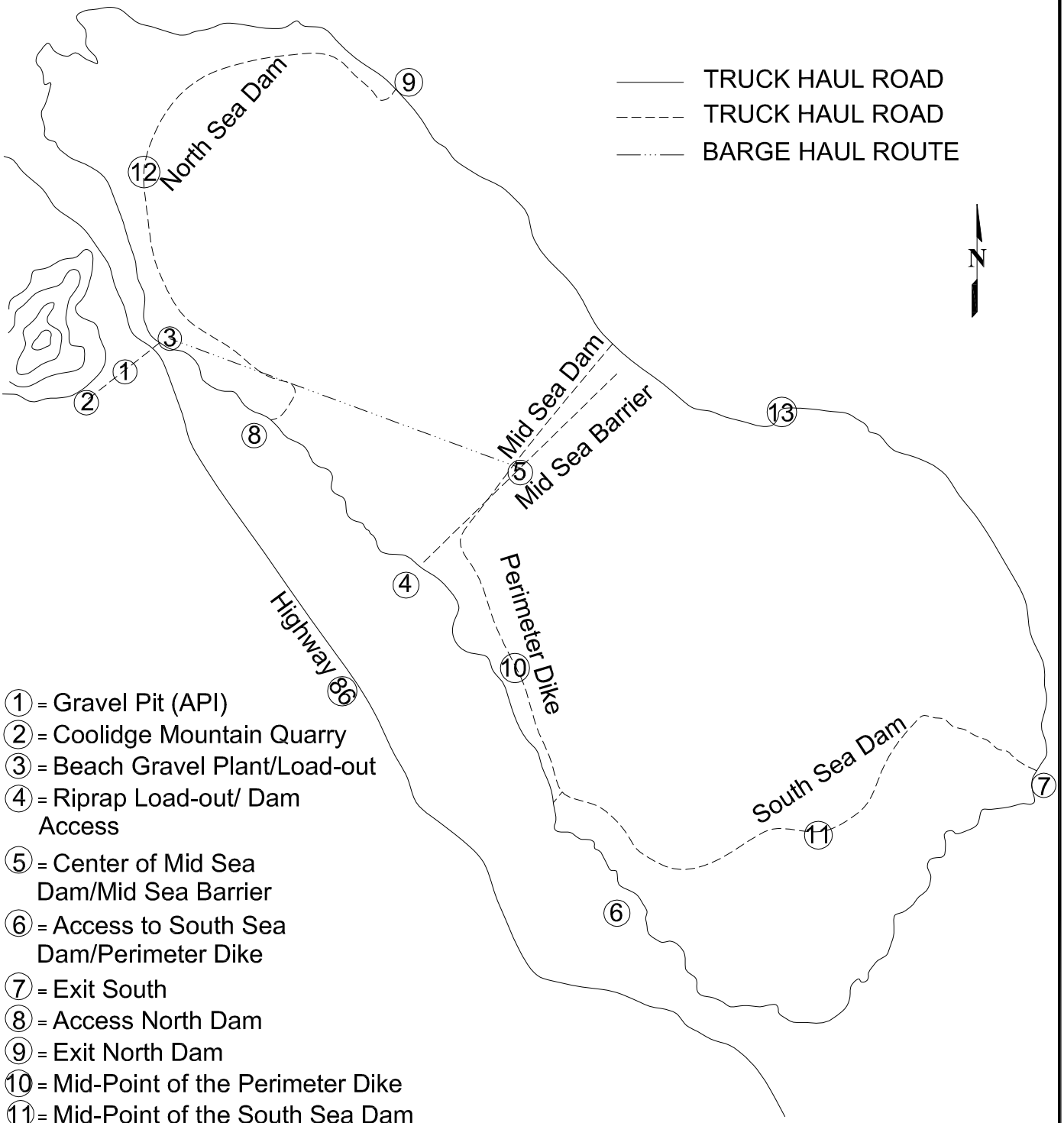

See Plate 1 and Plate 3

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SALTON SEA

SALTON SEA RESTORATION

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CHECKED BY:
PLATE **2**

DRAWN: NOV, 06 | APPROVED BY: | PROJ NO: 71100 | FILE NAME: Figure 2.dwg

SAND AND GRAVEL - ONE WAY TRUCK HAUL DISTANCES:

3 to 5 - Approx. 19.0 Miles

3 to 10 - Approx. 25.6 Miles

3 to 11 - Approx. 41.2 Miles

3 to 8 to12 - Approx. 21.0 Miles

3 to 9 to 12 - Approx. 47.0 Miles

3 to 13 - Approx. 82.4 Miles (see Note 1)

SAND AND GRAVEL - ONE WAY BARGE HAUL DISTANCES:

3 to 5 - Approx. 10.0 Miles

RIPRAP - ONE WAY TRUCK HAUL DISTANCES:

2 to 4 - Approx. 17.0 Miles

2 to 5 - Approx. 22.0 Miles

2 to 10 - Approx. 28.1 Miles

2 to 11- Approx. 43.7 Miles

2 to 8 to 12 - Approx. 23.5 Miles

2 to 9 to 12 - Approx. 49.5 Miles

2 to 13 - Approx. 84.9 Miles

RIPRAP - ONE WAY BARGE HAUL DISTANCES:

4 to 5 - Approx. 4.5 Miles

See Plate 1 and 2 for relationships for haul distances and alternatives.

Note 1: Approx. 82.4 miles average haul for concentric rings conservatively estimated to account for lack of access by either existing county road system and US Navy Salton Sea Test Base.

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SALTON SEA

HAUL DISTANCE INFORMATION

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PLATE **3**

DRAWN: NOV, 06 | APPROVED BY: | PROJ NO: 71100 | FILE NAME: Figure 3.dwg

Alternative 1: Mid Sea Dam/North Marine Lake

Type A Sand and Gravel

		Direct Unit Cost	Unit	Mid Sea Dam Barge Haul (50%)	Mid Sea Dam Truck Haul (50%)	Perimeter Dike Truck Haul	South Sea Dam Truck Haul
1	Produce Sand/Gravel-Fixed Cost	$0.09	Ton	$0.09	$0.09	$0.09	$0.09
2	Produce Sand/Gravel-Variable Cost	$4.10	Ton	$4.10	$4.10	$4.10	$4.10
3	Build Conveyer Loadout Dock System	$0.00	Ton	$0.00	$0.00	$0.00	$0.00
4	Haul and Place Sand and Gravel - Barge- Fixed Setup & Acquisition Cost	$0.05	Ton	$0.05			
5	Access for Mid Sea, Perimater Dike and South Sea Dam	$0.03	Ton	$0.03	$0.03	$0.03	$0.03
6	Haul and Place Sand and Gravel by Barge to the Mid Sea Dam - Variable Cost	$2.79	Ton	$2.79			
7	Haul and Place Sand and Gravel by Truck to the Mid Sea Dam - Variable Cost	$5.35	Ton		$5.35		
8	Haul and Place Sand and Gravel by Truck to the Perimeter Dike - Variable Cost	$6.91	Ton			$6.91	
9	Haul and Place Sand and Gravel by Truck to the South Sea Dam - Variable Cost	$8.08	Ton				$8.08
	Subtotal:		Ton	$7.06	$9.58	$11.13	$12.30
	Plus Indirect Cost 10%		Ton	$7.77	$10.53	$12.25	$13.53
	Plus Profit 10%		Ton	$8.54	$11.59	$13.47	$14.89
	Unit Price (subtotal x 1.62 tons/cy)		CY	$13.84	$18.77	$21.82	$24.12

Type B Sand and Gravel

		Direct Unit Cost	Unit	Mid Sea Dam Barge Haul (50%)	Mid Sea Dam Truck Haul (50%)	Perimeter Dike Truck Haul	South Sea Dam Truck Haul
1	Produce Sand/Gravel-Fixed Cost	$0.00	Ton	$0.00	$0.00	$0.00	$0.00
2	Produce Sand/Gravel-Variable Cost	$4.10	Ton	$4.10	$4.10	$4.10	$4.10
3	Build Conveyer Loadout Dock System	$0.00	Ton	$0.00	$0.00	$0.00	$0.00
4	Haul and Place Sand and Gravel - Barge- Fixed Setup & Acquisition Cost	$0.00	Ton	$0.00	$0.00	$0.00	$0.00
5	Access for Mid Sea, Perimater Dike and South Sea Dam	$0.00	Ton	$0.00	$0.00	$0.00	$0.00
6	Haul and Place Sand and Gravel by Barge to the Mid Sea Dam - Variable Cost	$2.79	Ton	$2.79			
7	Haul and Place Sand and Gravel by Truck to the Mid Sea Dam - Variable Cost	$5.35	Ton		$5.35		
8	Haul and Place Sand and Gravel by Truck to the Perimeter Dike - Variable Cost	$6.91	Ton			$6.91	
9	Haul and Place Sand and Gravel by Truck to the South Sea Dam - Variable Cost	$8.08	Ton				$8.08
	Subtotal:		Ton	$6.89	$9.46	$11.01	$12.18
	Plus Indirect Cost 10%		Ton	$7.58	$10.40	$12.11	$13.40
	Plus Profit 10%		Ton	$8.34	$11.44	$13.32	$14.74
	Unit Price (subtotal x 1.62 tons/cy)		CY	$13.51	$18.53	$21.59	$23.88

RipRap

		Direct Unit Cost	Unit	Mid Sea Dam Barge Haul (67%)	Mid Sea Dam Truck Haul (33%)	Perimeter Dike Truck Haul	South Sea Dam Truck Haul
1	Produce Riprap-Fixed Cost	$0.24	Ton	$0.24	$0.24	$0.24	$0.24
2	Produce Riprap-Variable Cost	$6.71	Ton	$6.71	$6.71	$6.71	$6.71
3	Haul and Place Riprap by Barge - Fixed Cost	$0.54	Ton	$0.54			
4	Haul and Place Riprap by Barge - Variable Cost	$5.44	Ton	$5.44			
5	Dress Riprap by Barge - Variable Cost	$0.69	Ton	$0.69			
6	Haul Riprap by Truck to Mid Sea dam - Variable Cost	$6.64	Ton		$6.64		
7	Haul Riprap by Truck to Perimeter Dike - Variable Cost	$9.38	Ton			$9.38	
8	Haul Riprap by Truck to South Sea Dam - Variable Cost	$15.79	Ton				$15.79
9	Haul Riprap by Truck and Place Riprap from Beach by Crane	$2.08	Ton		$2.08	$2.08	$2.08
	Subtotal:		Ton	$13.62	$15.67	$18.40	$24.81
	Plus Indirect Cost 10%		Ton	14.99	17.23	20.24	27.29
	Plus Profit 10%		Ton	16.48	18.96	22.27	30.02
	Unit Price (subtotal x 1.70 tons/cy)		CY	28.02	32.22	37.85	51.04

Alternative 2A: Mid Sea Barrier/South Marine Lake

Type A Sand and Gravel

		Direct Unit Cost	Unit	Mid Sea Barrier Barge Haul (50%)	Mid Sea Barrier Truck Haul (50%)
1	Produce Sand/Gravel-Fixed Cost	$0.48	Ton	$0.48	$0.48
2	Produce Sand/Gravel-Variable Cost	$4.10	Ton	$4.10	$4.10
3	Build Conveyer Loadout Dock System	$0.02	Ton	$0.02	$0.02
4	Haul and Place Sand and Gravel - Barge- Fixed Setup & Acquisition Cost	$0.25	Ton	$0.25	
5	Access for Mid Sea Barrier	$0.14	Ton	$0.14	$0.14
6	Haul and Place Sand and Gravel by Barge to the Mid Sea Barrier - Variable Cost	$2.79	Ton	$2.79	
7	Haul and Place Sand and Gravel by Truck to the Mid Sea Barrier - Variable Cost	$5.35	Ton		$5.35
	Subtotal:		Ton	$7.77	$10.09
	Plus Indirect Cost 10%		Ton	$8.55	$11.10
	Plus Profit 10%		Ton	$9.41	$12.21
	Unit Price (subtotal x 1.62 tons/cy)		CY	$15.24	$19.78

Type B Sand and Gravel

		Direct Unit Cost	Unit	Mid Sea Barrier Barge Haul (50%)	Mid Sea Barrier Truck Haul (50%)
1	Produce Sand/Gravel-Fixed Cost	$0.00	Ton	$0.00	$0.00
2	Produce Sand/Gravel-Variable Cost	$4.10	Ton	$4.10	$4.10
3	Build Conveyer Loadout Dock System	$0.00	Ton	$0.00	$0.00
4	Haul and Place Sand and Gravel - Barge- Fixed Setup & Acquisition Cost	$0.00	Ton	$0.00	$0.00
5	Access for Mid Sea Barrier	$0.00	Ton	$0.00	$0.00
6	Haul and Place Sand and Gravel by Barge to the Mid Sea Dam - Variable Cost	$2.79	Ton	$2.79	
7	Haul and Place Sand and Gravel by Truck to the Mid Sea Dam - Variable Cost	$5.35	Ton		$5.35
	Subtotal:		Ton	$6.89	$9.46
	Plus Indirect Cost 10%		Ton	$7.58	$10.40
	Plus Profit 10%		Ton	$8.34	$11.44
	Unit Price (subtotal x 1.62 tons/cy)		CY	$13.51	$18.53

RipRap

		Direct Unit Cost	Unit	Mid Sea Barrier Barge Haul (67%)	Mid Sea Barrier Truck Haul (33%)
1	Produce Riprap-Fixed Cost	$0.89	Ton	$0.89	$0.89
2	Produce Riprap-Variable Cost	$6.71	Ton	$6.71	$6.71
3	Haul and Place Riprap by Barge - Fixed Cost	$0.84	Ton	$0.84	
4	Haul and Place Riprap by Barge - Variable Cost	$5.44	Ton	$5.44	
5	Dress Riprap by Barge - Variable Cost	$0.69	Ton	$0.69	
6	Haul Riprap by Truck to Mid Sea Barrier - Variable Cost	$6.64	Ton		$6.64
7	Haul Riprap by Truck and Place Riprap from Beach by Crane	$2.08	Ton		$2.08
	Subtotal:		Ton	$14.57	$16.31
	Plus Indirect Cost 10%		Ton	16.03	17.94
	Plus Profit 10%		Ton	17.63	19.74
	Unit Price (subtotal x 1.70 tons/cy)		CY	29.98	33.55

Alternative 2B: Mid Sea Barrier/South Marine Lake

Type A Sand and Gravel

		Direct Unit Cost	Unit	Mid Sea Barrier Barge Haul (50%)	Mid Sea Barrier Truck Haul (50%)
1	Produce Sand/Gravel-Fixed Cost	$0.93	Ton	$0.93	$0.93
2	Produce Sand/Gravel-Variable Cost	$4.10	Ton	$4.10	$4.10
3	Build Conveyer Loadout Dock System	$0.05	Ton	$0.05	$0.05
4	Haul and Place Sand and Gravel - Barge- Fixed Setup & Acquisition Cost	$0.48	Ton	$0.48	
5	Access for Mid Sea Barrier	$0.26	Ton	$0.26	$0.26
6	Haul and Place Sand and Gravel by Barge to the Mid Sea Barrier - Variable Cost	$2.79	Ton	$2.79	
7	Haul and Place Sand and Gravel by Truck to the Mid Sea Barrier - Variable Cost	$5.35	Ton		$5.35
	Subtotal:		Ton	$8.61	$10.69
	Plus Indirect Cost 10%		Ton	$9.47	$11.76
	Plus Profit 10%		Ton	$10.42	$12.94
	Unit Price (subtotal x 1.62 tons/cy)		CY	$16.88	$20.96

Type B Sand and Gravel

		Direct Unit Cost	Unit	Mid Sea Barrier Barge Haul (50%)	Mid Sea Barrier Truck Haul (50%)
1	Produce Sand/Gravel-Fixed Cost	$0.00	Ton	$0.00	$0.00
2	Produce Sand/Gravel-Variable Cost	$4.10	Ton	$4.10	$4.10
3	Build Conveyer Loadout Dock System	$0.00	Ton	$0.00	$0.00
4	Haul and Place Sand and Gravel - Barge- Fixed Setup & Acquisition Cost	$0.00	Ton	$0.00	$0.00
5	Access for Mid Sea Barrier	$0.00	Ton	$0.00	$0.00
6	Haul and Place Sand and Gravel by Barge to the Mid Sea Barrier - Variable Cost	$2.79	Ton	$2.79	
7	Haul and Place Sand and Gravel by Truck to the Mid Sea Barrier - Variable Cost	$5.35	Ton		$5.35
	Subtotal:		Ton	$6.89	$9.46
	Plus Indirect Cost 10%		Ton	$7.58	$10.40
	Plus Profit 10%		Ton	$8.34	$11.44
	Unit Price (subtotal x 1.62 tons/cy)		CY	$13.51	$18.53

RipRap

		Direct Unit Cost	Unit	Mid Sea Barrier Barge Haul (67%)	Mid Sea Barrier Truck Haul (33%)
1	Produce Riprap-Fixed Cost	$0.91	Ton	$0.91	$0.91
2	Produce Riprap-Variable Cost	$6.71	Ton	$6.71	$6.71
3	Haul and Place Riprap by Barge - Fixed Cost	$0.87	Ton	$0.87	
4	Haul and Place Riprap by Barge - Variable Cost	$5.44	Ton	$5.44	
5	Dress Riprap by Barge - Variable Cost	$0.69	Ton	$0.69	
6	Haul Riprap by Truck to Mid Sea Barrier - Variable Cost	$6.64	Ton		$6.64
7	Haul Riprap by Truck and Place Riprap from Beach by Crane	$2.08	Ton		$2.08
	Subtotal:		Ton	$14.62	$16.34
	Plus Indirect Cost 10%		Ton	16.08	17.97
	Plus Profit 10%		Ton	17.69	19.77
	Unit Price (subtotal x 1.7 tons/cy)		CY	30.08	33.60

Alternative 3A: Concentric Dikes with Stone Columns

Type A Sand and Gravel

		Direct Unit Cost	Unit	Concentric Dikes Truck Haul
1	Produce Sand/Gravel-Fixed Cost	$0.05	Ton	$0.05
2	Produce Sand/Gravel-Variable Cost	$4.10	Ton	$4.10
3	Build Conveyer Loadout Dock System	$0.00	Ton	$0.00
4	Haul and Place Sand and Gravel - Barge- Fixed Setup & Acquisition Cost	$0.03	Ton	
5	Access for Concentric Dikes	$0.01	Ton	$0.01
6	Average Haul and Place Sand and Gravel by Truck to the Concentric Dikes - Variable Cost	$12.12	Ton	$12.12
	Subtotal:		Ton	$16.29
	Plus Indirect Cost 10%		Ton	$17.92
	Plus Profit 10%		Ton	$19.71
	Unit Price (subtotal x 1.62 tons/cy)		CY	$31.93

Type B Sand and Gravel

		Direct Unit Cost	Unit	Concentric Dikes Truck Haul
1	Produce Sand/Gravel-Fixed Cost	$0.00	Ton	$0.00
2	Produce Sand/Gravel-Variable Cost	$4.10	Ton	$4.10
3	Build Conveyer Loadout Dock System	$0.00	Ton	$0.00
4	Haul and Place Sand and Gravel - Barge- Fixed Setup & Acquisition Cost	$0.00	Ton	$0.00
5	Access for Concentric Dikes	$0.00	Ton	$0.00
6	Haul and Place Sand and Gravel by Truck to the Concentric Dikes - Variable Cost	$12.12	Ton	$12.12
	Subtotal:		Ton	$16.22
	Plus Indirect Cost 10%		Ton	$17.84
	Plus Profit 10%		Ton	$19.63
	Unit Price (subtotal x 1.62 tons/cy)		CY	$31.80

RipRap

		Direct Unit Cost	Unit	Concentric Dikes Truck Haul
1	Produce Riprap-Fixed Cost	$0.08	Ton	$0.08
2	Produce Riprap-Variable Cost	$6.71	Ton	$6.71
3	Haul Riprap by Truck to Concentric Dikes - Variable Cost	$15.79	Ton	$15.79
4	Haul Riprap by Truck and Place Riprap from Beach by Crane	$2.08	Ton	$2.08
	Subtotal:		Ton	$24.65
	Plus Indirect Cost 10%		Ton	27.11
	Plus Profit 10%		Ton	29.83
	Unit Price (subtotal x 1.7 tons/cy)		CY	50.70

Alternative 3B: Concentric Dikes without Stone Columns

Type A Sand and Gravel

		Direct Unit Cost	Unit	Concentric Dikes Truck Haul
1	Produce Sand/Gravel-Fixed Cost	$0.07	Ton	$0.07
2	Produce Sand/Gravel-Variable Cost	$4.10	Ton	$4.10
3	Build Conveyer Loadout Dock System	$0.00	Ton	$0.00
4	Haul and Place Sand and Gravel - Barge- Fixed Setup & Acquisition Cost	$0.04	Ton	
5	Access for Concentric Dikes	$0.02	Ton	$0.02
6	Average Haul and Place Sand and Gravel by Truck to the Concentric Dikes - Variable Cost	$12.12	Ton	$12.12
	Subtotal:		Ton	$16.32
	Plus Indirect Cost 10%		Ton	$17.95
	Plus Profit 10%		Ton	$19.75
	Unit Price (subtotal x 1.62 tons/cy)		CY	$31.99

Type B Sand and Gravel

		Direct Unit Cost	Unit	Concentric Dikes Truck Haul
1	Produce Sand/Gravel-Fixed Cost	$0.00	Ton	$0.00
2	Produce Sand/Gravel-Variable Cost	$4.10	Ton	$4.10
3	Build Conveyer Loadout Dock System	$0.00	Ton	$0.00
4	Haul and Place Sand and Gravel - Barge- Fixed Setup & Acquisition Cost	$0.00	Ton	$0.00
5	Access for Concentric Dikes	$0.00	Ton	$0.00
6	Haul and Place Sand and Gravel by Truck to the Concentric Dikes - Variable Cost	$12.12	Ton	$12.12
	Subtotal:		Ton	$16.22
	Plus Indirect Cost 10%		Ton	$17.84
	Plus Profit 10%		Ton	$19.63
	Unit Price (subtotal x 1.62 tons/cy)		CY	$31.80

RipRap

		Direct Unit Cost	Unit	Concentric Dikes Truck Haul
1	Produce Riprap-Fixed Cost	$0.08	Ton	$0.08
2	Produce Riprap-Variable Cost	$6.71	Ton	$6.71
3	Haul Riprap by Truck to Concentric Dikes - Variable Cost	$15.79	Ton	$15.79
4	Haul Riprap by Truck and Place Riprap from Beach by Crane	$2.08	Ton	$2.08
	Subtotal:		Ton	$24.65
	Plus Indirect Cost 10%		Ton	27.11
	Plus Profit 10%		Ton	29.83
	Unit Price (subtotal x 1.7 tons/cy)		CY	50.70

Alternative 4: North Sea Dam/Marine Lake

Type A Sand and Gravel

		Direct Unit Cost	Unit	North Sea Dam Truck Haul
1	Produce Sand/Gravel-Fixed Cost	$0.07	Ton	$0.07
2	Produce Sand/Gravel-Variable Cost	$4.10	Ton	$4.10
3	Build Conveyer Loadout Dock System	$0.00	Ton	$0.00
4	Haul and Place Sand and Gravel - Barge- Fixed Setup & Acquisition Cost	$0.04	Ton	
5	Access for North Sea Dam	$0.02	Ton	$0.02
6	Haul and Place Sand and Gravel by Truck to the North Sea Dam - Variable Cost	$8.08	Ton	$8.08
	Subtotal:		Ton	$12.27
	Plus Indirect Cost 10%		Ton	$13.50
	Plus Profit 10%		Ton	$14.85
	Unit Price (subtotal x 1.62 tons/cy)		CY	$24.06

Type B Sand and Gravel

		Direct Unit Cost	Unit	North Sea Dam Truck Haul
1	Produce Sand/Gravel-Fixed Cost	$0.00	Ton	$0.00
2	Produce Sand/Gravel-Variable Cost	$4.10	Ton	$4.10
3	Build Conveyer Loadout Dock System	$0.00	Ton	$0.00
4	Haul and Place Sand and Gravel - Barge- Fixed Setup & Acquisition Cost	$0.00	Ton	$0.00
5	Access for North Sea Dam	$0.00	Ton	$0.00
6	Haul and Place Sand and Gravel by Truck to the North Sea Dam - Variable Cost	$8.08	Ton	$8.08
	Subtotal:		Ton	$12.18
	Plus Indirect Cost 10%		Ton	$13.40
	Plus Profit 10%		Ton	$14.74
	Unit Price (subtotal x 1.62 tons/cy)		CY	$23.88

RipRap

		Direct Unit Cost	Unit	North Sea Dam Truck Haul
1	Produce Riprap-Fixed Cost	$0.22	Ton	$0.22
2	Produce Riprap-Variable Cost	$6.71	Ton	$6.71
3	Haul Riprap by Truck to North Sea Dam - Variable Cost	$10.90	Ton	$10.90
4	Haul Riprap by Truck and Place Riprap from Beach by Crane	$2.08	Ton	$2.08
	Subtotal:		Ton	$19.90
	Plus Indirect Cost 10%		Ton	21.89
	Plus Profit 10%		Ton	24.08
	Unit Price (subtotal x 1.7 tons/cy)		CY	40.94

General Notes regarding Unit Price Derivations

Notes:

1. **Quantities used to calculate variable costs were arbitrarily assumed in order to develop labor and equipment needs. The resulting variable costs are independent of the final quantities.**
2. **All fixed costs for plant setup, etc. included in the Type A materials. Type B and filter were assumed to be pr**
3. **Type B and Filter Rock is modeled as a variable cost only and is independent of the final quantities.**
4. **Traffic control costs were not developed and assumed to be part of the unlisted items**
5. **Water for production and dust control is assumed to be pumped from the Salton Sea.**

Final Unit Cost Roll Up by Alternative

Alternative 1 Mid-Sea Dam/North Marine Lake
Salton Sea Authority Alternative

Item No.	Description				Fixed Cost	Quantity	Fixed Unit $		Source	Variable Unit $	Source	Direct Unit $	10.00% Indirect Unit $	Total Unit $	10.00% Profit $	Final Unit $	1.62 TN/CY Final Unit $
1	**Dredging**																
	Unit Pricing																
	Dredging - Variable Cost									$6.38 /CY	F 46	**$6.38 /CY**					
	Note: For dreding work, use 0% for Indirect Costs and 5% for Profit.					Indirect Costs = 0.0%											
	Quantities					Profit = 5.0%											
	Mid Sea Dam	27,802,500	CY			27,802,500 CY				$6.38 /CY		**$6.38 /CY**	**$0.00 /CY**	$6.38 /CY	**$0.32 /CY**	$6.70 /CY	**$6.70 /CY**
	Perimeter Dikes	5,473,600	CY			5,473,600 CY				$6.38 /CY		**$6.38 /CY**	**$0.00 /CY**	$6.38 /CY	**$0.32 /CY**	$6.70 /CY	**$6.70 /CY**
	South Sea Dam	5,683,700	CY			5,683,700 CY				$6.38 /CY		**$6.38 /CY**	**$0.00 /CY**	$6.38 /CY	**$0.32 /CY**	$6.70 /CY	**$6.70 /CY**
	Subtotal - Dredging	38,959,800	CY			38,959,800 CY											
2	**Type A Sand**																
	Unit Pricing																
	Produce Sand/Gravel - Fixed Costs				$10,078,430	110,909,898 Tons	$0.0909 /Ton		F-6,7,8,9			**$0.09 /Ton**					
	Produce Sand/Gravel - Variable Costs									$4.10 /Ton	F-16,17	**$4.10 /Ton**					
	Build Conveyor Loadout Dock System				$490,269	110,909,898 Tons	$0.0044 /Ton		F-12,13,14			**$0.00 /Ton**					
	Haul & Place Sand/Gravel - Barge - Fixed Setup & Acquisition Costs				$5,206,441	110,909,898 Tons	$0.0469 /Ton		F-15			**$0.05 /Ton**					
	Access for Mid-Sea, Perimeter and South Dam Barriers				$2,870,750	110,909,898 Tons	$0.0259 /Ton		F-10,11			**$0.03 /Ton**					
	Haul & Place Sand/Gravel by Barge to the Mid-Sea Dam - Variable Cost									$2.79 /Ton	F-18,19,20	**$2.79 /Ton**					
	Haul & Place Sand/Gravel by Truck to The Mid-Sea Dam - Variable Cost									$5.35 /Ton	F-21,22	**$5.35 /Ton**					
	Trucking Haul to the Perimeter Dike - Variable Cost									$6.91 /Ton	F-23.1,23.2	**$6.91 /Ton**					
	Trucking Haul to the South Sea Dam - Variable Cost									$8.08 /Ton	F-24.1,24.2	**$8.08 /Ton**					
	Quantities																
	Mid Sea Dam	44,295,900	CY														
50%	Mid Sea Dam - Barge	22,147,950	CY	x the Conversion of 1.62	Tons/CY =	35,879,679 Tons						**$7.06 /Ton**	**$0.71 /Ton**	$7.77 /Ton	**$0.78 /Ton**	$8.54 /Ton	**$13.84 /CY**
50%	Mid Sea Dam - Truck	22,147,950	CY	x the Conversion of 1.62	Tons/CY =	35,879,679 Tons						**$9.58 /Ton**	**$0.96 /Ton**	$10.53 /Ton	**$1.05 /Ton**	$11.59 /Ton	**$18.77 /CY**
	Perimeter Dikes	8,493,100	CY	x the Conversion of 1.62	Tons/CY =	13,758,822 Tons						**$11.13 /Ton**	**$1.11 /Ton**	$12.25 /Ton	**$1.22 /Ton**	$13.47 /Ton	**$21.82 /CY**
	South Sea Dam	15,673,900	CY	x the Conversion of 1.62	Tons/CY =	25,391,718 Tons						**$12.30 /Ton**	**$1.23 /Ton**	$13.53 /Ton	**$1.35 /Ton**	$14.89 /Ton	**$24.12 /CY**
	Subtotal - Type A Sand	68,462,900	CY	x the Conversion of 1.62	Tons/CY =	110,909,898 Tons								Average Unit Cost for Mid Sea Dam - Type A Sand			$16.30 /CY
3	**Type B Sand /Gravel**																
	Unit Pricing																
	Produce Sand/Gravel - Fixed Costs																
	Produce Sand/Gravel - Variable Costs									$4.10 /Ton	F-16,17	**$4.10 /Ton**					
	Build Conveyor Loadout Dock System											**$0.00 /Ton**					
	Haul & Place Sand/Gravel - Barge - Fixed Setup & Acquisition Costs											**$0.00 /Ton**					
	Access for Mid-Sea, Perimeter and South Dam Barriers											**$0.00 /Ton**					
	Haul & Place Sand/Gravel by Barge to the Mid-Sea Dam - Variable Cost									$2.79 /Ton	F-18,19,20	**$2.79 /Ton**					
	Haul & Place Sand/Gravel by Truck to The Mid-Sea Dam - Variable Cost									$5.35 /Ton	F-21,22	**$5.35 /Ton**					
	Trucking Haul to the Perimeter Dike - Variable Cost									$6.91 /Ton	F-23.1,23.2	**$6.91 /Ton**					
	Trucking Haul to the South Sea Dam - Variable Cost									$8.08 /Ton	F-24.1,24.2	**$8.08 /Ton**					
	Quantities																
	Mid Sea Dam	10,777,800	CY														
50%	Mid Sea Dam - Barge	5,388,900	CY	x the Conversion of 1.62	Tons/CY =	8,730,018 Tons						**$6.89 /Ton**	**$0.69 /Ton**	$7.58 /Ton	**$0.76 /Ton**	$8.34 /Ton	**$13.51 /CY**
50%	Mid Sea Dam - Truck	5,388,900	CY	x the Conversion of 1.62	Tons/CY =	8,730,018 Tons						**$9.46 /Ton**	**$0.95 /Ton**	$10.40 /Ton	**$1.04 /Ton**	$11.44 /Ton	**$18.53 /CY**
	Perimeter Dikes	797,500	CY	x the Conversion of 1.62	Tons/CY =	1,291,950 Tons						**$11.01 /Ton**	**$1.10 /Ton**	$12.11 /Ton	**$1.21 /Ton**	$13.32 /Ton	**$21.59 /CY**
	South Sea Dam	2,737,900	CY	x the Conversion of 1.62	Tons/CY =	4,435,398 Tons						**$12.18 /Ton**	**$1.22 /Ton**	$13.40 /Ton	**$1.34 /Ton**	$14.74 /Ton	**$23.88 /CY**
	Subtotal - Type B S /G	14,313,200	CY	x the Conversion of 1.62	Tons/CY =	23,187,384 Tons								Average Unit Cost for Mid Sea Dam - Type B Sand /Gravel			$16.02 /CY

Final Unit Cost Roll Up by Alternative

Alternative 1 Mid-Sea Dam/North Marine Lake
Salton Sea Authority Alternative

Item No.	Description				Fixed Cost	Quantity	Fixed Unit $		Source	Variable Unit $	Source	Direct Unit $	10.00% Indirect Unit $	Total Unit $	10.00% Profit $	Final Unit $	1.62 TN/CY Final Unit $
4	**Filter Rock (Fine and Coarse)**																
	Unit Pricing																
	Filter Rock - Unit Cost (Same as Type B Sand/Gravel)											**$4.10 /Ton**					
	Quantities																
	Mid Sea Dam	1,219,900	CY														
100%	Mid Sea Dam - Barge	1,219,900	CY x the Conversion of	1.62	Tons/CY =	1,976,238	Tons					**$6.89 /Ton**	**$0.69 /Ton**	$7.58 /Ton	**$0.76 /Ton**	$8.34 /Ton	**$13.51 /CY**
0%	Mid Sea Dam - Truck	-										**$9.46 /Ton**	**$0.95 /Ton**	$10.40 /Ton	**$1.04 /Ton**	$11.44 /Ton	**$18.53 /CY**
	Perimeter Dikes	-										**$11.01 /Ton**	**$1.10 /Ton**	$12.11 /Ton	**$1.21 /Ton**	$13.32 /Ton	**$21.59 /CY**
	South Sea Dam	1,530,100	CY x the Conversion of	1.62	Tons/CY =	2,478,762	Tons					**$12.18 /Ton**	**$1.22 /Ton**	$13.40 /Ton	**$1.34 /Ton**	$14.74 /Ton	**$23.88 /CY**
	Subtotal - Filter Rock	2,750,000	CY x the Conversion of	1.62	Tons/CY =	4,455,000	Tons										
5	**Riprap**																
	Unit Pricing																
	Produce Riprap - Fixed Cost				$4,375,763	18,000,620	Tons	$0.2431	/Ton	F-25,26,27,28		**$0.24 /Ton**					
	Produce Riprap - Variable Cost										$6.71 /Ton F-30,31,32,33	**$6.71 /Ton**					
	28.5% of the Riprap Quantity Placed by Barge =					5,131,280	Tons										
	Haul & Place Riprap by Barge - Fixed Cost				$2,772,870	5,131,280	Tons	$0.5404	/Ton	F-29		**$0.54 /Ton**					
	Haul & Place Riprap by Barge - Variable Cost										$5.44 /Ton F-34,35	**$5.44 /Ton**					
	Dress Riprap by Barge - Variable Cost										$0.69 /Ton F-41	**$0.69 /Ton**					
	Load Riprap for Haul by Truck - Variable Cost										$1.12 /Ton F-37	**$1.12 /Ton**					
	Haul Riprap by Truck to Mid-Sea Dam Point - Variable Cost										$6.64 /Ton F-36.1,36.2	**$6.64 /Ton**					
	Haul Riprap by Truck to Perimeter Dike - Variable Cost										$9.38 /Ton F-38.1,38.2	**$9.38 /Ton**					
	Haul Riprap by Truck to the South Dam, North Dam & Concentric Dikes - Variable Cost										$15.79 /Ton F-39.1,39.2	**$15.79 /Ton**					
	Haul Riprap by Truck & Place Riprap from Beach by Crane - Variable Cost										$2.08 /Ton F-40	**$2.08 /Ton**					
	Quantities																
	Mid Sea Dam	4,527,600	CY														
															Average Unit Cost for Mid Sea Dam - Riprap		$29.42 /CY
67%	Mid Sea Dam - Barge	3,018,400	CY x the Conversion of	1.70	Tons/CY =	5,131,280	Tons					**$13.62 /Ton**	**$1.36 /Ton**	$14.99 /Ton	**$1.50 /Ton**	$16.48 /Ton	**$28.02 /CY**
33%	Mid Sea Dam - Truck	1,509,200	CY x the Conversion of	1.70	Tons/CY =	2,565,640	Tons					**$15.67 /Ton**	**$1.57 /Ton**	$17.23 /Ton	**$1.72 /Ton**	$18.96 /Ton	**$32.22 /CY**
	Perimeter Dikes	2,291,300	CY x the Conversion of	1.70	Tons/CY =	3,895,210	Tons					**$18.40 /Ton**	**$1.84 /Ton**	$20.24 /Ton	**$2.02 /Ton**	$22.27 /Ton	**$37.85 /CY**
	Crest Armoring - P. Dikes	114,400	CY x the Conversion of	1.70	Tons/CY =	194,480	Tons					**$18.40 /Ton**	**$1.84 /Ton**	$20.24 /Ton	**$2.02 /Ton**	$22.27 /Ton	**$37.85 /CY**
	South Sea Dam	3,655,300	CY x the Conversion of	1.70	Tons/CY =	6,214,010	Tons					**$24.81 /Ton**	**$2.48 /Ton**	$27.29 /Ton	**$2.73 /Ton**	$30.02 /Ton	**$51.04 /CY**
	Subtotal - Riprap	10,588,600	CY x the Conversion of	1.70	Tons/CY =	18,000,620	Tons										
6	**Stone Columns**																
	Unit Pricing																
	Stone Column Support - Variable Cost										$41.75 /LF SC F-49	**$41.75 /LF SC**					
	Note: For Stone Column work, use 0% for Indirect Costs and 10% for Profit.					Indirect Costs =	0%										
	Quantities					Profit =	10%										
	Mid Sea Dam	7,757,200	LF			7,757,200	LF					**$41.75 /LF SC**	**$0.00 /LF SC**	$41.75 /LF SC	**$4.17 /LF SC**	$45.92 /LF SC	**$45.92 /LF SC**
	Perimeter Dikes	1,859,000	LF			1,859,000	LF					**$41.75 /LF SC**	**$0.00 /LF SC**	$41.75 /LF SC	**$4.17 /LF SC**	$45.92 /LF SC	**$45.92 /LF SC**
	South Sea Dam	2,876,500	LF			2,876,500	LF					**$41.75 /LF SC**	**$0.00 /LF SC**	$41.75 /LF SC	**$4.17 /LF SC**	$45.92 /LF SC	**$45.92 /LF SC**
	Subtotal - Stone Columns	12,492,700	LF			12,492,700	LF										

Final Unit Cost Roll Up by Alternative

Alternative 1 Mid-Sea Dam/North Marine Lake
Salton Sea Authority Alternative

Item No.	Description				Fixed Cost	Quantity	Fixed Unit $		Source	Variable Unit $	Source	Direct Unit $	10.00% Indirect Unit $	Total Unit $	10.00% Profit $	Final Unit $	1.62 TN/CY Final Unit $
7	**Slurry Wall (No Membrane)**																
	Unit Pricing																
	Slurry Wall	Short Depth								$5.45 /SF	F-53	**$5.45 /SF**					
	Slurry Wall	Medium Depth								$9.20 /SF	F-53	**$9.20 /SF**					
	Note: For Slurry Wall work, use 0% for Indirect Costs and 10% for Profit.					**Indirect Costs =**	**0%**										
	Quantities					**Profit =**	**10%**										
	Mid Sea Dam	**4,955,500**	**SF**			**4,955,500**	**SF**					**$9.20 /SF**	**$0.00 /SF**	$9.20 /SF	**$0.92 /SF**	$10.12 /SF	**$10.12 /SF**
	Perimeter Dikes	**6,856,300**	**SF**			**6,856,300**	**SF**					**$5.45 /SF**	**$0.00 /SF**	$5.45 /SF	**$0.55 /SF**	$6.00 /SF	**$6.00 /SF**
	South Sea Dam	**3,751,000**	**SF**			**3,751,000**	**SF**					**$5.45 /SF**	**$0.00 /SF**	$5.45 /SF	**$0.55 /SF**	$6.00 /SF	**$6.00 /SF**
	South Sea - Fault Resistant	**2,962,300**	**SF**			**2,962,300**	**SF**	Note: Assumes 3 Parallel Walls in Fault Zone									**$18.00 /SF**
	Subtotal - Slurry Wall	**15,562,800**	**SF**			**15,562,800**	**SF**										
8	**Wick Drains**																
	Unit Pricing																
	Wick Drain Water Support - Fixed Costs				$1,383,981	32,806,400	LF	$0.0422	/LF WD	F-43,44		**$0.04 /LF WD**					
	Wick Drain Support - Variable Cost									$4.26 /LF WD	F-42	**$4.26 /LF WD**					
	Quantities																
	Mid Sea Dam	**18,905,700**	**LF**			**18,905,700**	**LF**					**$4.30 /LF WD**	**$0.43 /LF WD**	$4.73 /LF WD	**$0.47 /LF WD**	$5.21 /LF WD	**$5.21 /LF WD**
	Perimeter Dikes	**5,835,500**	**LF**			**5,835,500**	**LF**					**$4.30 /LF WD**	**$0.43 /LF WD**	$4.73 /LF WD	**$0.47 /LF WD**	$5.21 /LF WD	**$5.21 /LF WD**
	South Sea Dam	**8,065,200**	**LF**			**8,065,200**	**LF**					**$4.30 /LF WD**	**$0.43 /LF WD**	$4.73 /LF WD	**$0.47 /LF WD**	$5.21 /LF WD	**$5.21 /LF WD**
	Subtotal - Wick Drains	**32,806,400**	**LF**			**32,806,400**	**LF**										
9	**Habitat Ponds**																
	Unit Pricing																
	Clay - Habitat Pond Embankment																
	Habitat Ponds - 500 Acre Pond									$11,135 /Acre	F-51,52						
	Filter Rock (Fine and Coarse)																
	Total Habitat Ponds Unit $									**$11,135 /Acre**		**$11,135 /Acre**					
	Quantities																
	Mid Sea Dam	**-**	**Acres**			**-**	**Acres**					**$11,135 /Acre**	**$1,113 /Acre**	$12,248 /Acre	**$1,225 /Acre**	$13,473 /Acre	**$13,473 /Acre**
	Perimeter Dikes	**12,000**	**Acres**			**12,000**	**Acres**					**$11,135 /Acre**	**$1,113 /Acre**	$12,248 /Acre	**$1,225 /Acre**	$13,473 /Acre	**$13,473 /Acre**
	South Sea Dam	**-**	**Acres**			**-**	**Acres**					**$11,135 /Acre**	**$1,113 /Acre**	$12,248 /Acre	**$1,225 /Acre**	$13,473 /Acre	**$13,473 /Acre**
	Subtotal - Unit Pricing	**12,000**	**Acres**			**12,000**	**Acres**										

Notes
1. Direct Unit $ is Fixed Unit $ plus Variable Unit $
2. Indirect Unit $ is Direct Unit $ times 10%
3. Total Unit Price is Direct Unit $ plus Indirect Unit $
4. Profit is 10% of the Total Unit Price
5. Final Unit Price is Total Unit Price plus Profit
6. Final Unit Price is Carried Forward into the Cost Estimates
7. Stone Column, S-C-B Wall and Wick Drains were quoted by specialty subcontractors.
8. All the fixed costs for the Sand & Gravel production (i.e. all Type A or B material) are included with the Type A Sand productions costs.
9. The Riprap hauled by barge requires the construction of a barge loading facility. The fixed costs of the Riprap Barge loading facility are applied to one-half of the Riprap quantity.

Final Unit Cost Roll Up by Alternative

Alternative 2A - Seismic **Mid-Sea Barrier/South Marine Lake**

Item No.	Description				Fixed Cost	Quantity	Fixed Unit $		Source	Variable Unit $	Source	Direct Unit $	10.00% Indirect Unit $	Total Unit $	10.00% Profit $	Final Unit $	1.62 TN/CY Final Unit $
1	**Dredging**																
	Unit Pricing																
	Dredging - Variable Cost									$6.38 /CY	F 46	**$6.38 /CY**					
	Note: For dreding work, use 0% for Indirect Costs and 5% for Profit.					Indirect Costs = 0.0%											
	Quantities					Profit = 5.0%											
	Mid Sea Barrier	11,099,000	CY			11,099,000 CY				$6.38 /CY		**$6.38 /CY**	**$0.00 /CY**	$6.38 /CY	**$0.32 /CY**	$6.70 /CY	**$6.70 /CY**
	Subtotal - Dredging	11,099,000	CY			11,099,000 CY											
2	**Type A Sand**																
	Unit Pricing																
	Produce Sand/Gravel - Fixed Costs				$10,078,430	21,120,264 Tons	$0.4772 /Ton		F-6,7,8,9			**$0.48 /Ton**					
	Produce Sand/Gravel - Variable Costs									$4.10 /Ton	F-16,17	**$4.10 /Ton**					
	Build Conveyor Loadout Dock System				$490,269	21,120,264 Tons	$0.0232 /Ton		F-12,13,14			**$0.02 /Ton**					
	Haul & Place Sand/Gravel - Barge - Fixed Setup & Acquisition Costs				$5,206,441	21,120,264 Tons	$0.2465 /Ton		F-15			**$0.25 /Ton**					
	Access for Mid-Sea, Perimeter and South Dam Barriers				$2,870,750	21,120,264 Tons	$0.1359 /Ton		F-10,11			**$0.14 /Ton**					
	Haul & Place Sand/Gravel by Barge to the Mid-Sea Dam - Variable Cost									$2.79 /Ton	F-18,19,20	**$2.79 /Ton**					
	Haul & Place Sand/Gravel by Truck to The Mid-Sea Dam - Variable Cost									$5.35 /Ton	F-21,22	**$5.35 /Ton**					
	Trucking Haul to the Perimeter Dike - Variable Cost									$6.91 /Ton	F-23.1,23.2	**$6.91 /Ton**					
	Trucking Haul to the South Sea Dam - Variable Cost									$8.08 /Ton	F-24.1,24.2	**$8.08 /Ton**					
	Quantities																
	Mid Sea Barrier	13,037,200	CY											Average Unit Cost for Mid Sea Barrier - Type A Sand			$17.51 /CY
	50% Mid Sea Barrier - Barge	6,518,600	CY	x the Conversion of	1.62	Tons/CY = 10,560,132 Tons						**$7.77 /Ton**	**$0.78 /Ton**	$8.55 /Ton	**$0.86 /Ton**	$9.41 /Ton	**$15.24 /CY**
	50% Mid Sea Barrier - Truck	6,518,600	CY	x the Conversion of	1.62	Tons/CY = 10,560,132 Tons						**$10.09 /Ton**	**$1.01 /Ton**	$11.10 /Ton	**$1.11 /Ton**	$12.21 /Ton	**$19.78 /CY**
	Subtotal - Type A Sand	13,037,200	CY	x the Conversion of	1.62	Tons/CY = 21,120,264 Tons											
3	**Type B Sand /Gravel**																
	Unit Pricing																
	Produce Sand/Gravel - Fixed Costs																
	Produce Sand/Gravel - Variable Costs									$4.10 /Ton	F-16,17	**$4.10 /Ton**					
	Build Conveyor Loadout Dock System											**$0.00 /Ton**					
	Haul & Place Sand/Gravel - Barge - Fixed Setup & Acquisition Costs											**$0.00 /Ton**					
	Access for Mid-Sea, Perimeter and South Dam Barriers											**$0.00 /Ton**					
	Haul & Place Sand/Gravel by Barge to the Mid-Sea Dam - Variable Cost									$2.79 /Ton	F-18,19,20	**$2.79 /Ton**					
	Haul & Place Sand/Gravel by Truck to The Mid-Sea Dam - Variable Cost									$5.35 /Ton	F-21,22	**$5.35 /Ton**					
	Trucking Haul to the Perimeter Dike - Variable Cost									$6.91 /Ton	F-23.1,23.2	**$6.91 /Ton**					
	Trucking Haul to the South Sea Dam - Variable Cost									$8.08 /Ton	F-24.1,24.2	**$8.08 /Ton**					
	Quantities																
	Mid Sea Barrier	1,020,800	CY											Average Unit Cost for Mid Sea Barrier - Type B Sand /Gravel			$16.02 /CY
	50% Mid Sea Barrier - Barge	510,400	CY	x the Conversion of	1.62	Tons/CY = 826,848 Tons						**$6.89 /Ton**	**$0.69 /Ton**	$7.58 /Ton	**$0.76 /Ton**	$8.34 /Ton	**$13.51 /CY**
	50% Mid Sea Barrier - Truck	510,400	CY	x the Conversion of	1.62	Tons/CY = 826,848 Tons						**$9.46 /Ton**	**$0.95 /Ton**	$10.40 /Ton	**$1.04 /Ton**	$11.44 /Ton	**$18.53 /CY**
	Subtotal - Type B S /G	1,020,800	CY	x the Conversion of	1.62	Tons/CY = 1,653,696 Tons											

Final Unit Cost Roll Up by Alternative

Alternative 2A - Seismic **Mid-Sea Barrier/South Marine Lake**

Item No.	Description				Fixed Cost	Quantity	Fixed Unit $		Source	Variable Unit $	Source	Direct Unit $	10.00% Indirect Unit $	Total Unit $	10.00% Profit $	Final Unit $	1.62 TN/CY Final Unit $
4	**Filter Rock (Fine and Coarse)**																
	Unit Pricing																
	Filter Rock - Unit Cost (Same as Type B Sand/Gravel)											**$4.10 /Ton**					
	Quantities																
	Mid Sea Barrier	-	CY														
100%	Mid Sea Barrier - Barge	-	CY x the Conversion of	1.62	Tons/CY =	- Tons						**$6.89 /Ton**	**$0.69 /Ton**	$7.58 /Ton	**$0.76 /Ton**	$8.34 /Ton	**$13.51 /CY**
0%	Mid Sea Barrier - Truck	-										**$9.46 /Ton**	**$0.95 /Ton**	$10.40 /Ton	**$1.04 /Ton**	$11.44 /Ton	**$18.53 /CY**
	Subtotal - Filter Rock	-	CY x the Conversion of	1.62	Tons/CY =	- Tons											
5	**Riprap**																
	Unit Pricing																
	Produce Riprap - Fixed Cost				$4,375,763	4,923,710 Tons	$0.8887 /Ton		F-25,26,27,28			**$0.89 /Ton**					
	Produce Riprap - Variable Cost									$6.71 /Ton	F-30,31,32,33	**$6.71 /Ton**					
			66.7% of the Riprap Quantity Placed by Barge =			3,282,473 Tons											
	Haul & Place Riprap by Barge - Fixed Cost				$2,772,870	3,282,473 Tons	$0.8448 /Ton		F-29			**$0.84 /Ton**					
	Haul & Place Riprap by Barge - Variable Cost									$5.44 /Ton	F-34,35	**$5.44 /Ton**					
	Dress Riprap by Barge - Variable Cost									$0.69 /Ton	F-41	**$0.69 /Ton**					
	Load Riprap for Haul by Truck - Variable Cost									$1.12 /Ton	F-37	**$1.12 /Ton**					
	Haul Riprap by Truck to Mid-Sea Dam Point - Variable Cost									$6.64 /Ton	F-36.1,36.2	**$6.64 /Ton**					
	Haul Riprap by Truck to Perimeter Dike - Variable Cost									$9.38 /Ton	F-38.1,38.2	**$9.38 /Ton**					
	Variable Unit Cost of Riprap Truck Haul to the South Dam & North Dam									$10.90 /Ton	F-39.1,39.2	**$10.90 /Ton**					
	Haul Riprap by Truck & Place Riprap from Beach by Crane - Variable Cost									$2.08 /Ton	F-40	**$2.08 /Ton**					
	Quantities																
	Mid Sea Barrier	2,896,300	CY												Average Unit Cost for Mid Sea Barrier - Riprap		$31.17 /CY
67%	Mid Sea Barrier - Barge	1,930,867	CY x the Conversion of	1.70	Tons/CY =	3,282,473 Tons						**$14.57 /Ton**	**$1.46 /Ton**	$16.03 /Ton	**$1.60 /Ton**	$17.63 /Ton	**$29.98 /CY**
33%	Mid Sea Barrier - Truck	965,433	CY x the Conversion of	1.70	Tons/CY =	1,641,237 Tons						**$16.31 /Ton**	**$1.63 /Ton**	$17.94 /Ton	**$1.79 /Ton**	$19.74 /Ton	**$33.55 /CY**
	Subtotal - Riprap	2,896,300	CY x the Conversion of	1.70	Tons/CY =	4,923,710 Tons											
6	**Stone Columns**																
	Unit Pricing																
	Stone Column Support - Variable Cost									$41.75 /LF SC	F-49	**$41.75 /LF SC**					
	Note: For Stone Column work, use 0% for Indirect Costs and 10% for Profit.					Indirect Costs = 0%											
	Quantities					Profit = 10%											
	Mid Sea Barrier	2,651,000	LF			2,651,000 LF						**$41.75 /LF SC**	**$0.00 /LF SC**	$41.75 /LF SC	**$4.17 /LF SC**	$45.92 /LF SC	**$45.92 /LF SC**
	Subtotal - Stone Columns	2,651,000	LF			2,651,000 LF											

Final Unit Cost Roll Up by Alternative

Alternative 2A - Seismic **Mid-Sea Barrier/South Marine Lake**

Item No.	Description				Fixed Cost	Quantity	Fixed Unit $		Source	Variable Unit $	Source	Direct Unit $	10.00% Indirect Unit $	Total Unit $	10.00% Profit $	Final Unit $	1.62 TN/CY Final Unit $
7	**Slurry Wall (No Membrane)**																
	Unit Pricing																
	Slurry Wall	Short Depth								$5.45 /SF	F-53	**$5.45 /SF**					
	Slurry Wall	Medium Depth								$9.20 /SF	F-53	**$9.20 /SF**					
	Note: For Slurry Wall work, use 0% for Indirect Costs and 10% for Profit.					Indirect Costs = 0%											
	Quantities					Profit = 10%											
	Mid Sea Barrier	3,791,700 SF				3,791,700 SF						**$9.20 /SF**	**$0.00 /SF**	$9.20 /SF	**$0.92 /SF**	$10.12 /SF	**$10.12 /SF**
	Subtotal - Slurry Wall	3,791,700 SF				3,791,700 SF											
8	**Wick Drains**																
	Unit Pricing																
	Wick Drain Water Support - Fixed Costs				$1,383,981	6,736,400 LF	$0.2054	/LF WD	F-43,44			**$0.21 /LF WD**					
	Wick Drain Support - Variable Cost									$4.26 /LF WD	F-42	**$4.26 /LF WD**					
	Quantities																
	Mid Sea Barrier	6,736,400 LF				6,736,400 LF						**$4.47 /LF WD**	**$0.45 /LF WD**	$4.91 /LF WD	**$0.49 /LF WD**	$5.40 /LF WD	**$5.40 /LF WD**
	Subtotal - Wick Drains	6,736,400 LF				6,736,400 LF											
9	**Habitat Ponds**																
	Unit Pricing																
	Clay - Habitat Pond Embankment																
	Habitat Ponds - 500 Acre Pond									$11,135 /Acre	F-51,52						
	Filter Rock (Fine and Coarse)																
	Total Habitat Ponds Unit $									**$11,135 /Acre**		**$11,135 /Acre**					
	Quantities																
	Mid Sea Barrier	21,700 Acres				21,700 Acres						**$11,135 /Acre**	**$1,113 /Acre**	$12,248 /Acre	**$1,225 /Acre**	$13,473 /Acre	**$13,473 /Acre**
	Subtotal - Unit Pricing	21,700 Acres				21,700 Acres											

Notes
1. Direct Unit $ is Fixed Unit $ plus Variable Unit $
2. Indirect Unit $ is Direct Unit $ times 10%
3. Total Unit Price is Direct Unit $ plus Indirect Unit $
4. Profit is 10% of the Total Unit Price
5. Final Unit Price is Total Unit Price plus Profit
6. Final Unit Price is Carried Forward into the Cost Estimates
7. Stone Column, S-C-B Wall and Wick Drains were quoted by specialty subcontractors.
8. All the fixed costs for the Sand & Gravel production (i.e. all Type A or B material) are included with the Type A Sand productions costs.
9. The Riprap hauled by barge requires the construction of a barge loading facility. The fixed costs of the Riprap Barge loading facility are applied to one-half of the Riprap quantity.

Final Unit Cost Roll Up by Alternative

Alternative 2B - Non Seismic **Mid-Sea Barrier/South Marine Lake**
No Stone Columns

Item No.	Description				Fixed Cost	Quantity		Fixed Unit $		Source	Variable Unit $		Source	Direct Unit $	10.00% Indirect Unit $	Total Unit $	10.00% Profit $	Final Unit $	1.62 TN/CY Final Unit $
1	**Dredging**																		
	Unit Pricing																		
	Dredging - Variable Cost										$6.38 /CY		F 46	**$6.38 /CY**					
	Note: For dreding work, use 0% for Indirect Costs and 5% for Profit.					**Indirect Costs =**	**0.0%**												
	Quantities					**Profit =**	**5.0%**												
	Mid Sea Barrier	**10,111,200**	**CY**			**10,111,200**	**CY**				$6.38 /CY			**$6.38 /CY**	**$0.00 /CY**	$6.38 /CY	**$0.32 /CY**	$6.70 /CY	**$6.70 /CY**
	Subtotal - Dredging	**10,111,200**	**CY**			**10,111,200**	**CY**												
2	**Type A Sand**																		
	Unit Pricing																		
	Produce Sand/Gravel - Fixed Costs				$10,078,430	10,848,816	Tons	$0.9290 /Ton		F-6,7,8,9				**$0.93 /Ton**					
	Produce Sand/Gravel - Variable Costs										$4.10 /Ton		F-16,17	**$4.10 /Ton**					
	Build Conveyor Loadout Dock System				$490,269	10,848,816	Tons	$0.0452 /Ton		F-12,13,14				**$0.05 /Ton**					
	Haul & Place Sand/Gravel - Barge - Fixed Setup & Acquisition Costs				$5,206,441	10,848,816	Tons	$0.4799 /Ton		F-15				**$0.48 /Ton**					
	Access for Mid-Sea, Perimeter and South Dam Barriers				$2,870,750	10,848,816	Tons	$0.2646 /Ton		F-10,11				**$0.26 /Ton**					
	Haul & Place Sand/Gravel by Barge to the Mid-Sea Dam - Variable Cost										$2.79 /Ton		F-18,19,20	**$2.79 /Ton**					
	Haul & Place Sand/Gravel by Truck to The Mid-Sea Dam - Variable Cost										$5.35 /Ton		F-21,22	**$5.35 /Ton**					
	Trucking Haul to the Perimeter Dike - Variable Cost										$6.91 /Ton		F-23.1,23.2	**$6.91 /Ton**					
	Trucking Haul to the South Sea Dam - Variable Cost										$8.08 /Ton		F-24.1,24.2	**$8.08 /Ton**					
	Quantities																		
	Mid Sea Barrier	**6,696,800**	**CY**													Average Unit Cost for Mid Sea Barrier - Type A Sand			$18.92 /CY
	50% Mid Sea Barrier - Barge	**3,348,400**	**CY**	**x the Conversion of**	**1.62**	**Tons/CY =**	**5,424,408**	**Tons**						**$8.61 /Ton**	**$0.86 /Ton**	$9.47 /Ton	**$0.95 /Ton**	$10.42 /Ton	**$16.88 /CY**
	50% Mid Sea Barrier - Truck	**3,348,400**	**CY**	**x the Conversion of**	**1.62**	**Tons/CY =**	**5,424,408**	**Tons**						**$10.69 /Ton**	**$1.07 /Ton**	$11.76 /Ton	**$1.18 /Ton**	$12.94 /Ton	**$20.96 /CY**
	Subtotal - Type A Sand	**6,696,800**	**CY**	**x the Conversion of**	**1.62**	**Tons/CY =**	**10,848,816**	**Tons**											
3	**Type B Sand /Gravel**																		
	Unit Pricing																		
	Produce Sand/Gravel - Fixed Costs																		
	Produce Sand/Gravel - Variable Costs										$4.10 /Ton		F-16,17	**$4.10 /Ton**					
	Build Conveyor Loadout Dock System													**$0.00 /Ton**					
	Haul & Place Sand/Gravel - Barge - Fixed Setup & Acquisition Costs													**$0.00 /Ton**					
	Access for Mid-Sea, Perimeter and South Dam Barriers													**$0.00 /Ton**					
	Haul & Place Sand/Gravel by Barge to the Mid-Sea Dam - Variable Cost										$2.79 /Ton		F-18,19,20	**$2.79 /Ton**					
	Haul & Place Sand/Gravel by Truck to The Mid-Sea Dam - Variable Cost										$5.35 /Ton		F-21,22	**$5.35 /Ton**					
	Trucking Haul to the Perimeter Dike - Variable Cost										$6.91 /Ton		F-23.1,23.2	**$6.91 /Ton**					
	Trucking Haul to the South Sea Dam - Variable Cost										$8.08 /Ton		F-24.1,24.2	**$8.08 /Ton**					
	Quantities																		
	Mid Sea Barrier	**3,217,500**	**CY**													Average Unit Cost for Mid Sea Barrier - Type B Sand /Gravel			$16.02 /CY
	50% Mid Sea Barrier - Barge	**1,608,750**	**CY**	**x the Conversion of**	**1.62**	**Tons/CY =**	**2,606,175**	**Tons**						**$6.89 /Ton**	**$0.69 /Ton**	$7.58 /Ton	**$0.76 /Ton**	$8.34 /Ton	**$13.51 /CY**
	50% Mid Sea Barrier - Truck	**1,608,750**	**CY**	**x the Conversion of**	**1.62**	**Tons/CY =**	**2,606,175**	**Tons**						**$9.46 /Ton**	**$0.95 /Ton**	$10.40 /Ton	**$1.04 /Ton**	$11.44 /Ton	**$18.53 /CY**
	Subtotal - Type B S /G	**3,217,500**	**CY**	**x the Conversion of**	**1.62**	**Tons/CY =**	**5,212,350**	**Tons**											

Final Unit Cost Roll Up by Alternative

Alternative 2B - Non Seismic **Mid-Sea Barrier/South Marine Lake**
No Stone Columns

Item No.	Description				Fixed Cost	Quantity	Fixed Unit $		Source	Variable Unit $	Source	Direct Unit $	10.00% Indirect Unit $	Total Unit $	10.00% Profit $	Final Unit $	1.62 TN/CY Final Unit $
4	**Filter Rock (Fine and Coarse)**																
	Unit Pricing																
	Filter Rock - Unit Cost (Same as Type B Sand/Gravel)											**$4.10 /Ton**					
	Quantities																
	Mid Sea Barrier	-	CY														
100%	Mid Sea Barrier - Barge	-	CY x the Conversion of	1.62	Tons/CY =	-	Tons					**$6.89 /Ton**	**$0.69 /Ton**	$7.58 /Ton	**$0.76 /Ton**	$8.34 /Ton	**$13.51 /CY**
0%	Mid Sea Barrier - Truck	-										**$9.46 /Ton**	**$0.95 /Ton**	$10.40 /Ton	**$1.04 /Ton**	$11.44 /Ton	**$18.53 /CY**
	Subtotal - Filter Rock	-	CY x the Conversion of	1.62	Tons/CY =	-	Tons										
5	**Riprap**																
	Unit Pricing																
	Produce Riprap - Fixed Cost				$4,375,763	4,787,200	Tons	$0.9141	/Ton	F-25,26,27,28		**$0.91 /Ton**					
	Produce Riprap - Variable Cost										$6.71 /Ton F-30,31,32,33	**$6.71 /Ton**					
			66.7% of the Riprap Quantity Placed by Barge =			3,191,467	Tons										
	Haul & Place Riprap by Barge - Fixed Cost				$2,772,870	3,191,467	Tons	$0.8688	/Ton	F-29		**$0.87 /Ton**					
	Haul & Place Riprap by Barge - Variable Cost										$5.44 /Ton F-34,35	**$5.44 /Ton**					
	Dress Riprap by Barge - Variable Cost										$0.69 /Ton F-41	**$0.69 /Ton**					
	Load Riprap for Haul by Truck - Variable Cost										$1.12 /Ton F-37	**$1.12 /Ton**					
	Haul Riprap by Truck to Mid-Sea Dam Point - Variable Cost										$6.64 /Ton F-36.1,36.2	**$6.64 /Ton**					
	Haul Riprap by Truck to Perimeter Dike - Variable Cost										$9.38 /Ton F-38.1,38.2	**$9.38 /Ton**					
	Variable Unit Cost of Riprap Truck Haul to the South Dam & North Dam										$10.90 /Ton F-39.1,39.2	**$10.90 /Ton**					
	Haul Riprap by Truck & Place Riprap from Beach by Crane - Variable Cost										$2.08 /Ton F-40	**$2.08 /Ton**					
	Quantities																
	Mid Sea Barrier	2,816,000	CY												Average Unit Cost for Mid Sea Barrier - Riprap		$31.25 /CY
67%	Mid Sea Barrier - Barge	1,877,333	CY x the Conversion of	1.70	Tons/CY =	3,191,467	Tons					**$14.62 /Ton**	**$1.46 /Ton**	$16.08 /Ton	**$1.61 /Ton**	$17.69 /Ton	**$30.08 /CY**
33%	Mid Sea Barrier - Truck	938,667	CY x the Conversion of	1.70	Tons/CY =	1,595,733	Tons					**$16.34 /Ton**	**$1.63 /Ton**	$17.97 /Ton	**$1.80 /Ton**	$19.77 /Ton	**$33.60 /CY**
	Subtotal - Riprap	2,816,000	CY x the Conversion of	1.70	Tons/CY =	4,787,200	Tons										
6	**Stone Columns**																
	Unit Pricing																
	Stone Column Support - Variable Cost										$41.75 /LF SC F-49	**$41.75 /LF SC**					
	Note: For Stone Column work, use 0% for Indirect Costs and 10% for Profit.												Indirect Costs = 0%				
	Quantities														Profit = 10%		
	Mid Sea Barrier	-	LF			-	LF					**$41.75 /LF SC**	**$0.00 /LF SC**	$41.75 /LF SC	**$4.17 /LF SC**	$45.92 /LF SC	**$45.92 /LF SC**
	Subtotal - Stone Columns	-	LF			-	LF										

Final Unit Cost Roll Up by Alternative

Alternative 2B - Non Seismic **Mid-Sea Barrier/South Marine Lake**
No Stone Columns

Item No.	Description				Fixed Cost	Quantity	Fixed Unit $		Source	Variable Unit $	Source	Direct Unit $	10.00% Indirect Unit $	Total Unit $	10.00% Profit $	Final Unit $	1.62 TN/CY Final Unit $
7	**Slurry Wall (No Membrane)**																
	Unit Pricing																
	Slurry Wall	Short Depth								$5.45 /SF	F-53	**$5.45 /SF**					
	Slurry Wall	Medium Depth								$9.20 /SF	F-53	**$9.20 /SF**					
	Note: For Slurry Wall work, use 0% for Indirect Costs and 10% for Profit.					Indirect Costs = 0%											
	Quantities					Profit = 10%											
	Mid Sea Barrier	3,791,700 SF				3,791,700 SF						**$9.20 /SF**	**$0.00 /SF**	$9.20 /SF	**$0.92 /SF**	$10.12 /SF	**$10.12 /SF**
	Subtotal - Slurry Wall	3,791,700 SF				3,791,700 SF											
8	**Wick Drains**																
	Unit Pricing																
	Wick Drain Water Support - Fixed Costs				$1,383,981	7,803,400 LF	$0.1774 /LF WD		F-43,44			**$0.18 /LF WD**					
	Wick Drain Support - Variable Cost									$4.26 /LF WD	F-42	**$4.26 /LF WD**					
	Quantities																
	Mid Sea Barrier	7,803,400 LF				7,803,400 LF						**$4.44 /LF WD**	**$0.44 /LF WD**	$4.88 /LF WD	**$0.49 /LF WD**	$5.37 /LF WD	**$5.37 /LF WD**
	Subtotal - Wick Drains	7,803,400 LF				7,803,400 LF											
9	**Habitat Ponds**																
	Unit Pricing																
	Clay - Habitat Pond Embankment																
	Habitat Ponds - 500 Acre Pond									$11,135 /Acre	F-51,52						
	Filter Rock (Fine and Coarse)																
	Total Habitat Ponds Unit $									**$11,135 /Acre**		**$11,135 /Acre**					
	Quantities																
	Mid Sea Barrier	21,700 Acres				21,700 Acres						**$11,135 /Acre**	**$1,113 /Acre**	$12,248 /Acre	**$1,225 /Acre**	$13,473 /Acre	**$13,473 /Acre**
	Subtotal - Unit Pricing	21,700 Acres				21,700 Acres											

Notes
1. Direct Unit $ is Fixed Unit $ plus Variable Unit $
2. Indirect Unit $ is Direct Unit $ times 10%
3. Total Unit Price is Direct Unit $ plus Indirect Unit $
4. Profit is 10% of the Total Unit Price
5. Final Unit Price is Total Unit Price plus Profit
6. Final Unit Price is Carried Forward into the Cost Estimates
7. Stone Column, S-C-B Wall and Wick Drains were quoted by specialty subcontractors.
8. All the fixed costs for the Sand & Gravel production (i.e. all Type A or B material) are included with the Type A Sand productions costs.
9. The Riprap hauled by barge requires the construction of a barge loading facility. The fixed costs of the Riprap Barge loading facility are applied to one-half of the Riprap quantity.

Final Unit Cost Roll Up by Alternative

Alternative 3A — **Concentric Dikes Without Stone Columns**

Item No.	Description				Fixed Cost	Quantity	Fixed Unit $		Source	Variable Unit $	Source	Direct Unit $	10.00% Indirect Unit $	Total Unit $	10.00% Profit $	Final Unit $	1.62 TN/CY Final Unit $
1	**Dredging**																
	Unit Pricing																
	Dredging - Variable Cost									$6.38 /CY	F 46	**$6.38 /CY**					
	Note: For dreding work, use 0% for Indirect Costs and 5% for Profit.					Indirect Costs = 0.0%											
	Quantities					Profit = 5.0%											
	Concentric Dikes	129,245,600	CY			129,245,600 CY				$6.38 /CY		**$6.38 /CY**	**$0.00 /CY**	$6.38 /CY	**$0.32 /CY**	$6.70 /CY	**$6.70 /CY**
	Subtotal - Dredging	129,245,600	CY			129,245,600 CY											
2	**Type A Sand**																
	Unit Pricing																
	Produce Sand/Gravel - Fixed Costs				$10,078,430	138,782,160 Tons	$0.0726 /Ton		F-6,7,8,9			**$0.07 /Ton**					
	Produce Sand/Gravel - Variable Costs									$4.10 /Ton	F-16,17	**$4.10 /Ton**					
	Build Conveyor Loadout Dock System				$490,269	138,782,160 Tons	$0.0035 /Ton		F-12,13,14			**$0.00 /Ton**					
	Haul & Place Sand/Gravel - Barge - Fixed Setup & Acquisition Costs				$5,206,441	138,782,160 Tons	$0.0375 /Ton		F-15			**$0.04 /Ton**					
	Access for Mid-Sea, Perimeter and South Dam Barriers				$2,870,750	138,782,160 Tons	$0.0207 /Ton		F-10,11			**$0.02 /Ton**					
	Haul & Place Sand/Gravel by Barge to the Mid-Sea Dam - Variable Cost									$2.79 /Ton	F-18,19,20	**$2.79 /Ton**					
	Haul & Place Sand/Gravel by Truck to The Mid-Sea Dam - Variable Cost									$5.35 /Ton	F-21,22	**$5.35 /Ton**					
	Trucking Haul to the Perimeter Dike - Variable Cost									$6.91 /Ton	F-23.1,23.2	**$6.91 /Ton**					
	Total Average Concentric Haul									$12.12 /Ton	F-24.1,24.2	**$12.12 /Ton**					
	Quantities																
	Concentric Dikes	85,668,000	CY x the Conversion of	1.62	Tons/CY =	138,782,160 Tons						**$16.32 /Ton**	**$1.63 /Ton**	$17.95 /Ton	**$1.80 /Ton**	$19.75 /Ton	**$31.99 /CY**
	Subtotal - Type A Sand	85,668,000	CY x the Conversion of	1.62	Tons/CY =	138,782,160 Tons											
3	**Type B Sand /Gravel**																
	Unit Pricing																
	Produce Sand/Gravel - Fixed Costs																
	Produce Sand/Gravel - Variable Costs									$4.10 /Ton	F-16,17	**$4.10 /Ton**					
	Build Conveyor Loadout Dock System											**$0.00 /Ton**					
	Haul & Place Sand/Gravel - Barge - Fixed Setup & Acquisition Costs											**$0.00 /Ton**					
	Access for Mid-Sea, Perimeter and South Dam Barriers											**$0.00 /Ton**					
	Haul & Place Sand/Gravel by Barge to the Mid-Sea Dam - Variable Cost									$2.79 /Ton	F-18,19,20	**$2.79 /Ton**					
	Haul & Place Sand/Gravel by Truck to The Mid-Sea Dam - Variable Cost									$5.35 /Ton	F-21,22	**$5.35 /Ton**					
	Trucking Haul to the Perimeter Dike - Variable Cost									$6.91 /Ton	F-23.1,23.2	**$6.91 /Ton**					
	Total Average Concentric Haul									$12.12 /Ton	F-24.1,24.2	**$12.12 /Ton**					
	Quantities																
	Concentric Dikes	21,310,300	CY x the Conversion of	1.62	Tons/CY =	34,522,686 Tons						**$16.22 /Ton**	**$1.62 /Ton**	$17.84 /Ton	**$1.78 /Ton**	$19.63 /Ton	**$31.80 /CY**
	Subtotal - Type B S /G	21,310,300	CY x the Conversion of	1.62	Tons/CY =	34,522,686 Tons											

Final Unit Cost Roll Up by Alternative

Alternative 3A **Concentric Dikes Without Stone Columns**

Item No.	Description				Fixed Cost	Quantity	Fixed Unit $		Source	Variable Unit $	Source	Direct Unit $	10.00% Indirect Unit $	Total Unit $	10.00% Profit $	Final Unit $	1.62 TN/CY Final Unit $
4	**Filter Rock (Fine and Coarse)**																
	Unit Pricing																
	Filter Rock - Unit Cost (Same as Type B Sand/Gravel)											**$4.10 /Ton**					
	Quantities																
	Concentric Dikes	-										**$16.22 /Ton**	**$1.62 /Ton**	$17.84 /Ton	**$1.78 /Ton**	$19.63 /Ton	**$31.80 /CY**
	Subtotal - Filter Rock	-	CY x the Conversion of	1.62	Tons/CY =	-	Tons										
5	**Riprap**																
	Unit Pricing																
	Produce Riprap - Fixed Cost				$4,375,763	54,041,130	Tons	$0.0810	/Ton	F-25,26,27,28		**$0.08 /Ton**					
	Produce Riprap - Variable Cost										$6.71 /Ton F-30,31,32,33	**$6.71 /Ton**					
	0% of the Riprap Quantity Placed by Barge =				-	Tons											
	Haul & Place Riprap by Barge - Fixed Cost				$2,772,870		Tons		/Ton	F-29		**$0.00 /Ton**					
	Haul & Place Riprap by Barge - Variable Cost										$5.44 /Ton F-34,35	**$5.44 /Ton**					
	Dress Riprap by Barge - Variable Cost										$0.69 /Ton F-41	**$0.69 /Ton**					
	Load Riprap for Haul by Truck - Variable Cost										$1.12 /Ton F-37	**$1.12 /Ton**					
	Haul Riprap by Truck to Mid-Sea Dam Point - Variable Cost										$6.64 /Ton F-36.1,36.2	**$6.64 /Ton**					
	Haul Riprap by Truck to Perimeter Dike - Variable Cost										$9.38 /Ton F-38.1,38.2	**$9.38 /Ton**					
	Total Average Concentric Haul										$15.79 /Ton F-39.1,39.2	**$15.79 /Ton**					
	Haul Riprap by Truck & Place Riprap from Beach by Crane - Variable Cost										$2.08 /Ton F-40	**$2.08 /Ton**					
	Quantities																
	Concentric Dikes	31,788,900	CY x the Conversion of	1.70	Tons/CY =	54,041,130	Tons					**$24.65 /Ton**	**$2.46 /Ton**	$27.11 /Ton	**$2.71 /Ton**	$29.83 /Ton	**$50.70 /CY**
	Subtotal - Riprap	31,788,900	CY x the Conversion of	1.70	Tons/CY =	54,041,130	Tons										
6	**Stone Columns**																
	Unit Pricing																
	Stone Column Support - Variable Cost										$41.75 /LF SC F-49	**$41.75 /LF SC**					
	Note: For Stone Column work, use 0% for Indirect Costs and 10% for Profit.					Indirect Costs =	0%										
	Quantities					Profit =	10%										
	Concentric Dikes	-	LF			-	LF					**$41.75 /LF SC**	**$0.00 /LF SC**	$41.75 /LF SC	**$4.17 /LF SC**	$45.92 /LF SC	**$45.92 /LF SC**
	Subtotal - Stone Columns	-	LF			-	LF										

Final Unit Cost Roll Up by Alternative

Alternative 3A **Concentric Dikes Without Stone Columns**

Item No.	Description				Fixed Cost	Quantity	Fixed Unit $		Source	Variable Unit $	Source	Direct Unit $	10.00% Indirect Unit $	Total Unit $	10.00% Profit $	Final Unit $	1.62 TN/CY Final Unit $
7	**Slurry Wall (No Membrane)**																
	Unit Pricing																
	Slurry Wall	Short Depth								$5.45 /SF	F-53	**$5.45 /SF**					
	Slurry Wall	Medium Depth								$9.20 /SF	F-53	**$9.20 /SF**					
	Note: For Slurry Wall work, use 0% for Indirect Costs and 10% for Profit.					Indirect Costs = 0%											
	Quantities					Profit = 10%											
	Concentric Dikes	99,328,900 SF				99,328,900 SF						**$5.45 /SF**	**$0.00 /SF**	$5.45 /SF	**$0.55 /SF**	$6.00 /SF	**$6.00 /SF**
	Subtotal - Slurry Wall	99,328,900 SF				99,328,900 SF											
8	**Wick Drains**																
	Unit Pricing																
	Wick Drain Water Support - Fixed Costs				$1,383,981	87,642,500 LF	$0.0158	/LF WD	F-43,44			**$0.02 /LF WD**					
	Wick Drain Support - Variable Cost									$4.26 /LF WD	F-42	**$4.26 /LF WD**					
	Quantities																
	Concentric Dikes	87,642,500 LF				87,642,500 LF						**$4.28 /LF WD**	**$0.43 /LF WD**	$4.70 /LF WD	**$0.47 /LF WD**	$5.17 /LF WD	**$5.17 /LF WD**
	Subtotal - Wick Drains	87,642,500 LF				87,642,500 LF											
9	**Habitat Ponds**																
	Unit Pricing																
	Clay - Habitat Pond Embankment																
	Habitat Ponds - 500 Acre Pond									$11,135 /Acre	F-51,52						
	Filter Rock (Fine and Coarse)																
	Total Habitat Ponds Unit $									**$11,135 /Acre**		**$11,135 /Acre**					
	Quantities																
	Concentric Dikes	- Acres		- Acres								**$11,135 /Acre**	**$1,113 /Acre**	$12,248 /Acre	**$1,225 /Acre**	$13,473 /Acre	**$13,473 /Acre**
	Subtotal - Unit Pricing	- Acres		- Acres													

Notes
1. Direct Unit $ is Fixed Unit $ plus Variable Unit $
2. Indirect Unit $ is Direct Unit $ times 10%
3. Total Unit Price is Direct Unit $ plus Indirect Unit $
4. Profit is 10% of the Total Unit Price
5. Final Unit Price is Total Unit Price plus Profit
6. Final Unit Price is Carried Forward into the Cost Estimates
7. Stone Column, S-C-B Wall and Wick Drains were quoted by specialty subcontractors.
8. All the fixed costs for the Sand & Gravel production (i.e. all Type A or B material) are included with the Type A Sand productions costs.
9. The Riprap hauled by barge requires the construction of a barge loading facility. The fixed costs of the Riprap Barge loading facility are applied to one-half of the Riprap quantity.

Final Unit Cost Roll Up by Alternative

Alternative 3B **Concentric Dikes With Stone Columns**

Item No.	Description				Fixed Cost	Quantity	Fixed Unit $		Source	Variable Unit $	Source	Direct Unit $	10.00% Indirect Unit $	Total Unit $	10.00% Profit $	Final Unit $	1.62 TN/CY Final Unit $
1	**Dredging**																
	Unit Pricing																
	Dredging - Variable Cost									$6.38 /CY	F 46	**$6.38 /CY**					
	Note: For dreding work, use 0% for Indirect Costs and 5% for Profit.					Indirect Costs = 0.0%											
	Quantities					Profit = 5.0%											
	Concentric Dikes	129,245,600	CY			129,245,600 CY				$6.38 /CY		**$6.38 /CY**	**$0.00 /CY**	$6.38 /CY	**$0.32 /CY**	$6.70 /CY	**$6.70 /CY**
	Subtotal - Dredging	129,245,600	CY			129,245,600 CY											
2	**Type A Sand**																
	Unit Pricing																
	Produce Sand/Gravel - Fixed Costs				$10,078,430	195,838,236 Tons	$0.0515 /Ton		F-6,7,8,9			**$0.05 /Ton**					
	Produce Sand/Gravel - Variable Costs									$4.10 /Ton	F-16,17	**$4.10 /Ton**					
	Build Conveyor Loadout Dock System				$490,269	195,838,236 Tons	$0.0025 /Ton		F-12,13,14			**$0.00 /Ton**					
	Haul & Place Sand/Gravel - Barge - Fixed Setup & Acquisition Costs				$5,206,441	195,838,236 Tons	$0.0266 /Ton		F-15			**$0.03 /Ton**					
	Access for Mid-Sea, Perimeter and South Dam Barriers				$2,870,750	195,838,236 Tons	$0.0147 /Ton		F-10,11			**$0.01 /Ton**					
	Haul & Place Sand/Gravel by Barge to the Mid-Sea Dam - Variable Cost									$2.79 /Ton	F-18,19,20	**$2.79 /Ton**					
	Haul & Place Sand/Gravel by Truck to The Mid-Sea Dam - Variable Cost									$5.35 /Ton	F-21,22	**$5.35 /Ton**					
	Trucking Haul to the Perimeter Dike - Variable Cost									$6.91 /Ton	F-23.1,23.2	**$6.91 /Ton**					
	Total Average Concentric Haul									$12.12 /Ton	F-24.1,24.2	**$12.12 /Ton**					
	Quantities																
	Concentric Dikes	120,887,800	CY x the Conversion of	1.62	Tons/CY =	195,838,236 Tons						**$16.29 /Ton**	**$1.63 /Ton**	$17.92 /Ton	**$1.79 /Ton**	$19.71 /Ton	**$31.93 /CY**
	Subtotal - Type A Sand	120,887,800	CY x the Conversion of	1.62	Tons/CY =	195,838,236 Tons											
3	**Type B Sand /Gravel**																
	Unit Pricing																
	Produce Sand/Gravel - Fixed Costs																
	Produce Sand/Gravel - Variable Costs									$4.10 /Ton	F-16,17	**$4.10 /Ton**					
	Build Conveyor Loadout Dock System											**$0.00 /Ton**					
	Haul & Place Sand/Gravel - Barge - Fixed Setup & Acquisition Costs											**$0.00 /Ton**					
	Access for Mid-Sea, Perimeter and South Dam Barriers											**$0.00 /Ton**					
	Haul & Place Sand/Gravel by Barge to the Mid-Sea Dam - Variable Cost									$2.79 /Ton	F-18,19,20	**$2.79 /Ton**					
	Haul & Place Sand/Gravel by Truck to The Mid-Sea Dam - Variable Cost									$5.35 /Ton	F-21,22	**$5.35 /Ton**					
	Trucking Haul to the Perimeter Dike - Variable Cost									$6.91 /Ton	F-23.1,23.2	**$6.91 /Ton**					
	Total Average Concentric Haul									$12.12 /Ton	F-24.1,24.2	**$12.12 /Ton**					
	Quantities																
	Concentric Dikes	10,803,716	CY x the Conversion of	1.62	Tons/CY =	17,502,020 Tons						**$16.22 /Ton**	**$1.62 /Ton**	$17.84 /Ton	**$1.78 /Ton**	$19.63 /Ton	**$31.80 /CY**
	Subtotal - Type B S /G	10,803,716	CY x the Conversion of	1.62	Tons/CY =	17,502,020 Tons											

Final Unit Cost Roll Up by Alternative

Alternative 3B **Concentric Dikes With Stone Columns**

Item No.	Description				Fixed Cost	Quantity	Fixed Unit $		Source	Variable Unit $	Source	Direct Unit $	10.00% Indirect Unit $	Total Unit $	10.00% Profit $	Final Unit $	1.62 TN/CY Final Unit $
4	**Filter Rock (Fine and Coarse)**																
	Unit Pricing																
	Filter Rock - Unit Cost (Same as Type B Sand/Gravel)											**$4.10 /Ton**					
	Quantities																
	Concentric Dikes	-										**$16.22 /Ton**	**$1.62 /Ton**	$17.84 /Ton	**$1.78 /Ton**	$19.63 /Ton	**$31.80 /CY**
	Subtotal - Filter Rock	-	CY x the Conversion of	1.62	Tons/CY =	-	Tons										
5	**Riprap**																
	Unit Pricing																
	Produce Riprap - Fixed Cost				$4,375,763	54,519,850	Tons	$0.0803	/Ton	F-25,26,27,28		**$0.08 /Ton**					
	Produce Riprap - Variable Cost										$6.71 /Ton F-30,31,32,33	**$6.71 /Ton**					
	0% of the Riprap Quantity Placed by Barge =				-	Tons											
	Haul & Place Riprap by Barge - Fixed Cost				$2,772,870		Tons		/Ton	F-29		**$0.00 /Ton**					
	Haul & Place Riprap by Barge - Variable Cost										$5.44 /Ton F-34,35	**$5.44 /Ton**					
	Dress Riprap by Barge - Variable Cost										$0.69 /Ton F-41	**$0.69 /Ton**					
	Load Riprap for Haul by Truck - Variable Cost										$1.12 /Ton F-37	**$1.12 /Ton**					
	Haul Riprap by Truck to Mid-Sea Dam Point - Variable Cost										$6.64 /Ton F-36.1,36.2	**$6.64 /Ton**					
	Haul Riprap by Truck to Perimeter Dike - Variable Cost										$9.38 /Ton F-38.1,38.2	**$9.38 /Ton**					
	Total Average Concentric Haul										$15.79 /Ton F-39.1,39.2	**$15.79 /Ton**					
	Haul Riprap by Truck & Place Riprap from Beach by Crane - Variable Cost										$2.08 /Ton F-40	**$2.08 /Ton**					
	Quantities																
	Concentric Dikes	32,070,500	CY x the Conversion of	1.70	Tons/CY =	54,519,850	Tons					**$24.65 /Ton**	**$2.46 /Ton**	$27.11 /Ton	**$2.71 /Ton**	$29.83 /Ton	**$50.70 /CY**
	Subtotal - Riprap	32,070,500	CY x the Conversion of	1.70	Tons/CY =	54,519,850	Tons										
6	**Stone Columns**																
	Unit Pricing																
	Stone Column Support - Variable Cost										$41.75 /LF SC F-49	**$41.75 /LF SC**					
	Note: For Stone Column work, use 0% for Indirect Costs and 10% for Profit.					Indirect Costs =	0%										
	Quantities					Profit =	10%										
	Concentric Dikes	27,325,100	LF			27,325,100	LF					**$41.75 /LF SC**	**$0.00 /LF SC**	$41.75 /LF SC	**$4.17 /LF SC**	$45.92 /LF SC	**$45.92 /LF SC**
	Subtotal - Stone Columns	27,325,100	LF			27,325,100	LF										

Final Unit Cost Roll Up by Alternative

Alternative 3B **Concentric Dikes With Stone Columns**

Item No.	Description				Fixed Cost	Quantity	Fixed Unit $		Source	Variable Unit $	Source	Direct Unit $	10.00% Indirect Unit $	Total Unit $	10.00% Profit $	Final Unit $	1.62 TN/CY Final Unit $
7	**Slurry Wall (No Membrane)**																
	Unit Pricing																
	Slurry Wall	Short Depth								$5.45 /SF	F-53	**$5.45 /SF**					
	Slurry Wall	Medium Depth								$9.20 /SF	F-53	**$9.20 /SF**					
	Note: For Slurry Wall work, use 0% for Indirect Costs and 10% for Profit.					Indirect Costs = 0%											
	Quantities					Profit = 10%											
	Concentric Dikes	99,328,900	SF			99,328,900 SF						**$5.45 /SF**	**$0.00 /SF**	$5.45 /SF	**$0.55 /SF**	$6.00 /SF	**$6.00 /SF**
	Subtotal - Slurry Wall	99,328,900	SF			99,328,900 SF											
8	**Wick Drains**																
	Unit Pricing																
	Wick Drain Water Support - Fixed Costs				$1,383,981	87,642,720 LF	$0.0158	/LF WD	F-43,44			**$0.02 /LF WD**					
	Wick Drain Support - Variable Cost									$4.26 /LF WD	F-42	**$4.26 /LF WD**					
	Quantities																
	Concentric Dikes	87,642,720	LF			87,642,720 LF						**$4.28 /LF WD**	**$0.43 /LF WD**	$4.70 /LF WD	**$0.47 /LF WD**	$5.17 /LF WD	**$5.17 /LF WD**
	Subtotal - Wick Drains	87,642,720	LF			87,642,720 LF											
9	**Habitat Ponds**																
	Unit Pricing																
	Clay - Habitat Pond Embankment																
	Habitat Ponds - 500 Acre Pond									$11,135 /Acre	F-51,52						
	Filter Rock (Fine and Coarse)																
	Total Habitat Ponds Unit $									**$11,135 /Acre**		**$11,135 /Acre**					
	Quantities																
	Concentric Dikes	-	Acres	-	Acres							**$11,135 /Acre**	**$1,113 /Acre**	$12,248 /Acre	**$1,225 /Acre**	$13,473 /Acre	**$13,473 /Acre**
	Subtotal - Unit Pricing	-	Acres	-	Acres												

Notes
1. Direct Unit $ is Fixed Unit $ plus Variable Unit $
2. Indirect Unit $ is Direct Unit $ times 10%
3. Total Unit Price is Direct Unit $ plus Indirect Unit $
4. Profit is 10% of the Total Unit Price
5. Final Unit Price is Total Unit Price plus Profit
6. Final Unit Price is Carried Forward into the Cost Estimates
7. Stone Column, S-C-B Wall and Wick Drains were quoted by specialty subcontractors.
8. All the fixed costs for the Sand & Gravel production (i.e. all Type A or B material) are included with the Type A Sand productions costs.
9. The Riprap hauled by barge requires the construction of a barge loading facility. The fixed costs of the Riprap Barge loading facility are applied to one-half of the Riprap quantity.

Final Unit Cost Roll Up by Alternative

Alternative 3C **Concentric Dikes With Geotubes**
Bureau Option - This Sheet is Blank

													10.00%		10.00%		1.62 TN/CY
Item No.	Description				Fixed Cost	Quantity	Fixed Unit $		Source	Variable Unit $	Source	Direct Unit $	Indirect Unit $	Total Unit $	Profit $	Final Unit $	Final Unit $

Final Unit Cost Roll Up by Alternative

Alternative 4 **North Sea Dam/Marine Lake**

Item No.	Description				Fixed Cost	Quantity	Fixed Unit $		Source	Variable Unit $	Source	Direct Unit $	10.00% Indirect Unit $	Total Unit $	10.00% Profit $	Final Unit $	1.62 TN/CY Final Unit $
1	**Dredging**																
	Unit Pricing																
	Dredging - Variable Cost									$6.38 /CY	F 46	**$6.38 /CY**					
	Note: For dreding work, use 0% for Indirect Costs and 5% for Profit.					Indirect Costs = 0.0%											
	Quantities					Profit = 5.0%											
	North Sea Dam	41,925,400	CY			41,925,400 CY				$6.38 /CY		**$6.38 /CY**	**$0.00 /CY**	$6.38 /CY	**$0.32 /CY**	$6.70 /CY	**$6.70 /CY**
	Subtotal - Dredging	41,925,400	CY			41,925,400 CY											
2	**Type A Sand**																
	Unit Pricing																
	Produce Sand/Gravel - Fixed Costs				$10,078,430	148,668,696 Tons	$0.0678 /Ton		F-6,7,8,9			**$0.07 /Ton**					
	Produce Sand/Gravel - Variable Costs									$4.10 /Ton	F-16,17	**$4.10 /Ton**					
	Build Conveyor Loadout Dock System				$490,269	148,668,696 Tons	$0.0033 /Ton		F-12,13,14			**$0.00 /Ton**					
	Haul & Place Sand/Gravel - Barge - Fixed Setup & Acquisition Costs				$5,206,441	148,668,696 Tons	$0.0350 /Ton		F-15			**$0.04 /Ton**					
	Access for Mid-Sea, Perimeter and South Dam Barriers				$2,870,750	148,668,696 Tons	$0.0193 /Ton		F-10,11			**$0.02 /Ton**					
	Haul & Place Sand/Gravel by Barge to the Mid-Sea Dam - Variable Cost									$2.79 /Ton	F-18,19,20	**$2.79 /Ton**					
	Haul & Place Sand/Gravel by Truck to The Mid-Sea Dam - Variable Cost									$5.35 /Ton	F-21,22	**$5.35 /Ton**					
	Trucking Haul to the Perimeter Dike - Variable Cost									$6.91 /Ton	F-23.1,23.2	**$6.91 /Ton**					
	Trucking Haul to the South Sea Dam - Variable Cost									$8.08 /Ton	F-24.1,24.2	**$8.08 /Ton**					
	Quantities																
	North Sea Dam	91,770,800	CY	x the Conversion of	1.62	Tons/CY = 148,668,696 Tons						**$12.27 /Ton**	**$1.23 /Ton**	$13.50 /Ton	**$1.35 /Ton**	$14.85 /Ton	**$24.06 /CY**
	Subtotal - Type A Sand	91,770,800	CY	x the Conversion of	1.62	Tons/CY = 148,668,696 Tons											
3	**Type B Sand /Gravel**																
	Unit Pricing																
	Produce Sand/Gravel - Fixed Costs																
	Produce Sand/Gravel - Variable Costs									$4.10 /Ton	F-16,17	**$4.10 /Ton**					
	Build Conveyor Loadout Dock System											**$0.00 /Ton**					
	Haul & Place Sand/Gravel - Barge - Fixed Setup & Acquisition Costs											**$0.00 /Ton**					
	Access for Mid-Sea, Perimeter and South Dam Barriers											**$0.00 /Ton**					
	Haul & Place Sand/Gravel by Barge to the Mid-Sea Dam - Variable Cost									$2.79 /Ton	F-18,19,20	**$2.79 /Ton**					
	Haul & Place Sand/Gravel by Truck to The Mid-Sea Dam - Variable Cost									$5.35 /Ton	F-21,22	**$5.35 /Ton**					
	Trucking Haul to the Perimeter Dike - Variable Cost									$6.91 /Ton	F-23.1,23.2	**$6.91 /Ton**					
	Trucking Haul to the South Sea Dam - Variable Cost									$8.08 /Ton	F-24.1,24.2	**$8.08 /Ton**					
	Quantities																
	North Sea Dam	20,625,000	CY	x the Conversion of	1.62	Tons/CY = 33,412,500 Tons						**$12.18 /Ton**	**$1.22 /Ton**	$13.40 /Ton	**$1.34 /Ton**	$14.74 /Ton	**$23.88 /CY**
	Subtotal - Type B S /G	20,625,000	CY	x the Conversion of	1.62	Tons/CY = 33,412,500 Tons											

Final Unit Cost Roll Up by Alternative

Alternative 4 **North Sea Dam/Marine Lake**

Item No.	Description				Fixed Cost	Quantity	Fixed Unit $		Source	Variable Unit $	Source	Direct Unit $	10.00% Indirect Unit $	Total Unit $	10.00% Profit $	Final Unit $	1.62 TN/CY Final Unit $
4	**Filter Rock (Fine and Coarse)**																
	Unit Pricing																
	Filter Rock - Unit Cost (Same as Type B Sand/Gravel)											**$4.10 /Ton**					
	Quantities																
	North Sea Dam	3,138,300										**$12.18 /Ton**	**$1.22 /Ton**	$13.40 /Ton	**$1.34 /Ton**	$14.74 /Ton	**$23.88 /CY**
	Subtotal - Filter Rock	3,138,300	CY x the Conversion of	1.62	Tons/CY =	5,084,046	Tons										
5	**Riprap**																
	Unit Pricing																
	Produce Riprap - Fixed Cost				$4,375,763	19,502,230	Tons	$0.2244	/Ton	F-25,26,27,28			**$0.22 /Ton**				
	Produce Riprap - Variable Cost										$6.71 /Ton	F-30,31,32,33	**$6.71 /Ton**				
	0% of the Riprap Quantity Placed by Barge =					-	Tons										
	Haul & Place Riprap by Barge - Fixed Cost				$2,772,870	-	Tons		/Ton	F-29			**$0.00 /Ton**				
	Haul & Place Riprap by Barge - Variable Cost										$5.44 /Ton	F-34,35	**$5.44 /Ton**				
	Dress Riprap by Barge - Variable Cost										$0.69 /Ton	F-41	**$0.69 /Ton**				
	Load Riprap for Haul by Truck - Variable Cost										$1.12 /Ton	F-37	**$1.12 /Ton**				
	Haul Riprap by Truck to Mid-Sea Dam Point - Variable Cost										$6.64 /Ton	F-36.1,36.2	**$6.64 /Ton**				
	Haul Riprap by Truck to Perimeter Dike - Variable Cost										$9.38 /Ton	F-38.1,38.2	**$9.38 /Ton**				
	Variable Unit Cost of Riprap Truck Haul to the South Dam & North Dam										$10.90 /Ton	F-39.1,39.2	**$10.90 /Ton**				
	Haul Riprap by Truck & Place Riprap from Beach by Crane - Variable Cost										$2.08 /Ton	F-40	**$2.08 /Ton**				
	Quantities																
	North Sea Dam	11,471,900	CY x the Conversion of	1.70	Tons/CY =	19,502,230	Tons						**$19.90 /Ton**	**$1.99 /Ton**	$21.89 /Ton	**$2.19 /Ton**	$24.08 /Ton	**$40.94 /CY**
	Subtotal - Riprap	11,471,900	CY x the Conversion of	1.70	Tons/CY =	19,502,230	Tons										
6	**Stone Columns**																
	Unit Pricing																
	Stone Column Support - Variable Cost										$41.75 /LF SC	F-49	**$41.75 /LF SC**				
	Note: For Stone Column work, use 0% for Indirect Costs and 10% for Profit.									Indirect Costs =	0%						
	Quantities									Profit =	10%						
	North Sea Dam	15,675,000	LF			15,675,000	LF						**$41.75 /LF SC**	**$0.00 /LF SC**	$41.75 /LF SC	**$4.17 /LF SC**	$45.92 /LF SC	**$45.92 /LF SC**
	Subtotal - Stone Columns	15,675,000	LF			15,675,000	LF										

Final Unit Cost Roll Up by Alternative

Alternative 4 **North Sea Dam/Marine Lake**

Item No.	Description				Fixed Cost	Quantity	Fixed Unit $		Source	Variable Unit $	Source	Direct Unit $	10.00% Indirect Unit $	Total Unit $	10.00% Profit $	Final Unit $	1.62 TN/CY Final Unit $
7	**Slurry Wall (No Membrane)**																
	Unit Pricing																
	Slurry Wall	Short Depth								$5.45 /SF	F-53	**$5.45 /SF**					
	Slurry Wall	Medium Depth								$9.20 /SF	F-53	**$9.20 /SF**					
	Note: For Slurry Wall work, use 0% for Indirect Costs and 10% for Profit.					Indirect Costs = 0%											
	Quantities					Profit = 10%											
	North Sea Dam	13,208,800 SF				13,208,800 SF						**$5.45 /SF**	**$0.00 /SF**	$5.45 /SF	**$0.55 /SF**	$6.00 /SF	**$6.00 /SF**
	Subtotal - Slurry Wall	13,208,800 SF				13,208,800 SF											
8	**Wick Drains**																
	Unit Pricing																
	Wick Drain Water Support - Fixed Costs				$1,383,981	37,478,100 LF	$0.0369	/LF WD	F-43,44			**$0.04 /LF WD**					
	Wick Drain Support - Variable Cost									$4.26 /LF WD	F-42	**$4.26 /LF WD**					
	Quantities																
	North Sea Dam	37,478,100 LF				37,478,100 LF						**$4.30 /LF WD**	**$0.43 /LF WD**	$4.73 /LF WD	**$0.47 /LF WD**	$5.20 /LF WD	**$5.20 /LF WD**
	Subtotal - Wick Drains	37,478,100 LF				37,478,100 LF											
9	**Habitat Ponds**																
	Unit Pricing																
	Clay - Habitat Pond Embankment																
	Habitat Ponds - 500 Acre Pond									$11,135 /Acre	F-51,52						
	Filter Rock (Fine and Coarse)																
	Total Habitat Ponds Unit $									**$11,135 /Acre**		**$11,135 /Acre**					
	Quantities																
	North Sea Dam	37,200 Acres				37,200 Acres						**$11,135 /Acre**	**$1,113 /Acre**	$12,248 /Acre	**$1,225 /Acre**	$13,473 /Acre	**$13,473 /Acre**
	Subtotal - Unit Pricing	37,200 Acres				37,200 Acres											

Notes
1. Direct Unit $ is Fixed Unit $ plus Variable Unit $
2. Indirect Unit $ is Direct Unit $ times 10%
3. Total Unit Price is Direct Unit $ plus Indirect Unit $
4. Profit is 10% of the Total Unit Price
5. Final Unit Price is Total Unit Price plus Profit
6. Final Unit Price is Carried Forward into the Cost Estimates
7. Stone Column, S-C-B Wall and Wick Drains were quoted by specialty subcontractors.
8. All the fixed costs for the Sand & Gravel production (i.e. all Type A or B material) are included with the Type A Sand productions costs.
9. The Riprap hauled by barge requires the construction of a barge loading facility. The fixed costs of the Riprap Barge loading facility are applied to one-half of the Riprap quantity.

Final Unit Cost Roll Up by Alternative

Alternative 5 **Habitat Enhancement Without Marine Lake**

Item No.	Description				Fixed Cost	Quantity	Fixed Unit $		Source	Variable Unit $	Source	Direct Unit $	10.00% Indirect Unit $	Total Unit $	10.00% Profit $	Final Unit $	1.62 TN/CY Final Unit $
9	**Habitat Ponds**																
	Unit Pricing																
	Clay - Habitat Pond Embankment																
	Habitat Ponds - 500 Acre Pond									$11,135 /Acre	F-51,52						
	Filter Rock (Fine and Coarse)																
	Total Habitat Ponds Unit $									**$11,135 /Acre**		**$11,135 /Acre**					
	Quantities																
	Habitat Ponds	**42,200**	**Acres**			**42,200**	**Acres**					**$11,135 /Acre**	**$1,113 /Acre**	$12,248 /Acre	**$1,225 /Acre**	$13,473 /Acre	**$13,473 /Acre**
	Subtotal - Unit Pricing	**42,200**	**Acres**			**42,200**	**Acres**										

Notes
1. Direct Unit $ is Fixed Unit $ plus Variable Unit $
2. Indirect Unit $ is Direct Unit $ times 10%
3. Total Unit Price is Direct Unit $ plus Indirect Unit $
4. Profit is 10% of the Total Unit Price
5. Final Unit Price is Total Unit Price plus Profit
6. Final Unit Price is Carried Forward into the Cost Estimates
7. Stone Column, S-C-B Wall and Wick Drains were quoted by specialty subcontractors.
8. All the fixed costs for the Sand & Gravel production (i.e. all Type A or B material) are included with the Type A Sand productions costs.
9. The Riprap hauled by barge requires the construction of a barge loading facility. The fixed costs of the Riprap Barge loading facility are applied to one-half of the Riprap quantity.

LABOR HOURLY RATES FROM DAVIS-BACON

Item	Category	Hourly Rate Plus Fringes Base Rate	Location Adjustment	Adjusted Hourly Rate Plus Fringes Base Rate	Burden	40 - Hour Week Hourly Rate	Overtime Rate	45 - Hour Week Hourly Rate	50 - Hour Week Hourly Rate
1	Foreman	$56.30 /Hour	---	**$56.30 /Hour**	32.60%	**$74.65 /Hour**	$107.39 /Hour	**$78.29 /Hour**	**$81.20 /Hour**
2	Labor	$35.23 /Hour	---	**$35.23 /Hour**	34.70%	**$47.45 /Hour**	$68.12 /Hour	**$49.75 /Hour**	**$51.58 /Hour**
3	Operator	$50.83 /Hour	---	**$50.83 /Hour**	26.90%	**$64.50 /Hour**	$93.33 /Hour	**$67.70 /Hour**	**$70.27 /Hour**
4	Operator (Heavy)	$54.30 /Hour	---	**$54.30 /Hour**	26.90%	**$68.91 /Hour**	$99.71 /Hour	**$72.33 /Hour**	**$75.07 /Hour**
5	Operator (Oiler)	$48.30 /Hour	---	**$48.30 /Hour**	26.90%	**$61.29 /Hour**	$88.69 /Hour	**$64.33 /Hour**	**$66.77 /Hour**
6	Truck Driver	$38.71 /Hour	---	**$38.71 /Hour**	31.70%	**$50.98 /Hour**	$73.40 /Hour	**$53.47 /Hour**	**$55.46 /Hour**
7	Mechanic	$49.84 /Hour	---	**$49.84 /Hour**	26.90%	**$63.25 /Hour**	$91.52 /Hour	**$66.39 /Hour**	**$68.90 /Hour**
8	Electrician	$42.50 /Hour	---	**$42.50 /Hour**	23.10%	**$52.32 /Hour**	$76.02 /Hour	**$54.95 /Hour**	**$57.06 /Hour**
9	Iron Worker	$49.64 /Hour	---	**$49.64 /Hour**	55.90%	**$77.39 /Hour**	$109.15 /Hour	**$80.92 /Hour**	**$83.74 /Hour**
10	Blasting Tech	$37.13 /Hour	---	**$37.13 /Hour**	26.90%	**$47.12 /Hour**	$68.18 /Hour	**$49.46 /Hour**	**$51.33 /Hour**

Notes:
1. **Rates from Davis Bacon - Sept 15, 2006 for Imperial County in California.**
2. **Markups for Payroll Burden on Labor Rates are from RS MEANS, 2006**
3. **Overtime rate at 1.5 times the base hourly rate**
4. **Overtime burden percentage is reduced by 50% for the premium portion only**
5. **Foreman Rate = Operator (Heavy) + $2.00**

SUMMARY OF EQUIPMENT RATES

Description	Base Monthly Rental Rate	Base Hourly Operating Cost	Total Hourly Rate	Standby Hourly Rate
Manitowoc 4600 - Dragline			$359.67 /Hour	$143.87 /Hour
Manitowoc 4600 - Picking			$345.67 /Hour	$138.27 /Hour
Cat 966 Loader			$92.00 /Hour	$36.80 /Hour
Cat 980 Loader			$123.00 /Hour	$49.20 /Hour
Cat 988 Loader			$198.00 /Hour	$79.20 /Hour
Cat 992 Loader			$348.80 /Hour	$139.52 /Hour
Mechanic Truck			$30.04 /Hour	$12.02 /Hour
Pickup Truck - 1/2 Ton			$13.11 /Hour	$5.24 /Hour
Pickup Truck - 3/4 Ton			$16.84 /Hour	$6.74 /Hour
Truck Scales	$3,085 /Month	$9.10 /Hour	$26.63 /Hour	$10.65 /Hour
Cat 235 Hoe			$110.00 /Hour	$44.00 /Hour
Cat 345 Hoe			$134.47 /Hour	$53.79 /Hour
40 KW Generator			$23.11 /Hour	$9.24 /Hour
500 KW Generator			$130.09 /Hour	$52.04 /Hour
1135 KW Generator			$285.96 /Hour	$114.38 /Hour
300' x 48" Conveyor			$96.00 /Hour	$38.40 /Hour
60' x 48" Conveyor			$32.00 /Hour	$12.80 /Hour
Feed Tunnel System			$150.00 /Hour	$60.00 /Hour
Work Boat			$52.00 /Hour	$20.80 /Hour
Cat 14 Blade			$108.11 /Hour	$43.24 /Hour
Cat 16 Blade			$128.04 /Hour	$51.22 /Hour
Cat D6 Dozer			$92.38 /Hour	$36.95 /Hour
Cat D8 Dozer			$169.85 /Hour	$67.94 /Hour
Cat D10 Dozer			$260.53 /Hour	$104.21 /Hour
Challenger w/Can or Disc			$140.00 /Hour	$56.00 /Hour
TCM 835 Rubber Tire Dozer			$60.00 /Hour	$24.00 /Hour
Cat 426 Back Hoe			$44.97 /Hour	$17.99 /Hour
Cat 637 Scraper			$330.15 /Hour	$132.06 /Hour
25 Ton Hydraulic Crane			$82.00 /Hour	$32.80 /Hour
60 Ton Hydraulic Crane			$104.21 /Hour	$41.68 /Hour
Welder - 600 Amp	$460 /Month	$1.50 /Hour	$4.11 /Hour	$1.65 /Hour
Flat Bed Truck	$2,095 /Month	$21.55 /Hour	$33.45 /Hour	$13.38 /Hour
Chain Saw	$300 /Month	$0.30 /Hour	$2.00 /Hour	$0.80 /Hour
36x48 - Jaw	$7,980 /Month	$22.10 /Hour	$67.44 /Hour	$26.98 /Hour
42x48 - Jaw & Feeder			$155.00 /Hour	$62.00 /Hour
48" x 6' Feeder	$605 /Month	$1.20 /Hour	$4.64 /Hour	$1.86 /Hour
Apron Feeder 48" x 10'	$2,285 /Month	$4.35 /Hour	$17.33 /Hour	$6.93 /Hour
48" x 100' Conveyor	$5,800 /Month	$17.00 /Hour	$49.95 /Hour	$19.98 /Hour
Electrical Pit Box	$6,000 /Month	$8.00 /Hour	$42.09 /Hour	$16.84 /Hour
8 x 20 - 3 Deck Screen			$73.00 /Hour	$29.20 /Hour
5.5' Short Head Cone			$76.40 /Hour	$30.56 /Hour
Twin 36" Screws/Screen			$120.00 /Hour	$48.00 /Hour
60" Stacker			$40.00 /Hour	$16.00 /Hour
48" Stacker			$32.00 /Hour	$12.80 /Hour
36" Stacker			$32.00 /Hour	$12.80 /Hour

SUMMARY OF EQUIPMENT RATES

Description	Base Monthly Rental Rate	Base Hourly Operating Cost	Total Hourly Rate	Standby Hourly Rate
48" Plant Conveyor			**$12.50 /Hour**	$5.00 /Hour
36" Plant Conveyor			**$8.50 /Hour**	$3.40 /Hour
60" Tunnel Conveyor			**$18.00 /Hour**	$7.20 /Hour
48" Tunnel Conveyor			**$16.00 /Hour**	$6.40 /Hour
Job Office Trailer	$625 /Month	$1.70 /Hour	**$5.25 /Hour**	$2.10 /Hour
Small Hyd. Drill - 3.5" Holes			**$125.00 /Hour**	$50.00 /Hour
Large Hyd. Drill - 5" Holes			**$156.45 /Hour**	$62.58 /Hour
DM 45 - 6" Holes			**$277.25 /Hour**	$110.90 /Hour
Stake Truck			**$26.00 /Hour**	$10.40 /Hour
Prill Truck			**$70.50 /Hour**	$28.20 /Hour
Cat 769			**$143.87 /Hour**	$57.55 /Hour
Cat 777			**$270.41 /Hour**	$108.16 /Hour
Electrical Van			**$29.00 /Hour**	$11.60 /Hour
OS - Rock Truck - Hwy			**$95.00 /Hour**	$38.00 /Hour
OS - End Dump Truck			**$80.00 /Hour**	$32.00 /Hour
OS - Truck & Pup - 32 Ton			**$90.00 /Hour**	$36.00 /Hour
OS - Truck - Belly Dump			**$90.00 /Hour**	$36.00 /Hour
OS - Water Truck			**$75.00 /Hour**	$30.00 /Hour
River Tugs - Fuel & Main.			**$110.00 /Hour**	$44.00 /Hour
Barge - 40x90 - Main.			**$50.00 /Hour**	$20.00 /Hour
Barge - 40x60 - Main.			**$40.00 /Hour**	$16.00 /Hour
Double Drum Winch			**$47.00 /Hour**	$18.80 /Hour
SD 170 Compactor			**$72.85 /Hour**	$29.14 /Hour
Hoe Ram			**$40.00 /Hour**	$16.00 /Hour

NOTES:

1. The monthly rate is based on 176 hours per month.
2. The standby rate is based on 40% of the Full Hourly Rate
3. Base Rates are from the 2006 Blue Book as Published by Prime Media
4. Some Rates are estimated from Past Projects and Field Experience
5. Equipment Rates are assumed to have a zero salvage value at the end of the project.

Equip - 1/8/2007
Checked by Mike Pauletto & Phil Martinson

Produce Sand/Gravel - Fixed Costs

Shift Duration: 9 Hours/Day @ 5 Days/Week = 45 Hours/Week

Item & Description		Quantity	Unit Cost	Duration/Size	Equipment Total	STS Total	Labor Total	Permanent Material Total	Subcontractor Total	Subtotals
1. Move In - Mobilization of Plant										
5,000 LF x 48" Conveyor	WV	27 CWT	$5,500 /CWT	3 EA		$445,500				
992 Cat Loader	MW	2 EA	$20,000 /EA	1 EA		$40,000				
992 Cat Loader	WC	1 EA	$7,000 /EA	1 EA		$7,000				
Jaw	MW	3 EA	$20,000 /EA	1 EA		$60,000				
100 LF x 48" Conveyor	WC	15 CWT	$4,000 /CWT	1 EA		$60,000				
Electrical Panel	WC	1 EA	$4,000 /EA	1 EA		$4,000				
966 Cat Loader	WC	1 EA	$5,000 /EA	1 EA		$5,000				
Mechanic Truck	WC	3 EA	$2,500 /EA	1 EA		$7,500				
Tunnel Feed	WC	2 EA	$4,000 /EA	1 EA		$8,000				
Electrical Van	WC	1 EA	$4,000 /EA	1 EA		$4,000				
426 Cat Loader	WC	1 EA	$3,000 /EA	1 EA		$3,000				
8 x 20 Screen	WC	5 EA	$4,000 /EA	1 EA		$20,000				
Support for Screen	WC	5 EA	$4,000 /EA	1 EA		$20,000				
5.5' Short Head Cone	WC	1 EA	$5,000 /EA	1 EA		$5,000				
Wet Screen	WC	1 EA	$5,000 /EA	1 EA		$5,000				
60" Stacker	MW	4 EA	$5,000 /EA	1 EA		$20,000				
48" Stacker	MW	4 EA	$5,000 /EA	1 EA		$20,000				
30" Stacker	WC	2 EA	$4,000 /EA	1 EA		$8,000				
48" Plant Conveyor	WC	10 EA	$4,000 /EA	1 EA		$40,000				
36" Plant Conveyor	WC	2 EA	$4,000 /EA	1 EA		$8,000				
60" Tunnel Conveyor	WV	8 EA	$5,000 /EA	1 EA		$40,000				
48" Tunnel Conveyor	WV	8 EA	$5,000 /EA	1 EA		$40,000				
Miscellaneous		1 EA	$100,000 /EA	1 EA		$100,000				
Subtotal of STS Cost										**$970,000**
2. Purchase Conveyor										
Purchase Overland Conveyor		2 EA	$537,500 /EA	1 LS		$1,075,000				
Subtotal of STS Cost										**$1,075,000**

Item & Description	Quantity	Unit Cost	Duration/Size	Equipment Total	STS Total	Labor Total	Permanent Material Total	Subcontractor Total	Subtotals
3. Quarry Site Preparation									
5 Weeks @	**45 Hours per Week =**		**225 Hours**						
Pickup Truck - 1/2 Ton	1 EA	$13.11 /HR	225 Hours	$2,950					
Cat D8 Dozer	1 EA	$169.85 /HR	225 Hours	$38,216					
Cat 988 Loader	1 EA	$198.00 /HR	225 Hours	$44,550					
Cat 637 Scraper	1 EA	$330.15 /HR	225 Hours	$74,284					
Cat 16 Blade	1 EA	$128.04 /HR	225 Hours	$28,809					
Subtotal of Equipment Cost									**$188,809**
Foreman	1 EA	$78.29 /HR	225 Hours			$17,615			
Labor	2 EA	$49.75 /HR	225 Hours			$22,386			
Operator	2 EA	$67.70 /HR	225 Hours			$30,467			
Subtotal of Labor Cost									**$70,467**
4. Setup Crusher Plant									
21.5 Weeks @	**45 Hours per Week =**		**968 Hours**						
Main Plant	1 EA	$1,000,000 /EA	1 EA		$1,000,000				
Electrical	1 EA	$700,000 /EA	1 EA		$700,000				
Conveyor Bridge for Highway	1 EA	$400,000 /EA	1 EA		$400,000				
Subtotal of STS Cost									**$2,100,000**
Pickup Truck	4 EA	$10.33 /HR	968 Hours	$39,975					
Mechanic Truck	6 EA	$22.20 /HR	968 Hours	$128,897					
Cat 980	1 EA	$100.07 /HR	968 Hours	$96,815					
Cat 426 Back Hoe	1 EA	$38.13 /HR	968 Hours	$36,894					
Grove 25 Ton Crane	2 EA	$75.07 /HR	968 Hours	$145,268					
Grove 73 Ton Crane	1 EA	$212.57 /HR	968 Hours	$205,664					
Welder - 600 Amp	2 EA	$4.11 /HR	968 Hours	$7,960					
Subtotal of Equipment Cost									**$661,473**
Foreman	2 EA	$78.29 /HR	968 Hours			$151,487			
Labor	2 EA	$49.75 /HR	968 Hours			$96,260			
Operator	5 EA	$67.70 /HR	968 Hours			$327,515			
Mechanic	12 EA	$66.39 /HR	968 Hours			$770,801			
Electrician	5 EA	$54.95 /HR	968 Hours			$265,837			
Iron Worker	4 EA	$80.92 /HR	968 Hours			$313,156			
Subtotal of Labor Cost									**$1,925,055**

Item & Description	Quantity	Unit Cost	Duration/Size	Equipment Total	STS Total	Labor Total	Permanent Material Total	Subcontractor Total	Subtotals
5. Crusher Tear Down - Final Demobilization									
20 Weeks @	**45 Hours per Week =**		**900 Hours**						
Pickup Truck - 1/2 Ton	2 EA	$13.11 /HR	900 Hours	$23,598					
Mechanic Truck	3 EA	$30.04 /HR	900 Hours	$81,108					
Flat Bed Truck	1 EA	$33.45 /HR	900 Hours	$30,108					
Cat 426 Back Hoe	1 EA	$44.97 /HR	900 Hours	$40,473					
25 Ton Hydraulic Crane	1 EA	$82.00 /HR	900 Hours	$73,800					
60 Ton Hydraulic Crane	1 EA	$104.21 /HR	900 Hours	$93,789					
Subtotal of Equipment Cost									**$342,876**
Foreman	2 EA	$78.29 /HR	900 Hours			$140,918			
Labor	4 EA	$49.75 /HR	900 Hours			$179,088			
Operator	3 EA	$67.70 /HR	900 Hours			$182,799			
Mechanic	6 EA	$66.39 /HR	900 Hours			$358,512			
Electrician	4 EA	$54.95 /HR	900 Hours			$197,832			
Truck Driver	1 EA	$53.47 /HR	900 Hours			$48,124			
Subtotal of Labor Cost									**$1,107,273**
6. Permits/Engineering									
Permits	1 EA	$150,000 /EA	1 EA		$150,000				
OS Engineering	1 EA	$200,000 /EA	1 EA		$200,000				
Offsets	1 EA	$300,000 /EA	1 EA		$300,000				
Application Fees	1 EA	$50,000 /EA	1 EA		$50,000				
Subtotal of STS Cost									**$700,000**
7. Clear Pit Area									
			50 Hours						
Pickup Truck - 1/2 Ton	1 EA	$13.11 /HR	50 Hours	$656					
Cat D8 Dozer	1 EA	$169.85 /HR	50 Hours	$8,493					
Cat 980 Loader	1 EA	$123.00 /HR	50 Hours	$6,150					
OS - Water Truck	1 EA	$75.00 /HR	50 Hours	$3,750					
Chain Saw	1 EA	$2.00 /HR	50 Hours	$100					
Subtotal of Equipment Cost									**$19,148**
Foreman	1 EA	$78.29 /HR	50 Hours			$3,914			
Labor	1 EA	$49.75 /HR	50 Hours			$2,487			
Operator	3 EA	$67.70 /HR	50 Hours			$10,156			
Subtotal of Labor Cost									**$16,557**

Item & Description	Quantity	Unit Cost	Duration/Size	Equipment Total	STS Total	Labor Total	Permanent Material Total	Subcontractor Total	Subtotals
8. Overhead - Setup and Planning									
100 Weeks @	**45 Hours per Week =**		**4,500 Hours**						
Superintendent	1 EA	$100 /HR	4,500 Hours		$450,000				
Engineer	1 EA	$75 /HR	4,500 Hours		$337,500				
Job Office Trailer	1 EA	$5.25 /HR	4,500 Hours		$23,630				
									$811,130
9. Reclamation									
8 Weeks @	**40 Hours per Week =**		**320 Hours**						
Pickup Truck - 1/2 Ton	0.5 EA	$13.11 /HR	320 Hours	$2,098					
Cat D8 Dozer	1 EA	$169.85 /HR	320 Hours	$54,352					
Subtotal of Equipment Cost									**$56,450**
Foreman	0.5 EA	$78.29 /HR	320 Hours			$12,526			
Operator	1 EA	$67.70 /HR	320 Hours			$21,665			
Subtotal of Labor Cost									**$34,191**
10. Summary of Sand & Gravel - Production Costs				$1,268,756	$5,656,130	$3,153,544	$0	$0	**$10,078,430**

Total Fixed Cost of Sand & Gravel Production = $10,078,430

Notes:

1. **Conveyor units (3 @ 5,000 LF) will move Type A-B Sand & Gravel and Filter Rock from the aggregate plant to the barge/truck load out area adjacent to the Loadout Facility.**
2. **Highway legal trucks will transfer riprap from the quarry to the Loadout Facility.**

Access for Mid-Sea, Perimeter and South Dam Barriers

Shift Duration: 9 Hours/Day @ 5 Days/Week = 45 Hours/Week

Item & Description	Quantity	Unit Cost	Duration/Size	Equipment Total	STS Total	Labor Total	Permanent Material Total	Subcontractor Total	Subtotals
1. Load & Dump Pit Run	**$2.19 /Ton**								
305,000 Tons at	**22,500 Tons/Week =**		**13.6 Weeks**						
14 Weeks @	**45 Hours per Week =**		**630 Hours**						
Pickup Truck - 3/4 Ton	1 EA	$16.84 /HR	630 Hours	$10,609					
Cat 988 Loader	1 EA	$198.00 /HR	630 Hours	$124,740					
Cat D8 Dozer	1 EA	$169.85 /HR	630 Hours	$107,006					
Cat D6 Dozer	1 EA	$92.38 /HR	630 Hours	$58,199					
OS - Water Truck	1 EA	$75.00 /HR	630 Hours	$47,250					
Cat 14 Blade	1 EA	$108.11 /HR	630 Hours	$68,109					
Subtotal of Equipment Cost									**$415,913**
Foreman	1 EA	$78.29 /HR	630 Hours			$49,321			
Labor	1 EA	$49.75 /HR	630 Hours			$31,340			
Operator	4 EA	$67.70 /HR	630 Hours			$170,612			
Subtotal of Labor Cost									**$251,274**
2. Haul #1									
15 Miles (One Way Distance - Refer to Map)									
7.64 Weeks @	**45 Hours per Week =**		**344 Hours**						
OS - Truck - Belly Dump	19 EA	$90.00 /HR	344 Hours	$587,898					
Subtotal of Equipment Cost									**$587,898**
3. Haul #2									
31.5 Miles (One Way Distance - Refer to Map)									
5.9 Weeks @	**45 Hours per Week =**		**266 Hours**						
OS - Truck - Belly Dump	32 EA	$90.00 /HR	266 Hours	$764,640					
Subtotal of Equipment Cost									**$764,640**
4. Place fabric	**$2.12 /SY**								
67,900 SY at	**22,500 SY/Week =**		**3.0 Weeks**						
3 Weeks @	**45 Hours per Week =**		**135 Hours**						
Pickup Truck - 3/4 Ton	1 EA	$16.84 /HR	135 Hours	$2,273					
Work Boat	1 EA	$52.00 /HR	135 Hours	$7,020					
Flat Bed Truck	1 EA	$33.45 /HR	135 Hours	$4,516					
Cat 426 Back Hoe	1 EA	$44.97 /HR	135 Hours	$6,071					
Subtotal of Equipment Cost									**$19,881**

Item & Description	Quantity	Unit Cost	Duration/Size	Equipment Total	STS Total	Labor Total	Permanent Material Total	Subcontractor Total	Subtotals
Foreman	1 EA	$78.29 /HR	135 Hours			$10,569			
Labor	3 EA	$49.75 /HR	135 Hours			$20,147			
Operator	2 EA	$67.70 /HR	135 Hours			$18,280			
Truck Driver	1 EA	$53.47 /HR	135 Hours			$7,219			
Subtotal of Labor Cost									**$56,215**
Geo-grid Fabric	67,900 SY	$1.00 /SY	1 EA		$67,900				
Subtotal of STS Cost									**$67,900**
5. Remove Access	**$7.52 /CY**								
94,000 CY at	**11,250 CY/Week =**		**8.4 Weeks**						
9 Weeks @	**45 Hours per Week =**		**405 Hours**						
Pickup Truck - 3/4 Ton	1 EA	$16.84 /HR	405 Hours	$6,820					
Cat 345 Hoe	1 EA	$134.47 /HR	405 Hours	$54,460					
Cat D6 Dozer	1 EA	$92.38 /HR	405 Hours	$37,414					
Cat D8 Dozer	1 EA	$169.85 /HR	405 Hours	$68,789					
Cat 14 Blade	1 EA	$108.11 /HR	405 Hours	$43,785					
OS - Water Truck	1 EA	$75.00 /HR	405 Hours	$30,375					
OS - End Dump Truck	10 EA	$80.00 /HR	405 Hours	$324,000					
Subtotal of Equipment Cost									**$565,643**
Foreman	1 EA	$78.29 /HR	405 Hours			$31,707			
Operator	4 EA	$67.70 /HR	405 Hours			$109,679			
Subtotal of Labor Cost									**$141,386**
6. Summary of Access Removal Costs				$2,353,975	$67,900	$448,875	$0	$0	**$2,870,750**

Total Fixed Cost of Removing Access = $2,870,750

Notes:

1. **Quantities for Item 1, 4 and 5 assume construction of a one-half mile temporary access road to the nearest point of the Mid-Sea Dam, the Perimeter Dike and the South Dam Barrier.**
2. **The temporary access road will be removed at the end of the project.**

Build Conveyor Loadout Dock System

Shift Duration: 9 Hours/Day @ 5 Days/Week = 45 Hours/Week

Item & Description	Quantity	Unit Cost	Duration	Equipment Total	STS Total	Labor Total	Permanent Material Total	Subcontractor Total	Subtotals
1. Dredge/Lay Fabric			**18 Hours**						
Dredge	7,200 CY	$6.00 /CY	1 EA					$43,200	
Subtotal of Subcontractor Cost									**$43,200**
Filter Fabric	2,200 SY	$1.06 /SY	1 EA		$2,332				
Subtotal of STS Cost									**$2,332**
Pickup Truck - 1/2 Ton	1 EA	$13.11 /HR	18 Hours	$236					
Work Boat	1 EA	$52.00 /HR	18 Hours	$936					
Subtotal of Equipment Cost									**$1,172**
Foreman	1 EA	$78.29 /HR	18 Hours			$1,409			
Labor	4 EA	$49.75 /HR	18 Hours			$3,582			
Operator	1 EA	$67.70 /HR	18 Hours			$1,219			
Subtotal of Labor Cost									**$6,210**
2. Backfill with Gravel		**14,300 CY**	**64 Hours**						
Pickup Truck - 1/2 Ton	1 EA	$13.11 /HR	64 Hours	$839					
Cat 980 Loader	1 EA	$123.00 /HR	64 Hours	$7,872					
OS - End Dump Truck	5 EA	$80.00 /HR	64 Hours	$25,600					
Cat D6 Dozer	1 EA	$92.38 /HR	64 Hours	$5,912					
Subtotal of Equipment Cost									**$40,223**
Foreman	1 EA	$78.29 /HR	64 Hours			$5,010			
Labor	3 EA	$49.75 /HR	64 Hours			$9,551			
Subtotal of Labor Cost									**$14,562**

Item & Description	Quantity	Unit Cost	Duration	Equipment Total	STS Total	Labor Total	Permanent Material Total	Subcontractor Total	Subtotals
3. Install Bulkheads			**90 Hours**						
Purchase Bulkheads	14 EA	$2,000.00 /EA	1 EA		$28,000				
Subtotal of STS Cost									**$28,000**
Pickup Truck - 1/2 Ton	1 EA	$13.11 /HR	90 Hours	$1,180					
Manitowoc 4600 - Dragline	1 EA	$359.67 /HR	90 Hours	$32,370					
Cat 980 Loader	1 EA	$123.00 /HR	90 Hours	$11,070					
Mechanic Truck	1 EA	$30.04 /HR	90 Hours	$2,704					
Subtotal of Equipment Cost									**$47,324**
Foreman	1 EA	$78.29 /HR	90 Hours			$7,046			
Operator (Heavy)	2 EA	$72.33 /HR	90 Hours			$13,020			
Operator (Oiler)	1 EA	$64.33 /HR	90 Hours			$5,790			
Mechanic	1 EA	$66.39 /HR	90 Hours			$5,975			
Subtotal of Labor Cost									**$31,831**
4. Install Conveyor System			**90 Hours**						
Pickup Truck - 1/2 Ton	1 EA	$13.11 /HR	90 Hours	$1,180					
60 Ton Hydraulic Crane	1 EA	$104.21 /HR	90 Hours	$9,379					
Mechanic Truck	1 EA	$30.04 /HR	90 Hours	$2,704					
Cat 980 Loader	1 EA	$123.00 /HR	90 Hours	$11,070					
Subtotal of Equipment Cost									**$24,332**
Foreman	1 EA	$78.29 /HR	90 Hours			$7,046			
Labor	2 EA	$49.75 /HR	90 Hours			$8,954			
Operator	2 EA	$67.70 /HR	90 Hours			$12,187			
Mechanic	2 EA	$66.39 /HR	90 Hours			$11,950			
Electrician	1 EA	$54.95 /HR	90 Hours			$4,946			
Subtotal of Labor Cost									**$45,083**

Item & Description	Quantity	Unit Cost	Duration	Equipment Total	STS Total	Labor Total	Permanent Material Total	Subcontractor Total	Subtotals
5. Install Piling									
Drive Piling	1 LS	$100,000 LS	1 EA					$100,000	
Subtotal of Subcontractor Cost									**$100,000**
6. Install Fleeting Gear									
Install Fleeting Gear	1 LS	$50,000 LS	1 EA					$50,000	
Subtotal of Subcontractor Cost									**$50,000**
7. Install Fleeting Gear									
Mobilization	1 LS	$56,000 LS	1 EA		$56,000				
Subtotal of STS Cost									**$56,000**
8. Summary of Build Conveyor Loadout Dock System				$113,052	$86,332	$97,685	$0	$193,200	**$490,269**

Total Fixed Cost of Building the Gravel Loadout System = $490,269

Haul & Place Sand/Gravel - Barge - Fixed Setup & Acquisition Costs

Shift Duration: 9 Hours/Day @ 5 Days/Week = 45 Hours/Week

Item & Description	Quantity	Unit Cost	Duration	Equipment Total	STS Total	Labor Total	Permanent Material Total	Subcontractor Total	Subtotals
1. Barge & Tug Equipment Acquisition									
Tugs	7 EA	$200,000 /EA	1 LS	$1,400,000					
Barge - Bottom Dump	14 EA	$120,000 /EA	1 LS	$1,680,000					
Bottom Dumps - 150 Ton	14 EA	$80,000 /EA	1 LS	$1,120,000					
Permit Tugs	7 EA	$50,000 /EA	1 LS	$350,000					
Subtotal of Equipment Cost									**$4,550,000**
2. Assemble Bottom Dump Barges									
14 Weeks @	**45 Hours per Week =**		**630 Hours**						
Pickup Truck - 1/2 Ton	1 EA	$13.11 /HR	630 Hours	$8,259					
Mechanic Truck	1 EA	$26.63 /HR	630 Hours	$16,776					
Manitowoc 4600 - Dragline	1 EA	$359.67 /HR	630 Hours	$226,592					
Cat 980 Loader	1 EA	$123.00 /HR	630 Hours	$77,490					
Subtotal of Equipment Cost									**$329,117**
Foreman	1 EA	$78.29 /HR	630 Hours			$49,321			
Labor	2 EA	$49.75 /HR	630 Hours			$62,681			
Operator (Heavy)	2 EA	$72.33 /HR	630 Hours			$91,139			
Operator (Oiler)	1 EA	$64.33 /HR	630 Hours			$40,531			
Mechanic	2 EA	$66.39 /HR	630 Hours			$83,653			
Subtotal of Labor Cost									**$327,324**
3. Summary of Fixed Costs for Sand & Gravel - Haul & Placing by Barge				$4,879,117	$0	$327,324	$0	$0	**$5,206,441**

Fixed Cost of Haul & Placing Sand & Gravel by Barge = $5,206,441

Produce Sand/Gravel - Variable Costs

Shift Duration: 9 Hours/Day @ 5 Days/Week = 45 Hours/Week

Quantity: 2,416,267 Ton Barge Haul — 45 Hours/Week
2,416,267 Ton Truck Haul — 45 Hours/Week
4,832,533 Ton Total Sand/Gravel Haul & Placement ÷ Daily Production =
2,416 Hours of Production ÷ Hours per Day =
268.5 Days of Production ÷ Days per Week =
53.7 Weeks of Production
55.0 Assumed Weeks of Production

Production: **2,000 Tons/Hour - Sand/Gravel Plant** — 45 Hours/Week
1,000 Tons/Hour - Placing Sand/Gravel — 90 Hours/Week

Item & Description	Quantity	Unit Cost	Duration/Size	Equipment Total	STS Total	Labor Total	Permanent Material Total	Subcontractor Total	Subtotals
1. Sand & Gravel Production Costs - Variable Crushing Cost									
55 Weeks @	**45 Hours per Week =**		**2,475 Hours**						
Royalty Cost	4,832,533 Tons	$1.00 /EA	1 EA		$4,832,533				
Subtotal of STS Cost									**$4,832,533**
42x48 - Jaw & Feeder	3 EA	$155.00 /HR	2,475 Hours	$1,150,875					
Cat 992 Loader	3 EA	$348.80 /HR	2,475 Hours	$2,589,840					
48" x 100' Conveyor	15 EA	$49.95 /HR	2,475 Hours	$1,854,563					
Electrical Pit Box	3 EA	$15.00 /HR	2,475 Hours	$111,375					
Cat 966 Loader	1 EA	$92.00 /HR	2,475 Hours	$227,700					
Pickup Truck - 1/2 Ton	2 EA	$13.11 /HR	2,475 Hours	$64,895					
Mechanic Truck	1 EA	$30.04 /HR	2,475 Hours	$74,349					
5,000' Conveyor - Repairs Only	2 EA	$79.30 /HR	2,475 Hours	$392,535					
Mechanic Truck	1 EA	$30.04 /HR	2,475 Hours	$74,349					
Tunnels - Reclaim	4 EA	$50.00 /HR	2,475 Hours	$495,000					
8 x 20 - 3 Deck Screen	5 EA	$73.00 /HR	2,475 Hours	$903,375					
5.5' Short Head Cone	1 EA	$76.40 /HR	2,475 Hours	$189,090					
Twin 36" Screws/Screen	1 EA	$120.00 /HR	2,475 Hours	$297,000					
60" Stacker	2 EA	$40.00 /HR	2,475 Hours	$198,000					
48" Stacker	2 EA	$32.00 /HR	2,475 Hours	$158,400					
36" Stacker	2 EA	$32.00 /HR	2,475 Hours	$158,400					
48" Plant Conveyor	10 EA	$12.50 /HR	2,475 Hours	$309,375					
36" Plant Conveyor	4 EA	$8.50 /HR	2,475 Hours	$84,150					
60" Tunnel Conveyor	2 EA	$18.00 /HR	2,475 Hours	$89,100					
48" Tunnel Conveyor	2 EA	$16.00 /HR	2,475 Hours	$79,200					
1135 KW Generator	3 EA	$285.96 /HR	2,475 Hours	$2,123,253					
40 KW Generator	1 EA	$23.11 /HR	2,475 Hours	$57,197					
Electrical Van	1 EA	$29.00 /HR	2,475 Hours	$71,775					
Cat 426 Back Hoe	1 EA	$44.97 /HR	2,475 Hours	$111,301					
Pickup Truck - 1/2 Ton - Superintende	1 EA	$13.11 /HR	2,475 Hours	$32,447					
Job Office Trailer	1 EA	$5.25 /HR	2,475 Hours	$12,997					
Subtotal of Equipment Cost									**$11,910,540**

Item & Description	Quantity	Unit Cost	Duration/Size	Equipment Total	STS Total	Labor Total	Permanent Material Total	Subcontractor Total	Subtotals
Foreman	2 EA	$78.29 /HR	2,475 Hours			$387,525			
Labor	2 EA	$49.75 /HR	2,475 Hours			$246,246			
Operator	9 EA	$67.70 /HR	2,475 Hours			$1,508,092			
Operator (Oiler)	4 EA	$64.33 /HR	2,475 Hours			$636,911			
Electrician	1 EA	$54.95 /HR	2,475 Hours			$136,010			
Mechanic	1 EA	$66.39 /HR	2,475 Hours			$164,318			
Subtotal of Labor Cost									**$3,079,101**
2. Summary of Sand & Gravel - Production Costs				$11,910,540	$4,832,533	$3,079,101	$0	$0	**$19,822,174**

4,832,533 Tons of Sand & Gravel Produced

Variable - Unit Cost of Sand & Gravel Production = $4.10 /Ton

Conversion from Cubic Yards to Tons = 1.62 Tons/CY - Includes allowance for swell from pit to barge or truck

Variable - Unit Cost of Sand & Gravel Production = $6.64 /CY

Haul & Place Sand/Gravel by Barge to the Mid-Sea Dam - Variable Cost

Shift Duration:	9 Hours/Day @	5 Days/Week =		45 Hours/Week
Quantity:	**2,416,267**	**Ton**	**Barge Haul & Place Sand/Gravel**	45 Hours/Week
Production:	**2,000**	**Tons/Hour - Sand/Gravel Plant**		45 Hours/Week
	1,000	**Tons/Hour - Placing Sand/Gravel**		90 Hours/Week

Barge Haul - Cycle Time:	Load	10 Minutes		11 Foot Deep Flexifloat
	Startup	2 Minutes		3 Foot Freeboard
	Travel	40 Minutes		90 Tons per 40' x 10' Section
	Dump	2 Minutes		2 Sections + Rake per Barge
	Return (empty):	35 Minutes		180 Ton Capacity
	Dock	2 Minutes		(25) Tons Less for Belly Dump & Frame
	Wait:	5 Minutes		20 Tons Added for Rake Capacity
	Total barge Cycle Time:	**96 Minutes**	**10 Mile Haul**	175 Ton Capacity for each Barge
	One Way Distance for Mid Sea Dam Route 3 to 5 - Refer to Map			1 Barge = "1 Unit"
Barge Placing Production:	9	Hour Shift @		2 Barges or "Units" per Tug
	54	Work Minute/Hour =		
	486	Minutes per shift ÷ Cycle Time =	**Average Haul Speed =**	**4.80 Minutes/Mile**
	5.06	Cycles per Shift		**12.5 Miles per Hour**
	5	Cycles per shift used for this estimate		
	150	Tons per cycle x Cycles per Shift =		
	750	Tons Per shift per "Unit" of 1 Barge ÷ Hours per Shift =		
	83.33	**Tons per Hour per "Unit" of 1 Barge x Number of Barges =**		
	1,000	**Total Tons of Sand & Gravel Placed per Hour**		
	2	Shifts per Day x Hours per Shift =		
	18	Hours per Day		
	6	Units of Sand per Double Shift		
	6	Units of Gravel per Double Shift		
	12	Total Units of Sand & Gravel per Double Shift x Tons per Hour per Unit x Hours per Day =		
	18,000	**Tons of Sand & Gravel Placed per Day**		
	2,416,267	**Tons of Barge Haul ÷ Tons of Sand & Gravel Placed per Day =**		
	134.24	**Days to place Sand & Gravel ÷ Work Days per Week =**		
	26.85	**Weeks**		

Item & Description	Quantity	Unit Cost	Duration	Equipment Total	STS Total	Labor Total	Permanent Material Total	Subcontractor Total	Subtotals
1. Barge Loading Facility (Facility Capacity = 1,000 Tons/Hour)									
27 Weeks @	**90 Hours per Week =**		**2,430 Hours**						
Pickup Truck - 1/2 Ton	1 EA	$13.11 /HR	2,430 Hours	$31,857					
Feed Tunnel System	2 EA	$150.00 /HR	2,430 Hours	$729,000					
500 KW Generator	1 EA	$130.09 /HR	2,430 Hours	$316,119					
300' x 48" Conveyor	2 EA	$96.00 /HR	2,430 Hours	$466,560					
60' x 48" Conveyor	2 EA	$32.00 /HR	2,430 Hours	$155,520					
Subtotal of Equipment Cost									**$1,699,056**
Foreman	1 EA	$78.29 /HR	2,430 Hours			$190,239			
Operator	1 EA	$67.70 /HR	2,430 Hours			$164,519			
Operator (Oiler)	1 EA	$64.33 /HR	2,430 Hours			$156,333			
Subtotal of Labor Cost									**$511,091**
2. Barge Haul to Embankment - Operation & Crew Only (Equipment Separate)									
27 Weeks @	**90 Hours per Week**		**2,430 Hours**						
River Tugs - Low Draft	6 EA	$45.00 /HR	2,430 Hours	$656,100					
Belly Dump Barge	12 EA	$1.00 /HR	2,430 Hours	$29,160					
Work Boat	2 EA	$52.00 /HR	2,430 Hours	$252,720					
Subtotal of Equipment Cost									**$937,980**
Operator (Heavy)	18 EA	$67.70 /HR	2,430 Hours			$2,961,344			
Subtotal of Labor Cost									**$2,961,344**
3. Dress Embankment									
27 Weeks @	**45 Hours per Week =**		**1,215 Hours**						
Pickup Truck - 1/2 Ton	1 EA	$13.11 /HR	1,215 Hours	$15,929					
Cat 345 Hoe	1 EA	$134.47 /HR	1,215 Hours	$163,381					
Double Drum Winch	2 EA	$47.00 /HR	1,215 Hours	$114,210					
Work Boat	1 EA	$52.00 /HR	1,215 Hours	$63,180					
River Tugs - Fuel & Main.	0.10 EA	$110.00 /HR	1,215 Hours	$13,365					
Subtotal of Equipment Cost									**$370,065**
Foreman	1 EA	$78.29 /HR	1,215 Hours			$95,120			
Operator (Heavy)	1 EA	$72.33 /HR	1,215 Hours			$87,884			
Operator (Oiler)	1 EA	$64.33 /HR	1,215 Hours			$78,166			
Subtotal of Labor Cost									**$261,170**

Item & Description	Quantity	Unit Cost	Duration	Equipment Total	STS Total	Labor Total	Permanent Material Total	Subcontractor Total	Subtotals
4. Summary of Sand & Gravel - Haul & Placing				$3,007,101	$0	$3,733,605	$0	$0	**$6,740,705**
2,416,267	Tons	Barge Haul & Place Sand/Gravel							

Unit Cost of Haul & Placing Sand & Gravel by Barge = $2.79 /Ton

Conversion from Cubic Yards to Tons = 1.62 Tons/CY - Includes allowance for swell from pit to barge or truck

Unit Cost of Haul & Placing Sand & Gravel by Barge = $4.52 /CY

Haul & Place Sand/Gravel by Truck to The Mid-Sea Dam - Variable Cost

Shift Duration:	9 Hours/Day @	5 Days/Week =		45 Hours/Week
Quantity:	**2,416,267**	**Ton Truck Haul & Place Sand/Gravel**		45 Hours/Week
Production:	**2,000**	**Tons/Hour - Sand/Gravel Plant**		45 Hours/Week
	1,000	**Tons/Hour - Placing Sand/Gravel**		90 Hours/Week

Truck Haul - Cycle Time:	Load	2 Minutes	32 Tons (Truck & Pup)	
	Scales	0.5 Minutes	**40 Number of Trucks Used**	
	Travel	32.5 Minutes		
	Dump	0.5 Minutes	**Reduced Tonnage for this haul - slightly restricted**	
	Return (empty):	32.5 Minutes	30 Tons (Truck & Pup)	
	Wait:	1 Minutes		
Total truck Cycle Time:		**69 Minutes**	**19 Mile Haul**	**Average Haul Speed =** **1.82 Minutes/Mile**
	One Way Distance for Mid Sea Dam Route 3 to 5 - Refer to Map			**33.0 Miles per Hour**

Requirements for Truck Haul Production:	9	Hour Shift @
	54	Work Minute/Hour =
	486	Minutes per shift ÷ Cycle Time =
	7.04	Cycles per Shift
	30	Tons per cycle x Cycles per Shift =
	211	Tons Per shift per "Unit" of 1 Truck & Pup ÷ Hours per Shift =
	23.48	**Tons per Hour per "Unit" of 1 Truck & Pup x Number of Trucks =**
	939	**Total Tons of Sand & Gravel Placed per Hour**
	2	Shifts per Day x Hours per Shift =
	18	Hours per Day
	40	Total Units of Sand & Gravel per Double Shift x Tons per Hour per Unit x Hours per Day =
	16,904	**Tons of Sand & Gravel Placed per Day**
	2,416,267	**Tons of Truck Haul ÷ Tons of Sand & Gravel Placed per Day =**
	142.94	**Days to place Sand & Gravel ÷ Work Days per Week =**
	28.59	**Weeks**

Item & Description	Quantity	Unit Cost	Duration	Equipment Total	STS Total	Labor Total	Permanent Material Total	Subcontractor Total	Subtotals
1. Truck Loading Facility (Facility Capacity = 1,000 Tons/Hour)									
29 Weeks @	**90 Hours per Week =**		**2,610 Hours**						
Pickup Truck - 1/2 Ton	1 EA	$13.11 /HR	2,610 Hours	$34,217					
Cat 988 Loader	2 EA	$198.00 /HR	2,610 Hours	$1,033,560					
Subtotal of Equipment Cost									**$1,067,777**
Foreman	1 EA	$78.29 /HR	2,610 Hours			$204,331			
Operator	2 EA	$67.70 /HR	2,610 Hours			$353,411			
Subtotal of Labor Cost									**$557,743**
2. Truck Haul									
29 Weeks @	**90 Hours per Week**		**2,610 Hours**						
OS - Truck & Pup - 32 Ton	40 EA	$90.00 /HR	2,610 Hours	$9,396,000					
Pickup Truck - 1/2 Ton	1 EA	$13.11 /HR	2,610 Hours	$34,217					
OS - Water Truck	1 EA	$75.00 /HR	2,610 Hours	$195,750					
Cat 14 Blade	1 EA	$108.11 /HR	2,610 Hours	$282,167					
Cat D6 Dozer	1 EA	$92.38 /HR	2,610 Hours	$241,112					
TCM 835 Rubber Tire Dozer	1 EA	$60.00 /HR	2,610 Hours	$156,600					
Subtotal of Equipment Cost									**$10,305,846**
Foreman	1 EA	$78.29 /HR	2,610 Hours			$204,331			
Labor	1 EA	$49.75 /HR	2,610 Hours			$129,839			
Operator	3 EA	$67.70 /HR	2,610 Hours			$530,117			
Truck Driver	1 EA	$53.47 /HR	2,610 Hours			$139,560			
Subtotal of Labor Cost									**$1,003,847**
3. Summary of Variable Unit Cost for the Truck Haul to the Mid-Sea Barrier				$11,373,623	$0	$1,561,589	$0	$0	**$12,935,212**

2,416,267 Total Tons of Sand/Gravel Hauled to the Mid-Sea Barrier

Variable Unit Cost of the Mid-Sea Barrier Truck Haul = $5.35 /Ton

Conversion from Cubic Yards to Tons = 1.62 Tons/CY - Includes allowance for swell from pit to barge or truck

Variable Unit Cost of the Mid-Sea Barrier Truck Haul = $8.67 /CY **19 Mile Haul**

Trucking Haul to the Perimeter Dike - Variable Cost

Shift Duration:	9 Hours/Day @	5 Days/Week =	45 Hours/Week
	2 Shifts/Day @	5 Days/Week =	90 Hours/Week
Material:	Sand & Gravel		
Quantity:	1,000 Tons/Hour x	90 Hours/Week	
	90,000 Tons/Week		

Truck Haul - Cycle Time:	Load	2 Minutes		32 Tons (Truck & Pup)	
	Scales	0.5 Minutes			
	Travel	47.8 Minutes			
	Dump	2 Minutes			
	Return (empty):	47.8 Minutes			
	Wait:	1 Minutes			
	Total truck Cycle Time:	**101 Minutes**	**25.6 Mile Haul**	**Average Haul Speed =**	**1.97 Minutes/Mile**
	One Way Distance for Perimeter Dike Route 3 to 10 - Refer to Map				**30.4 Miles per Hour**

Requirements for Truck Haul Production:	9	Hour Shift @
	54	Work Minute/Hour =
	486	Minutes per shift ÷ Cycle Time =
	4.81	Cycles per Shift
	32	Tons per cycle x Cycles per Shift =
	154	Tons Per shift per "Unit" of 1 Truck & Pup ÷ Hours per Shift =
	17.09	**Tons per Hour per "Unit" of 1 Truck & Pup**
	1,000	Tons per Hour ÷ Tons per Hour per "Unit" of 1 Truck & Pup =
	58.5	**Number of Trucks Required**
	59	**Number of Trucks Used**

Item & Description	Quantity	Unit Cost	Duration/Size	Equipment Total	STS Total	Labor Total	Permanent Material Total	Subcontractor Total	Subtotals
1. Load Trucks									
1 Weeks @	**90**	**Hours per Week =**	**90 Hours**						
Pickup Truck - 3/4 Ton	1 EA	$110.00 /HR	90 Hours	$9,900					
Cat 988 Loader	2 EA	$198.00 /HR	90 Hours	$35,640					
Subtotal of Equipment Cost									**$45,540**
Foreman	1 EA	$78.29 /HR	90 Hours			$7,046			
Operator	2 EA	$67.70 /HR	90 Hours			$12,187			
Subtotal of Labor Cost									**$19,233**
2. Truck Haul									
1 Weeks @	**90**	**Hours per Week =**	**90 Hours**						
Pickup Truck - 1/2 Ton	1 EA	$13.11 /HR	90 Hours	$1,180					
OS - Truck & Pup - 32 Ton	59 EA	$90.00 /HR	90 Hours	$477,900					
OS - Water Truck	2 EA	$75.00 /HR	90 Hours	$13,500					
Cat 14 Blade	2 EA	$108.11 /HR	90 Hours	$19,460					
Cat D6 Dozer	1 EA	$92.38 /HR	90 Hours	$8,314					
TCM 835 Rubber Tire Dozer	1 EA	$60.00 /HR	90 Hours	$5,400					
Subtotal of Equipment Cost									**$525,754**
Foreman	1 EA	$78.29 /HR	90 Hours			$7,046			
Operator	4 EA	$67.70 /HR	90 Hours			$24,373			
Subtotal of Labor Cost									**$31,419**
3. Summary of Variable Unit Cost for the Truck Haul to the Perimeter Dike				$571,294	$0	$50,652	$0	$0	**$621,946**

Total Truck Haul Tons of Sand & Gravel per Week = 90,000 Tons/Week

Variable Unit Cost of the Perimeter Dike Truck Haul = $6.91 /Ton of Sand & Gravel

Conversion from Cubic Yards to Tons = 1.62 Tons/CY - Includes allowance for swell from pit to barge or truck

Variable Unit Cost of the Perimeter Dike Truck Haul = $11.20 /CY **25.6 Mile Haul**

Trucking Haul to the South Sea Dam - Variable Cost

Shift Duration: 9 Hours/Day @ 5 Days/Week = 45 Hours/Week
2 Shifts/Day @ 5 Days/Week = 90 Hours/Week

Material: Sand & Gravel

Quantity: 1,000 Tons/Hour x 90 Hours/Week
90,000 Tons/Week

A. South Sea Dam — **Truck Haul - Cycle Time:** — **South Sea Dam Route 3 to 11** — 32 Tons (Truck & Pup)

Load	2 Minutes	
Scales	0.5 Minutes	
Travel	59.1 Minutes	
Dump	2 Minutes	
Return (empty):	59.1 Minutes	
Wait:	1 Minutes	
South Sea Dam Total truck Cycle Time:	**124 Minutes**	**41.2 Mile Haul**

Average Haul Speed = **1.50 Minutes/Mile** / **40.0 Miles per Hour**

One Way Distance for South Sea Dam Route 3 to 11 - Refer to Map

B. North Sea Dam - Long Haul — **Cycle Time:** — **North Sea Dam - Long Route 3 to 9 to 12** — **1/2 North Sea Dam Quantity on This Route** — 32

Load	2 Minutes	
Scales	0.5 Minutes	
Travel	86 Minutes	
Dump	2 Minutes	
Return (empty):	86 Minutes	
Wait:	1 Minutes	
North Sea Dam Long Haul Total truck Cycle Time:	**178 Minutes**	**47 Mile Haul**

Average Haul Speed = **1.89 Minutes/Mile** / **31.8 Miles per Hour**

One Way Distance for North Sea Dam Long Route 3 to 9 to 12 - Refer to Map

C. North Sea Dam - Short Haul — **Cycle Time:** — **North Sea Dam - Short Route 3 to 8 to 12** — **1/2 North Sea Dam Quantity on This Route** — 32

Load	2 Minutes	
Scales	0.5 Minutes	
Travel	32 Minutes	
Dump	2 Minutes	
Return (empty):	32 Minutes	
Wait:	1 Minutes	
North Sea Dam Short Haul Total truck Cycle Time:	**69.5 Minutes**	**21 Mile Haul**

Average Haul Speed = **1.65 Minutes/Mile** / **36.3 Miles per Hour**

One Way Distance for North Sea Dam Short Route 3 to 8 to 12 - Refer to Map

D. Summary

South Sea Dam Total truck Cycle Time:	**124 Minutes**
North Sea Dam Long Haul Total truck Cycle Time:	**178 Minutes**
North Sea Dam Short Haul Total truck Cycle Time:	**69.5 Minutes**
Average North Sea Dam Haul Total truck Cycle Time:	**124 Minutes**

Requirements for Truck Haul Production:

9	Hour Shift @
54	Work Minute/Hour =
486	Minutes per shift ÷ Cycle Time =
3.93	Cycles per Shift
32	Tons per cycle x Cycles per Shift =
126	Tons Per shift per "Unit" of 1 Truck & Pup ÷ Hours per Shift =
13.97	**Tons per Hour per "Unit" of 1 Truck & Pup**
1,000	Tons per Hour ÷ Tons per Hour per "Unit" of 1 Truck & Pup =
71.6	**Number of Trucks Required**
72	**Number of Trucks Used**

Item & Description	Quantity	Unit Cost	Duration/Size	Equipment Total	STS Total	Labor Total	Permanent Material Total	Subcontractor Total	Subtotals
1. Load Trucks									
1 Weeks @	90 Hours per Week =		90 Hours						
Pickup Truck - 3/4 Ton	1 EA	$110.00 /HR	90 Hours	$9,900					
Cat 988 Loader	2 EA	$198.00 /HR	90 Hours	$35,640					
Subtotal of Equipment Cost									**$45,540**
Foreman	1 EA	$78.29 /HR	90 Hours			$7,046			
Operator	2 EA	$67.70 /HR	90 Hours			$12,187			
Subtotal of Labor Cost									**$19,233**
2. Truck Haul									
1 Weeks @	90 Hours per Week =		90 Hours						
Pickup Truck - 1/2 Ton	1 EA	$13.11 /HR	90 Hours	$1,180					
OS - Truck & Pup - 32 Ton	72 EA	$90.00 /HR	90 Hours	$583,200					
OS - Water Truck	2 EA	$75.00 /HR	90 Hours	$13,500					
Cat 14 Blade	2 EA	$108.11 /HR	90 Hours	$19,460					
Cat D6 Dozer	1 EA	$92.38 /HR	90 Hours	$8,314					
TCM 835 Rubber Tire Dozer	1 EA	$60.00 /HR	90 Hours	$5,400					
Subtotal of Equipment Cost									**$631,054**
Foreman	1 EA	$78.29 /HR	90 Hours			$7,046			
Operator	4 EA	$67.70 /HR	90 Hours			$24,373			
Subtotal of Labor Cost									**$31,419**
3. Summary of Variable Unit Cost for the Truck Haul to the South Dam				$676,594	$0	$50,652	$0	$0	**$727,246**

Total Truck Haul Tons of Sand & Gravel per Week = 90,000 Tons/Week

Variable Unit Cost of the South Dam Truck Haul = $8.08 /Ton of Sand & Gravel

Conversion from Cubic Yards to Tons = 1.62 Tons/CY - Includes allowance for swell from pit to barge or truck

Variable Unit Cost of the South Dam Truck Haul = $13.09 /CY **41.2 Mile Haul**

Haul Sand & Gravel by Truck to the Concentric Dikes - Variable Cost

Variable Unit Cost of the South Dam Truck Haul = $8.08 /Ton of Sand & Gravel

Added Haul to The NE Side Sea Location = $8.08 /Ton of Sand & Gravel (Repeated Unit Cost)

Total Concentric Haul to The NE Side Sea Location = $16.16 /Ton of Sand & Gravel

Average Variable Unit Cost - Haul Sand & Gravel by Truck to the South Dam, North Dam & Concentric Dikes - Variable Cost

Allow for 1/2 of The Quantity for the North & South Dam @ $4.04 /Ton of Sand & Gravel

Allow for 1/2 of The Quantity for the Concentric Dam @ $8.08 /Ton of Sand & Gravel

Total Average Concentric Haul = $12.12 /Ton of Sand & Gravel

Produce Riprap - Fixed Cost

Shift Duration: 9 Hours/Day @ 5 Days/Week = 45 Hours/Week

Item & Description		Quantity	Unit Cost	Duration/Size	Equipment Total	STS Total	Labor Total	Permanent Material Total	Subcontractor Total	Subtotals
1. Move In - Mobilization of Plant										
Cat 235	WC	1 EA	$4,000 /EA	1 EA		$4,000				
Cat D8	WC	1 EA	$4,000 /EA	1 EA		$4,000				
Large Hyd Drill	WC	1 EA	$4,000 /EA	1 EA		$4,000				
DM 45	WC	3 EA	$6,000 /EA	1 EA		$18,000				
992 Loader	MW	1 EA	$20,000 /EA	1 EA		$20,000				
Cat 777	MW	4 EA	$12,000 /EA	1 EA		$48,000				
Grizzly	MW	1 EA	$8,000 /EA	1 EA		$8,000				
48" Conveyor	WC	2 EA	$2,000 /EA	1 EA		$4,000				
36" Conveyor	WC	2 EA	$2,000 /EA	1 EA		$4,000				
Screen	WC	1 EA	$4,000 /EA	1 EA		$4,000				
500 KW Generator	WC	1 EA	$4,000 /EA	1 EA		$4,000				
Electrical Van	WC	1 EA	$4,000 /EA	1 EA		$4,000				
Cat 988 Loader	WC	2 EA	$6,000 /EA	1 EA		$12,000				
Cat 980 Loader	WC	2 EA	$6,000 /EA	1 EA		$12,000				
Cat 769	WC	3 EA	$5,000 /EA	1 EA		$15,000				
Miscellaneous		1 EA	$35,000 /EA	1 EA		$35,000				
Subtotal of STS Cost										**$200,000**
2. Develop Quarry Bench's										
40 Weeks @		**45 Hours per Week =**		**1,800 Hours**						
Pickup Truck - 3/4 Ton		1 EA	$16.84 /HR	1,800 Hours	$30,312					
Cat 235 Hoe		1 EA	$110.00 /HR	1,800 Hours	$198,000					
Cat D8 Dozer		1 EA	$169.85 /HR	1,800 Hours	$305,730					
Subtotal of Equipment Cost										**$534,042**
Foreman		1 EA	$78.29 /HR	1,800 Hours			$140,918			
Operator		2 EA	$67.70 /HR	1,800 Hours			$243,732			
Subtotal of Labor Cost										**$384,650**

Item & Description	Quantity	Unit Cost	Duration/Size	Equipment Total	STS Total	Labor Total	Permanent Material Total	Subcontractor Total	Subtotals
3. Pioneer Drill/Shoot									
20 Weeks @	**45 Hours per Week =**		**900 Hours**						
Pickup Truck - 3/4 Ton	1 EA	$16.84 /HR	900 Hours	$15,156					
Small Hyd. Drill - 3.5" Holes	1 EA	$125.00 /HR	900 Hours	$112,500					
Subtotal of Equipment Cost									**$127,656**
Foreman	1 EA	$78.29 /HR	900 Hours			$70,459			
Labor	2 EA	$49.75 /HR	900 Hours			$89,544			
Subtotal of Labor Cost									**$160,003**
4. Site Preparation Grizzly									
1 Weeks @	**45 Hours per Week =**		**45 Hours**						
Pickup Truck - 3/4 Ton	1 EA	$16.84 /HR	45 Hours	$758					
Cat 988 Loader	1 EA	$198.00 /HR	45 Hours	$8,910					
Cat D8 Dozer	1 EA	$169.85 /HR	45 Hours	$7,643					
Subtotal of Equipment Cost									**$17,311**
Foreman	1 EA	$78.29 /HR	45 Hours			$3,523			
Operator	2 EA	$67.70 /HR	45 Hours			$6,093			
Subtotal of Labor Cost									**$9,616**

Item & Description	Quantity	Unit Cost	Duration/Size	Equipment Total	STS Total	Labor Total	Permanent Material Total	Subcontractor Total	Subtotals
5. Setup Grizzly & Screen									
15 Weeks @	**15 Hours per Week =**		**225 Hours**						
Pickup Truck - 3/4 Ton	1 EA	$16.84 /HR	225 Hours	$3,789					
Mechanic Truck	1 EA	$30.04 /HR	225 Hours	$6,759					
60 Ton Hydraulic Crane	1 EA	$104.21 /HR	225 Hours	$23,447					
Cat 988 Loader	1 EA	$198.00 /HR	225 Hours	$44,550					
Subtotal of Equipment Cost									**$78,545**
Foreman	1 EA	$78.29 /HR	225 Hours			$17,615			
Labor	1 EA	$49.75 /HR	225 Hours			$11,193			
Mechanic	2 EA	$66.39 /HR	225 Hours			$29,876			
Operator	2 EA	$67.70 /HR	225 Hours			$30,467			
Electrician	1 EA	$54.95 /HR	225 Hours			$12,365			
Subtotal of Labor Cost									**$101,515**
Setup	1 EA	$250,000 /EA	1 EA		$250,000				
Buy Grizzly	1 EA	$275,000 /EA	1 EA		$275,000				
Subtotal of STS Cost									**$525,000**
6. Temporary Haul Road connection									
3 Weeks @	**45 Hours per Week =**		**135 Hours**						
Pickup Truck - 3/4 Ton	1 EA	$16.84 /HR	135 Hours	$2,273					
Cat D8 Dozer	1 EA	$169.85 /HR	135 Hours	$22,930					
Cat 14 Blade	1 EA	$108.11 /HR	135 Hours	$14,595					
OS - Water Truck	1 EA	$75.00 /HR	135 Hours	$10,125					
SD 170 Compactor	1 EA	$72.85 /HR	135 Hours	$9,835					
Subtotal of Equipment Cost									**$59,758**
Foreman	1 EA	$78.29 /HR	135 Hours			$10,569			
Labor	1 EA	$49.75 /HR	135 Hours			$6,716			
Operator	3 EA	$67.70 /HR	135 Hours			$27,420			
Subtotal of Labor Cost									**$44,705**
Paving	9,000 Tons	$60.00 /Ton	1 EA		$540,000				
Rock Base	17,600 Tons	$10.00 /Ton	1 EA		$176,000				
Subtotal of STS Cost									**$716,000**

Item & Description	Quantity	Unit Cost	Duration/Size	Equipment Total	STS Total	Labor Total	Permanent Material Total	Subcontractor Total	Subtotals
7. Construct Ramps & Road to Bridge									
3 Weeks @	**45**	**Hours per Week =**	**135 Hours**						
Pickup Truck - 3/4 Ton	1 EA	$16.84 /HR	135 Hours	$2,273					
Cat D8 Dozer	1 EA	$169.85 /HR	135 Hours	$22,930					
Cat 14 Blade	1 EA	$108.11 /HR	135 Hours	$14,595					
OS - Water Truck	1 EA	$75.00 /HR	135 Hours	$10,125					
SD 170 Compactor	1 EA	$72.85 /HR	135 Hours	$9,835					
Subtotal of Equipment Cost									**$59,758**
Foreman	1 EA	$78.29 /HR	135 Hours			$10,569			
Labor	1 EA	$49.75 /HR	135 Hours			$6,716			
Operator	3 EA	$67.70 /HR	135 Hours			$27,420			
Subtotal of Labor Cost									**$44,705**
Rock Base on Ramps	7,400 Tons	$10.00 /Ton	1 EA		$74,000				
Borrow	44,500 CY	$5.00 /CY	1 EA		$222,500				
Paving	3,700 Tons	$80.00 /Ton	1 EA		$296,000				
Subtotal of STS Cost									**$592,500**
8. Build Temporary Haul Bridge									
Bridge	7,200 SF	$100.00 /SF	1 EA					$720,000	
Subtotal of STS Cost									**$720,000**
9. Summary of Riprap - Production Costs				$877,070	$2,033,500	$745,193	$0	$720,000	**$4,375,763**

Total Fixed Cost of Riprap Production Setup = $4,375,763

Haul & Place Riprap by Barge - Fixed Cost

Shift Duration: 9 Hours/Day @ 5 Days/Week = 45 Hours/Week
2 Shifts/Day @ 5 Days/Week = 90 Hours/Week

Item & Description	Quantity	Unit Cost	Duration/Size	Equipment Total	STS Total	Labor Total	Permanent Material Total	Subcontractor Total	Subtotals
1. Equipment Acquisition									
Tugs	3 EA	$200,000 /EA	1 LS	$600,000					
Barge - 40 x 90	3 EA	$400,000 /EA	1 LS	$1,200,000					
Barge Deck 12" x 40' x 90'	3 EA	$1,000 /MBF	44 MBF	$132,000					
Deck Barge	3 EA	$20,000 /EA	1 EA	$60,000					
Permit Tugs	3 EA	$50,000 /EA	1 LS	$150,000					
Wire Nets - Placing Riprap	3 EA	$50,000 /EA	1 LS	$150,000					
Subtotal of Equipment Cost									**$2,292,000**
2. Assemble Riprap Deck Barges	**10 Weeks @**		**45 Hours per Week**						
Pickup Truck - 1/2 Ton	1 EA	$13.11 /HR	450 Hours	$5,900					
Mechanic Truck	2 EA	$26.63 /HR	450 Hours	$23,966					
Manitowoc 4600 - Dragline	1 EA	$359.67 /HR	450 Hours	$161,852					
Cat 980 Loader	1 EA	$123.00 /HR	450 Hours	$55,350					
Subtotal of Equipment Cost									**$247,067**
Foreman	1 EA	$78.29 /HR	450 Hours			$35,230			
Labor	2 EA	$49.75 /HR	450 Hours			$44,772			
Operator (Heavy)	2 EA	$72.33 /HR	450 Hours			$65,099			
Operator (Oiler)	1 EA	$64.33 /HR	450 Hours			$28,951			
Mechanic	2 EA	$66.39 /HR	450 Hours			$59,752			
Subtotal of Labor Cost									**$233,803**
3. Summary of Fixed Costs for Sand & Gravel - Haul & Placing by Barge				$2,539,067	$0	$233,803	$0	$0	**$2,772,870**

Fixed Cost of Haul & Placing Riprap by Barge = $2,772,870

Bg RR-Fix - 1/8/2007
Checked by Mike Pauletto & Phil Martinson

Produce Riprap - Variable Cost

Shift Duration: 9 Hours/Day @ 5 Days/Week = 45 Hours/Week

Quantity:

6,960,000	CY In Place
1.7	Tons/CY Conversion
11,830,000	**Tons Finished Riprap Product**
50.0%	Percentage Yield
23,660,000	Tons to Mine in Place
2.25	Tons/CY in Place
10,515,556	**Total CY to Mine**

Goal: Produce 1' to 4' Riprap

Production Drill Pattern:

15 x 15	Drill Pattern
40	Foot Deep Drill Hole Yield
333	**CY per Drill Hole**
31,547	Total Number of Drill Holes Required
48	Foot Deep Drill Hole Length
1,514,240	**Total Footage of Drilling Required**

Production Rate & Duration:

6	Inch Diameter Drill Holes
48	LF/Hour - Using DM 45 Drill
3	Drills
144	**LF/Hour Total Production Rate**
10,516	Hours of Production ÷ Hours per Day =
1,168	Days of Production ÷ Days per Week =
233.7	Weeks of Production
234	**Assumed Weeks of Production**

Item & Description	Quantity	Unit Cost	Duration/Size	Equipment Total	STS Total	Labor Total	Permanent Material Total	Subcontractor Total	Subtotals
1. Drill Quarry									
234 Weeks @	**45 Hours per Week =**		**10,530 Hours**						
Pickup Truck - 1/2 Ton	1 EA	$13.11 /HR	10,530 Hours	$138,048					
DM 45 - 6" Holes	3 EA	$277.25 /HR	10,530 Hours	$8,758,328					
Large Hyd. Drill - 5" Holes	1 EA	$156.45 /HR	10,530 Hours	$1,647,419					
Subtotal of Equipment Cost									**$10,543,794**
Foreman	1 EA	$78.29 /HR	10,530 Hours			$824,370			
Labor	1 EA	$49.75 /HR	10,530 Hours			$523,832			
Operator	4 EA	$67.70 /HR	10,530 Hours			$2,851,664			
Subtotal of Labor Cost									**$4,199,867**
Drill - STS	1,514,240 LF	$0.95 /LF	1 EA		$1,438,528				
Subtotal of STS Cost									**$1,438,528**
2. Shoot Rock	**10,515,556 CY ÷ 2000 CY/Hour**		**5,258 Hours**						
117 Weeks @	**45 Hours per Week =**		**5,258 Hours**						
Pickup Truck - 1/2 Ton	1 EA	$13.11 /HR	5,258 Hours	$68,932					
Stake Truck	1 EA	$26.00 /HR	5,258 Hours	$136,708					
Prill Truck	1 EA	$70.50 /HR	5,258 Hours	$370,689					
Subtotal of Equipment Cost									**$576,329**
Foreman	1 EA	$78.29 /HR	5,258 Hours			$411,637			
Labor	3 EA	$49.75 /HR	5,258 Hours			$784,704			
Blasting Tech	1 EA	$49.46 /HR	5,258 Hours			$260,061			
Subtotal of Labor Cost									**$1,456,402**
Shoot - STS	10,515,556 CY	$0.40 /CY	1 EA		$4,206,222				
Subtotal of STS Cost									**$4,206,222**

Item & Description	Quantity	Unit Cost	Duration/Size	Equipment Total	STS Total	Labor Total	Permanent Material Total	Subcontractor Total	Subtotals
3. Trap/Sort Riprap	**10,515,556 CY ÷**	**800 CY/Hour**	**13,144 Hours**						
146 Weeks @	**90**	**Hours per Week =**	**13,144 Hours**						
Pickup Truck - 1/2 Ton	1 EA	$13.11 /HR	13,144 Hours	$172,318					
Cat 992 Loader	1 EA	$348.80 /HR	13,144 Hours	$4,584,627					
Cat D10 Dozer	1 EA	$260.53 /HR	13,144 Hours	$3,424,406					
Cat 988 Loader	2 EA	$198.00 /HR	13,144 Hours	$5,205,024					
Cat 235 Hoe	1 EA	$110.00 /HR	13,144 Hours	$1,445,840					
Hoe Ram	1 EA	$40.00 /HR	13,144 Hours	$525,760					
Cat 16 Blade	1 EA	$128.04 /HR	13,144 Hours	$1,682,958					
Subtotal of Equipment Cost									**$17,040,933**
Foreman	1 EA	$78.29 /HR	13,144 Hours			$1,029,015			
Operator	4 EA	$67.70 /HR	13,144 Hours			$3,559,570			
Operator (Heavy)	2 EA	$72.33 /HR	13,144 Hours			$1,901,469			
Subtotal of Labor Cost									**$6,490,054**
4. Process	**10,515,556 CY ÷**	**800 CY/Hour**	**13,144 Hours**						
146 Weeks @	**90**	**Hours per Week =**	**13,140 Hours**						
Pickup Truck - 1/2 Ton	1 EA	$13.11 /HR	13,140 Hours	$172,265					
Grizzly	1 EA	$39.00 /HR	13,140 Hours	$512,460					
48" Plant Conveyor	10 EA	$12.50 /HR	13,140 Hours	$1,642,500					
48" Stacker	1 EA	$32.00 /HR	13,140 Hours	$420,480					
500 KW Generator	1 EA	$130.09 /HR	13,140 Hours	$1,709,383					
Electrical Van	1 EA	$29.00 /HR	13,140 Hours	$381,060					
Subtotal of Equipment Cost									**$4,838,148**
Foreman	1 EA	$78.29 /HR	13,140 Hours			$1,028,701			
Operator	1 EA	$67.70 /HR	13,140 Hours			$889,622			
Operator (Oiler)	1 EA	$64.33 /HR	13,140 Hours			$845,355			
Subtotal of Labor Cost									**$2,763,678**

Item & Description	Quantity	Unit Cost	Duration/Size	Equipment Total	STS Total	Labor Total	Permanent Material Total	Subcontractor Total	Subtotals
5. Haul & Stockpile									
146 Weeks @	**90 Hours per Week =**		**13,140 Hours**						
Cat 777	4 EA	$270.41 /HR	13,140 Hours	$14,212,750					
Cat 769	3 EA	$143.87 /HR	13,140 Hours	$5,671,355					
OS - Water Truck	1 EA	$75.00 /HR	13,140 Hours	$985,500					
Subtotal of Equipment Cost									**$20,869,605**
Truck Driver	7 EA	$53.47 /HR	13,140 Hours			$4,918,273			
Subtotal of Labor Cost									**$4,918,273**
6. Summary of Riprap - Production Costs				$53,868,810	$5,644,750	$19,828,274	$0	$0	**$79,341,834**

11,830,000 Tons of Riprap Produced

Unit Cost of Riprap Production = $6.71 /Ton

Haul & Place Riprap by Barge - Variable Cost

Shift Duration:	9 Hours/Day @	5 Days/Week =	45 Hours/Week
	2 Shifts/Day @	5 Days/Week =	90 Hours/Week

Total Quantity:	**3,943,333**	**Tons Riprap Barge Haul - Beach Place**
	7,886,667	**Tons Riprap Barge Haul - Water Place**
	11,830,000	**Tons Total Riprap Haul**

Riprap Placement Production:	**3,943,333**	**Tons**	33.33% Crane Placement from Beach
	7,886,667	**Tons**	66.67% Water Placement

Barge Haul - Cycle Time:	Load	112 Minutes		11 Foot Deep Flexifloat
	Startup	2 Minutes		3 Foot Freeboard
	Travel	18 Minutes		90 Tons per 40' x 10' Section
	Dump	2 Minutes		8 Sections + Rake per Barge
	Return (empty):	18 Minutes		720 Ton Capacity
	Dock	2 Minutes		(110) Less Wood Deck & Loader
	Wait:	Minutes		90 Tons Added for Rake Capacity
	Total barge Cycle Time:	**154 Minutes**	**4.5 Mile Haul**	700 Net Load Capacity/Barge
	One Way Distance for Mid Sea Dam Route 4 to 5 - Refer to Map			1 Barge per Tug = 1 Unit

Barge Haul Requirements for Production:	9	Hour Shift @	
	54	Work Minute/Hour =	**Average Haul Speed = 17.11 Minutes/Mile**
	486	Minutes per shift	**3.5 Miles per Hour**
	3.16	Cycles per Shift	
	700	Tons per cycle x Cycles per Shift =	
	2,209	Tons Per shift per "Unit" of 1 Barge & Tug ÷ Hours per Shift =	
	245	Tons per Hour per "Unit" of 1 Barge & Tug x Number of Units =	
	3	Tug & Barge "Units"	
368.18	**736**	**Total Tons of Riprap Placed per Hour**	
	2	Shifts per Day x Hours per Shift =	
	18	Hours per Day	
	13,255	**Tons of Riprap Placed by Barge per Day**	
	7,886,667	**Total Tons of Riprap for Barge Haul ÷ Tons of Riprap Hauled & Placed by Barge per Day =**	
	595	**Days to place Riprap ÷ Work Days per Week =**	
	119	**Weeks**	

Item & Description	Quantity	Unit Cost	Duration/Size	Equipment Total	STS Total	Labor Total	Permanent Material Total	Subcontractor Total	Subtotals
1. Crane Loadout to Barge	**$1.99 /Ton**								
2/3 = 7,886,667 Tons Riprap	**375 Tons/Hour =**		**21,031 Hours**						
2 Cranes Increase Production	**750 Tons/Hour =**		**10,516 Hours**						
119 Weeks @	**90 Hours per Week =**		**10,710 Hours**						
Pickup Truck - 1/2 Ton	1 EA	$13.11 /HR	10,710 Hours	$140,408					
Manitowoc 4600 - Dragline	2 EA	$359.67 /HR	10,710 Hours	$7,704,131					
Cat 980 Loader	2 EA	$123.00 /HR	10,710 Hours	$2,634,660					
Subtotal of Equipment Cost									**$10,479,200**
Foreman	1 EA	$78.29 /HR	10,710 Hours			$838,462			
Operator (Heavy)	2 EA	$72.33 /HR	10,710 Hours			$1,549,356			
Operator (Oiler)	2 EA	$64.33 /HR	10,710 Hours			$1,378,044			
Operator	2 EA	$67.70 /HR	10,710 Hours			$1,450,205			
Subtotal of Labor Cost									**$5,216,068**
2. Tug & Barge Haul	**$2.33 /Ton**								
119 Weeks @	**90 Hours per Week =**		**10,710 Hours**						
Tug	3 EA	$110.00 /HR	10,710 Hours	$3,534,300					
Barge	3 EA	$50.00 /HR	10,710 Hours	$1,606,500					
Cat 980 Loader	3 EA	$123.00 /HR	10,710 Hours	$3,951,990					
Subtotal of Equipment Cost									**$9,092,790**
Operator (Heavy)	12 EA	$72.33 /HR	10,710 Hours			$9,296,137			
Subtotal of Labor Cost									**$9,296,137**
3. Summary of Riprap Barge Haul & Placing Variable Costs				$19,571,990	$0	$14,512,205	$0	$0	**$34,084,194**

7,886,667 Tons of Riprap Hauled & Placed by Barge

Variable Unit Cost of Riprap Haul & Placement by Barge = $4.32 /Ton

Variable Unit Cost of Riprap Truck Loading = $1.12 /Ton (From Appendix F-37)

Variable Unit Cost of Riprap Haul & Placement by Barge = $5.44 /Ton (With Loading Included)

Haul Riprap by Truck to Mid-Sea Dam Point - Variable Cost

Shift Duration: 9 Hours/Day @ 5 Days/Week = 45 Hours/Week
2 Shifts/Day @ 5 Days/Week = 90 Hours/Week

Total Quantity: **11,830,000 Tons Riprap Truck Haul**

Truck Haul - Cycle Time:

Load	1.5	Minutes
Scales	0.5	Minutes
Travel	33.6	Minutes
Dump	1.5	Minutes
Return (empty):	33.6	Minutes
Wait:	1	Minutes

25 Tons (Highway Rock Trucks)
40 Number of Trucks Used

Average truck Cycle Time: 71.7 Minutes | **22.0 Mile Haul** | **Average Haul Speed = 1.63 Minutes/Mile**
36.8 Miles per Hour

One Way Distance for Mid Sea Dam Route 2 to 5 - Refer to Map

Requirements for Truck Haul Production:

9	Hour Shift @
54	Work Minute/Hour =
486	Minutes per shift ÷ Cycle Time =
6.78	Cycles per Shift
25	Tons per cycle x Cycles per Shift =
169	Tons Per shift per "Unit" of 1 Rock Truck ÷ Hours per Shift =
18.83	**Tons per Hour per "Unit" of 1 Rock Truck x Number of Trucks =**
750	**Total Tons of Riprap Placed per Hour**
2	Shifts per Day x Hours per Shift =
18	Hours per Day
40	Total Units of Riprap per Double Shift x Tons per Hour per Unit x Hours per Day =
13,556	**Tons of Riprap Placed per Day**
11,830,000	**Tons of Truck Haul ÷ Tons of Riprap Placed per Day =**
872.65	**Days to place Riprap ÷ Work Days per Week =**
174.53	**Weeks Required**
175	**Weeks Used**

Item & Description	Quantity	Unit Cost	Duration/Size	Equipment Total	STS Total	Labor Total	Permanent Material Total	Subcontractor Total	Subtotals
1. Truck Haul	**$5.52 /Ton**								
11,830,000 Tons	**750 Tons/Hour =**		**15,773 Hours**						
175 Weeks @	**90 Hours per Week =**		**15,773 Hours**						
Pickup Truck - 1/2 Ton	1 EA	$13.11 /HR	15,773 Hours	$206,788					
OS - Rock Truck - Hwy	40 EA	$95.00 /HR	15,773 Hours	$59,938,667					
Cat 14 Blade	1 EA	$108.11 /HR	15,773 Hours	$1,705,255					
OS - Water Truck	1 EA	$75.00 /HR	15,773 Hours	$1,183,000					
Subtotal of Equipment Cost									**$63,033,710**
Foreman	1 EA	$78.29 /HR	15,773 Hours			$1,234,859			
Operator	1 EA	$67.70 /HR	15,773 Hours			$1,067,907			
Subtotal of Labor Cost									**$2,302,766**
2. Summary of Riprap Haul Variable Costs				$63,033,710	$0	$2,302,766	$0	$0	**$65,336,477**

11,830,000 Tons of Riprap Hauled by Truck

Variable Unit Cost of Riprap Haul to Mid Sea Dam =	**$5.52 /Ton**	
Variable Unit Cost of Riprap Truck Loading =	**$1.12 /Ton**	**(From Appendix F-37)**
Variable Unit Cost of Riprap Haul to Mid Sea Dam =	**$6.64 /Ton**	**(With Loading Included)**

Load Riprap for Haul by Truck - Variable Cost

Shift Duration: 9 Hours/Day @ 5 Days/Week = 45 Hours/Week
2 Shifts/Day @ 5 Days/Week = 90 Hours/Week

Total Quantity: 11,830,000 Tons Riprap to Load for Truck Haul

Item & Description	Quantity	Unit Cost	Duration/Size	Equipment Total	STS Total	Labor Total	Permanent Material Total	Subcontractor Total	Subtotals
1. Loadout Riprap - Truck Haul	**$1.12 /Ton**								
11,830,000 Tons	**750 Tons/Hour =**		**15,773 Hours**						
175 Weeks @	**90 Hours per Week =**		**15,773 Hours**						
Pickup Truck - 1/2 Ton	1 EA	$13.11 /HR	15,773 Hours	$206,788					
Cat 345 Hoe	2 EA	$134.47 /HR	15,773 Hours	$4,242,080					
Cat 988 Loader	1 EA	$198.00 /HR	15,773 Hours	$3,123,120					
Truck Scales	1 EA	$26.63 /HR	15,773 Hours	$420,019					
Subtotal of Equipment Cost									**$7,992,007**
Foreman	1 EA	$78.29 /HR	15,773 Hours			$1,234,859			
Labor	1 EA	$49.75 /HR	15,773 Hours			$784,671			
Operator	3 EA	$67.70 /HR	15,773 Hours			$3,203,722			
Subtotal of Labor Cost									**$5,223,252**
2. Summary of Riprap Truck Loading Variable Costs				$7,992,007	$0	$5,223,252	$0	$0	**$13,215,259**

11,830,000 Tons of Riprap Loaded for Truck Haul

Variable Unit Cost of Riprap Truck Loading = $1.12 /Ton

Haul Riprap by Truck to Perimeter Dike - Variable Cost

Shift Duration:	9 Hours/Day @	5 Days/Week =	45 Hours/Week
	2 Shifts/Day @	5 Days/Week =	90 Hours/Week

Total Quantity: **33,750 Tons Riprap Truck Haul**

Production: **375 Tons/Hour - Riprap Truck Haul**

Truck Haul - Cycle Time:	Load	2 Minutes	25 Tons (Highway Rock Trucks)		
	Scales	0.5 Minutes			
	Travel	47.8 Minutes			
	Dump	2 Minutes			
	Return (empty):	47.8 Minutes			
	Wait:	1 Minutes			
	Total truck Cycle Time:	**101 Minutes**	**28.1 Mile Haul**	**Average Haul Speed =**	**1.80 Minutes/Mile**
	One Way Distance for Perimeter Dike Route 2 to 10- Refer to Map				**33.4 Miles per Hour**

Requirements for Truck Haul Production:	9	Hour Shift @
	54	Work Minute/Hour =
	486	Minutes per shift ÷ Cycle Time =
	4.81	Cycles per Shift
	25	Tons per cycle x Cycles per Shift =
	120	Tons Per shift per "Unit" of 1 Rock Truck ÷ Hours per Shift =
	13.35	**Tons per Hour per "Unit" of 1 Rock Truck**
	375	Tons per Hour ÷ Tons per Hour per "Unit" of 1 Rock Truck =
	28.1	**Number of Trucks Required**
	29	**Number of Trucks Used**

Item & Description	Quantity	Unit Cost	Duration/Size	Equipment Total	STS Total	Labor Total	Permanent Material Total	Subcontractor Total	Subtotals
1. Truck Haul	**$8.26 /Ton**								
33,750 Tons	**375 Tons/Hour =**		**90 Hours**						
1 Weeks @	**90 Hours per Week =**		**90 Hours**						
Pickup Truck - 1/2 Ton	1 EA	$13.11 /HR	90 Hours	$1,180					
OS - Rock Truck - Hwy	29 EA	$95.00 /HR	90 Hours	$247,950					
Cat 14 Blade	1 EA	$108.11 /HR	90 Hours	$9,730					
OS - Water Truck	1 EA	$75.00 /HR	90 Hours	$6,750					
Subtotal of Equipment Cost									**$265,610**
Foreman	1 EA	$78.29 /HR	90 Hours			$7,046			
Operator	1 EA	$67.70 /HR	90 Hours			$6,093			
Subtotal of Labor Cost									**$13,139**
2. Summary of Riprap Haul Unit Costs				$265,610	$0	$13,139	$0	$0	**$278,749**

33,750 Tons of Riprap Hauled by Truck to the Perimeter Dike

Variable Unit Cost of Riprap Truck Haul to the Perimeter Dike =	**$8.26 /Ton**	
Variable Unit Cost of Riprap Truck Loading =	**$1.12 /Ton**	**(From Appendix F-37)**
Variable Unit Cost of Riprap Truck Haul to the Perimeter Dike =	**$9.38 /Ton**	**(With Loading Included)**

Haul Riprap by Truck to the South Dam, North Dam & Concentric Dikes - Variable Cost

Shift Duration:	9 Hours/Day @	5 Days/Week =	45 Hours/Week
	2 Shifts/Day @	5 Days/Week =	90 Hours/Week

Total Quantity: **33,750 Tons Riprap Truck Haul**

Production: **375 Tons/Hour - Riprap Truck Haul**

A. South Sea Dam — **Truck Haul - Cycle Time:** — **South Sea Dam Route 2 to 11** — 25 Tons (Highway Rock Trucks)

Load	2	Minutes
Scales	0.5	Minutes
Travel	59.1	Minutes
Dump	2	Minutes
Return (empty):	59.1	Minutes
Wait:	1	Minutes

South Sea Dam Total truck Cycle Time: **124 Minutes** — **43.7 Mile Haul** — **Average Haul Speed =** **1.42 Minutes/Mile** / **42.4 Miles per Hour**

One Way Distance for South Sea Dam Route 2 to 11 - Refer to Map

B. North Sea Dam - Long Haul — **Cycle Time:** — **North Sea Dam - Long Route 2 to 9 to 12** — **1/2 North Sea Dam Quantity on This Route** — 25

Load	2	Minutes
Scales	0.5	Minutes
Travel	86	Minutes
Dump	2	Minutes
Return (empty):	86	Minutes
Wait:	1	Minutes

North Sea Dam Long Haul Total truck Cycle Time: **178 Minutes** — **49.5 Mile Haul** — **Average Haul Speed =** **1.79 Minutes/Mile** / **33.5 Miles per Hour**

One Way Distance for North Sea Dam Long Route 2 to 9 to 12 - Refer to Map

C. North Sea Dam - Short Haul — **Cycle Time:** — **North Sea Dam - Short Route 2 to 8 to 12** — **1/2 North Sea Dam Quantity on This Route** — 25

Load	2	Minutes
Scales	0.5	Minutes
Travel	32	Minutes
Dump	2	Minutes
Return (empty):	32	Minutes
Wait:	1	Minutes

North Sea Dam Short Haul Total truck Cycle Time: **69.5 Minutes** — **23.5 Mile Haul** — **Average Haul Speed =** **1.48 Minutes/Mile** / **40.6 Miles per Hour**

One Way Distance for North Sea Dam Short Route 2 to 8 to 12 - Refer to Map

D. Summary

South Sea Dam Total truck Cycle Time:	**124 Minutes**
North Sea Dam Long Haul Total truck Cycle Time:	**178 Minutes**
North Sea Dam Short Haul Total truck Cycle Time:	**69.5 Minutes**
Average North Sea Dam Haul Total truck Cycle Time:	**124 Minutes**

Requirements for Truck Haul Production:

9	Hour Shift @
54	Work Minute/Hour =
486	Minutes per shift ÷ Cycle Time =
3.93	Cycles per Shift
25	Tons per cycle x Cycles per Shift =
98	Tons Per shift per "Unit" of 1 Rock Truck ÷ Hours per Shift =
10.91	**Tons per Hour per "Unit" of 1 Rock Truck**
375	Tons per Hour ÷ Tons per Hour per "Unit" of 1 Rock Truck =
34.4	**Number of Trucks Required**
35	**Number of Trucks Used**

Item & Description	Quantity	Unit Cost	Duration/Size	Equipment Total	STS Total	Labor Total	Permanent Material Total	Subcontractor Total	Subtotals
1. Truck Haul	$9.78 /Ton								
33,750 Tons	375 Tons/Hour =		90 Hours						
1 Weeks @	90 Hours per Week =		90 Hours						
Pickup Truck - 1/2 Ton	1 EA	$13.11 /HR	90 Hours	$1,180					
OS - Rock Truck - Hwy	35 EA	$95.00 /HR	90 Hours	$299,250					
Cat 14 Blade	1 EA	$108.11 /HR	90 Hours	$9,730					
OS - Water Truck	1 EA	$75.00 /HR	90 Hours	$6,750					
Subtotal of Equipment Cost									**$316,910**
Foreman	1 EA	$78.29 /HR	90 Hours			$7,046			
Operator	1 EA	$67.70 /HR	90 Hours			$6,093			
Subtotal of Labor Cost									**$13,139**
2. Summary of Riprap Haul Unit Costs				$316,910	$0	$13,139	$0	$0	**$330,049**

33,750 Tons of Riprap Hauled by Truck to the South Dam & North Dam

Variable Unit Cost of Riprap Truck Haul to the South Dam & North Dam =	$9.78 /Ton	
Variable Unit Cost of Riprap Truck Loading =	$1.12 /Ton	(From Appendix F-37)
Variable Unit Cost of Riprap Truck Haul to the South Dam & North Dam =	$10.90 /Ton	(With Loading Included)

Haul Riprap by Truck to the Concentric Dikes - Variable Cost

Variable Unit Cost of Riprap Truck Haul to the South Dam & North Dam =	$10.90 /Ton	(With Loading Included)
Added Haul to The NE Side Sea Location =	$9.78 /Ton	(Repeated Unit Cost from Above)
Total Concentric Haul to The NE Side Sea Location =	$20.68 /Ton	(With Loading Included)

Average Variable Unit Cost - Haul Riprap by Truck to the South Dam, North Dam & Concentric Dikes - Variable Cost

Allow for 1/2 of The Quantity for the North & South Dam @	$5.45 /Ton
Allow for 1/2 of The Quantity for the Concentric Dam @	$10.34 /Ton
Total Average Concentric Haul =	$15.79 /Ton

Haul Riprap by Truck & Place Riprap from Beach by Crane - Variable Cost

Shift Duration: 9 Hours/Day @ 5 Days/Week = 45 Hours/Week
2 Shifts/Day @ 5 Days/Week = 90 Hours/Week

Total Quantity: 11,830,000 Tons Riprap Hauled to Placing Site

Riprap Placement Production: 11,830,000 Tons

Crane Place 1/3: 3,943,333 Tons from the Beach

Item & Description	Quantity	Unit Cost	Duration/Size	Equipment Total	STS Total	Labor Total	Permanent Material Total	Subcontractor Total	Subtotals
1. Crane Place 1/3	$2.08 /Ton								
1/3 = 3,943,333 Tons Riprap	375 Tons/Hour =		10,516 Hours						
117 Weeks @	90 Hours per Week =		10,516 Hours						
Pickup Truck - 1/2 Ton	1 EA	$13.11 /HR	10,516 Hours	$137,859					
Manitowoc 4600 - Dragline	1 EA	$359.67 /HR	10,516 Hours	$3,782,130					
Cat 980 Loader	1 EA	$123.00 /HR	10,516 Hours	$1,293,413					
Subtotal of Equipment Cost									**$5,213,402**
Foreman	1 EA	$78.29 /HR	10,516 Hours			$823,239			
Operator (Heavy)	1 EA	$72.33 /HR	10,516 Hours			$760,614			
Operator (Oiler)	1 EA	$64.33 /HR	10,516 Hours			$676,512			
Operator	1 EA	$67.70 /HR	10,516 Hours			$711,938			
Subtotal of Labor Cost									**$2,972,304**
2. Summary of Riprap Haul & Placing Variable Costs				$5,213,402	$0	$2,972,304	$0	$0	**$8,185,706**

3,943,333 Tons of Riprap Placed by Crane from the Beach

Variable Unit Cost of Riprap Haul & Placement by Barge = $2.08 /Ton

Dress Riprap by Barge - Variable Cost

Shift Duration: 9 Hours/Day @ 5 Days/Week = 45 Hours/Week
2 Shifts/Day @ 5 Days/Week = 90 Hours/Week

Total Quantity: **3,943,333 Tons Riprap Barge Haul - Beach Place**
7,886,667 Tons Riprap Barge Haul - Water Place
11,830,000 Tons Total Riprap Haul

Riprap Placement Production: **3,943,333 Tons** 33.33% Crane Placement from Beach
7,886,667 Tons 66.67% Water Placement

Item & Description	Quantity	Unit Cost	Duration/Size	Equipment Total	STS Total	Labor Total	Permanent Material Total	Subcontractor Total	Subtotals
1. Dress Embankment	**$0.69 /Ton**								
7,886,667 Tons Riprap	**750 Tons/Hour =**		**10,516 Hours**						
117 Weeks @	**90 Hours per Week =**		**10,530 Hours**						
Pickup Truck - 1/2 Ton	1 EA	$13.11 /HR	10,530 Hours	$138,048					
Cat 345 Hoe	1 EA	$134.47 /HR	10,530 Hours	$1,415,969					
Double Drum Winch	2 EA	$47.00 /HR	10,530 Hours	$989,820					
Work Boat	1 EA	$52.00 /HR	10,530 Hours	$547,560					
River Tugs - Fuel & Main.	0.10 EA	$110.00 /HR	10,530 Hours	$115,830					
Subtotal of Equipment Cost									**$3,207,227**
Foreman	1 EA	$78.29 /HR	10,530 Hours			$824,370			
Operator (Heavy)	1 EA	$72.33 /HR	10,530 Hours			$761,658			
Operator (Oiler)	1 EA	$64.33 /HR	10,530 Hours			$677,442			
Subtotal of Labor Cost									**$2,263,470**
2. Summary of Dressing Riprap for Barge Variable Costs				$3,207,227	$0	$2,263,470	$0	$0	**$5,470,698**

7,886,667 Tons of Riprap Hauled & Placed by Barge

Variable Unit Cost of Dressing Riprap by Barge = $0.69 /Ton

ITEM WORK SHEET

Wick Drain Support - Variable Cost

Project: Salton Sea
Type of Work: Wick Drains

Estimator: Mike Pauletto
Date: 9/29/2006

Item No.
Sheet No.

DESCRIPTION (REFERENCE)	QUANTITY	LABOR & EQUIPMENT COST LUMP SUM COST	LABOR & EQUIPMENT COST UNIT COST	PERMANENT MAT. UNIT COST	SUBCONTRACTS UNIT COST	TOTAL UNIT COST
Wick Subcontractor (1)					$1.00 /LF WD	$1.00 /LF WD
Fixed Cost of Assembling Barges for Wick Drain Support (2) =	4,000,000 LF	$1,383,981.35	$0.35 /LF of Wick Drain (4)			$0.35 /LF of Wick Drain (4)
Variable Unit Cost of Wick Drain Support = (3)			$2.91 /LF WD			$2.91 /LF WD

Notes:

1. From Subcontractor Bid
2. From Appendix F-44
3. From Appendix F-45
4. The unit cost of $0.35/LF reflects the full capacity of one crew.
   The full capacity of one crew = 4,000,000 LF.
   Therefore the fixed unit cost is constant.

	Subtotal	$4.26 /LF
Additional Indirect Costs @	10.00%	$0.43 /LF
	Subtotal	$4.69 /LF
General Contractor Markup @	10.00%	$0.47 /LF
Total Variable Wick Drain Cost =		**$5.15 /LF**

Wick Drain Water Support - Fixed Costs

Shift Duration: 9 Hours/Day @ 5 Days/Week = 45 Hours/Week

Item & Description	Quantity	Unit Cost	Duration/Size	Equipment Total	STS Total	Labor Total	Permanent Material Total	Subcontractor Total	Subtotals
1. Equipment Acquisition									
Tugs	2 EA	$200,000 /EA	1 LS	$400,000					
Barge - 40 x 10	4 EA	$40,000 /EA	1 LS	$160,000					
Barge Rake - 20x10	4 EA	$20,000 /EA	1 LS	$80,000					
Barge Deck 12" x 40' x 90'	2 EA	$1,000 /MBF	44 MBF	$88,000					
Spuds	2 EA	$20,000 /EA	1 EA	$40,000					
Permit Tugs	2 EA	$50,000 /EA	1 LS	$100,000					
Wire Nets - Placing Rock	2 EA	$50,000 /EA	1 LS	$100,000					
Subtotal of Equipment Cost									**$968,000**
2. Assemble Wick Drain Barges									
6 Weeks @	**45 Hours per Week =**		**270 Hours**						
Pickup Truck - 3/4 Ton	1 EA	$16.84 /HR	270 Hours	$4,547					
Mechanic Truck	1 EA	$30.04 /HR	270 Hours	$8,111					
Manitowoc 4600 - Picking	1 EA	$345.67 /HR	270 Hours	$93,331					
Cat 980 Loader	1 EA	$123.00 /HR	270 Hours	$33,210					
Subtotal of Equipment Cost									**$139,199**
Foreman	1 EA	$78.29 /HR	270 Hours			$21,138			
Labor	2 EA	$49.75 /HR	270 Hours			$26,863			
Operator (Oiler)	2 EA	$64.33 /HR	270 Hours			$34,741			
Operator (Heavy)	1 EA	$72.33 /HR	270 Hours			$19,530			
Mechanic	2 EA	$66.39 /HR	270 Hours			$35,851			
Subtotal of Labor Cost									**$138,122**

Item & Description	Quantity	Unit Cost	Duration/Size	Equipment Total	STS Total	Labor Total	Permanent Material Total	Subcontractor Total	Subtotals
3. Demobilization									
3 Weeks @	**45 Hours per Week =**		**135 Hours**						
Pickup Truck - 3/4 Ton	1 EA	$16.84 /HR	135 Hours	$2,273					
Mechanic Truck	1 EA	$30.04 /HR	135 Hours	$4,055					
Manitowoc 4600 - Picking	1 EA	$345.67 /HR	135 Hours	$46,665					
Cat 980 Loader	1 EA	$123.00 /HR	135 Hours	$16,605					
Subtotal of Equipment Cost									**$69,599**
Foreman	1 EA	$78.29 /HR	135 Hours			$10,569			
Labor	2 EA	$49.75 /HR	135 Hours			$13,432			
Operator (Oiler)	2 EA	$64.33 /HR	135 Hours			$17,370			
Operator (Heavy)	1 EA	$72.33 /HR	135 Hours			$9,765			
Mechanic	2 EA	$66.39 /HR	135 Hours			$17,926			
Subtotal of Labor Cost									**$69,061**
4. Summary of Fixed Costs for Assembling Barges for Wick Drain Support				$1,176,798	$0	$207,184	$0	$0	**$1,383,981**

Fixed Cost of Assembling Barges for Wick Drain Support = $1,383,981

Wick Drain Support - Variable Cost

Shift Duration: 10 Hours/Day @ 5 Days/Week = 50 Hours/Week
2 Shifts/Day @ 5 Days/Week = 100 Hours/Week

Item & Description	Quantity	Unit Cost	Duration/Size	Equipment Total	STS Total	Labor Total	Permanent Material Total	Subcontractor Total	Subtotals
1. Tug & Barge Haul	4,000,000 LF at	36,000 LF/Week	111 Weeks						
111 Weeks @	100 Hours per Week =		11,100 Hours						
River Tugs - Fuel & Main.	2 EA	$110.00 /HR	11,100 Hours	$2,442,000					
Barge - 40x60 - Main.	2 EA	$40.00 /HR	11,100 Hours	$888,000					
Work Boat	1 EA	$52.00 /HR	11,100 Hours	$577,200					
Subtotal of Equipment Cost									**$3,907,200**
Foreman	2 EA	$78.29 /HR	11,100 Hours			$1,737,989			
Operator	8 EA	$67.70 /HR	11,100 Hours			$6,012,056			
Subtotal of Labor Cost									**$7,750,045**
2. Summary of Variable Costs for Support of Wick Drain Installation				$3,907,200	$0	$7,750,045	$0	$0	**$11,657,245**

Total Wick Drain Installed = 4,000,000 LF

Variable Unit Cost of Wick Drain Support = $2.91 /LF WD

SUBCONTRACTOR WORK SHEET

Dredging - Variable Cost

Project: Salton Sea
Type of Work: Dredging

Estimator: Mike Pauletto
Date: 9/20/2006

Item No.
Sheet No.

DESCRIPTION (REFERENCE)	QUANTITY	LABOR & EQUIPMENT COST LUMP SUM COST	LABOR & EQUIPMENT COST UNIT COST	PERMANENT MAT. UNIT COST	SUBCONTRACTS UNIT COST	TOTAL Cost
Dredging Subcontractor (1)	10,000,000 CY				$5.72 /CY	$57,200,000
Mobilization (2)						$6,600,000

Subtotal	$63,800,000
Total Quantity of Dredging Work to be Performed =	10,000,000 CY
Unit Price of Dredging Work =	$6.38 /CY
*General Contractor Markup (Note 3) @ 5.00%	$0.32 /CY
Unit Price of Dredging Work =	$6.70 /CY

Notes:
1. From Subcontractor Bid
2. From Subcontractor Bid
3. Markup for Dredging reduced to 5% since the specialty contractor does not need any support from the prime contractor.

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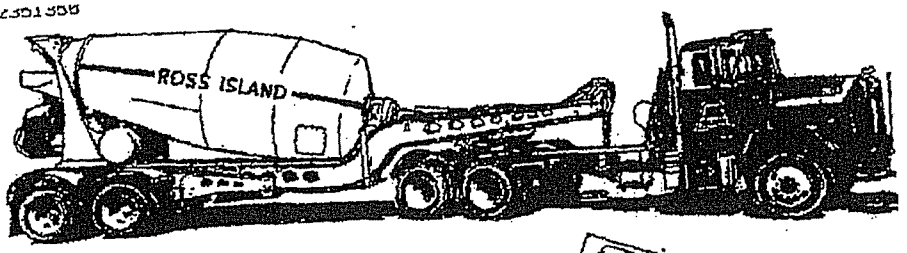

FAXED
AUG 19 2006
BY: 3:30 PM

FAX MEMORANDUM

ROSS ISLAND SAND & GRAVEL CO.
Phone: (503) 239-5504 FAX: (503) 235-1350

To: Mike Pruleto From: Paul T. Godsil

FAX: 360-260-2358 Pages: 2 PAGES

Phone: 360-571-5539 Date: 19 OCTOBER 06

Re: SAXTAN SEA DREDGING CC:

☐ Urgent ☐ For Review ☐ Please Comment ☐ Please Reply ☐ Please Recycle

Comments: REVISED.
DREDGING PRICES & CONDITIONS
FOLLOW!

P.S.!

Salton Sea Dredging Budget

REVISED!

Ross Island Sand Gravel Co.

August 19, 2006

Item No.	Discription	Units	Quantity	Bid Unit Price	Bid Amount
1	Mobilization		1	$	6,600,000
2	Dredging	CY	5,000,000	$5.72	$ 28,600,000
				Total budget price =	$ 35,200,000

Conditions of above price:

This budget price is for dredging approximately 5,000,000 cubic yards,

This bid includes mobilizing a diesel powered portable 20" dredge and floating booster permitted by CARB, dredge tender, and necessary operating labor & support equipment.

20,000 feet of 24" poly pipe

Placement of material below water without terminal barge, use of anchors only

This bid includes demobilization upon completion of the project

Bond is not included, Bond is available upon request.

Ninety percent of Mobilization bid item will be submitted & payment due upon commencement of dredging

Progress Payments due in full, no later than 30 days from date of invoice

Estimated length of job is 19 dredging months, working 6 days per week, 24 hours per day.

Launch site to be graded & prepared by others

Taxes on bid prices, if applicable, have not been included.

Quality control not included; however, Daily dredge reports & daily soundings of borrow area are included.

This a budget price has been derived without Geotechnical Data and without plans, specifications or site visit, however, a very realistic price in 2006 dollars

ITEM WORK SHEET

Stone Column Support - Variable Cost

Project: Salton Sea | Estimator: Mike Pauletto | Item No.
Type of Work: Stone Column | Date: 9/29/2006 | Sheet No.

DESCRIPTION (REFERENCE)		QUANTITY	LABOR & EQUIPMENT COST LUMP SUM COST	LABOR & EQUIPMENT COST UNIT COST	PERMANENT MAT. UNIT COST	SUBCONTRACTS UNIT COST	TOTAL UNIT COST
Subcontractor	(1)	5,000,000 LF				$36.00 /LF	$36.00 /LF
Support	(2)					$2.07 /LF	$2.07 /LF
Variable - Unit Cost of Sand & Gravel Production =	(3)			$4.10 /TN			
Variable Unit Cost of the Mid-Sea Barrier Truck Haul =	(4)			$5.35 /TN			
Total of Aggregate Cost	(6)	1,944,000 TN		$9.46 /TN			
	(7)	5,000,000 LF		$3.68 /LF			$3.68 /LF

Subtotal	$41.75 /LF
General Contractor Markup @ 10.00%	$4.17 /LF
Unit Price of Stone Column Work =	**$45.92 /LF**

Notes:

1. From Subcontractor Bid
2. From Subcontractor Bid
3. From Appendix F-17
4. From Appendix F-22
5. 5,000,000 LF is the maximum capacity of a single crew.
   Each additional crew will have the same average haul regardless of the alternate being estimated.
6. Rock useage is based on an aggregate requirement of 0.36 Tons per Lineal Foot of Stone Column, plus an additional 8.00% waste factor.
   Therefore 5,000,000 LF of Stone Column x 0.36 Tons/LF x 1.08 = 1,944,000 Tons.

Stone Column Support - Variable Cost

Shift Duration: 9 Hours/Day @ 5 Days/Week = 45 Hours/Week
2 Shifts/Day @ 5 Days/Week = 90 Hours/Week

Material: 1-1/4 - 3/4 Inch Rock -= Make @ Sand/Gravel Plant

Quantity: 5,000,000 LF of Stone Columns @ 0.36 Tons/LF = 1,800,000 Tons

Item & Description	Quantity	Unit Cost	Duration/Size	Equipment Total	STS Total	Labor Total	Permanent Material Total	Subcontractor Total	Subtotals
1. Support of Stone Column Construction									
	5,000,000 LF at	**25,000 LF/Week**	200 Weeks						
200 Weeks @	**90 Hours per Week =**		**18,000 Hours**						
Pickup Truck - 3/4 Ton	1 EA	$16.84 /HR	18,000 Hours	$303,120					
Cat 966 Loader	1 EA	$92.00 /HR	18,000 Hours	$1,656,000					
OS - End Dump Truck	4 EA	$80.00 /HR	18,000 Hours	$5,760,000					
Subtotal of Equipment Cost									**$7,719,120**
Foreman	1 EA	$78.29 /HR	18,000 Hours			$1,409,180			
Operator	1 EA	$67.70 /HR	18,000 Hours			$1,218,660			
Subtotal of Labor Cost									**$2,627,840**
2. Summary of Variable Costs for Support of Stone Column Construction				$7,719,120	$0	$2,627,840	$0	$0	**$10,346,960**

Total Stone Column Construction Quantity Installed = 5,000,000 LF

Variable Unit Cost of Stone Column Support = $2.07 /LF of Stone Column

Habitat Ponds - 500 Acre Pond

Shift Duration: 9 Hours/Day @ 5 Days/Week = 45 Hours/Week

Item & Description	Quantity	Unit Cost	Duration/Size	Equipment Total	STS Total	Labor Total	Permanent Material Total	Subcontractor Total	Subtotals
1. Excavation to Stockpile	**417,778 CY at**	**22,680 CY/Week =**	**18.4 Weeks**						
19 Weeks @	**45 Hours per Week =**		**855 Hours**						
Pickup Truck - 3/4 Ton	1 EA	$16.84 /HR	855 Hours	$14,398					
Cat D8 Dozer	2 EA	$169.85 /HR	855 Hours	$290,444					
Challenger w/Can or Disc	6 EA	$140.00 /HR	855 Hours	$718,200					
Cat 14 Blade	1 EA	$108.11 /HR	855 Hours	$92,434					
Subtotal of Equipment Cost									**$1,115,476**
Foreman	1 EA	$78.29 /HR	855 Hours			$66,936			
Labor	1 EA	$49.75 /HR	855 Hours			$42,533			
Operator	9 EA	$67.70 /HR	855 Hours			$520,977			
Subtotal of Labor Cost									**$630,447**
2. Aerate									
27 Weeks @	**45 Hours per Week =**		**1,215 Hours**						
Challenger w/Can or Disc	2 EA	$140.00 /HR	1,215 Hours	$340,200					
Subtotal of Equipment Cost									**$340,200**
Operator	2 EA	$67.70 /HR	1,215 Hours			$164,519			
Subtotal of Labor Cost									**$164,519**
3. Excavation to Embankment	**613,646 CY at**	**22,680 CY/Week =**	**27 Weeks**						
27 Weeks @	**45 Hours per Week =**		**1,215 Hours**						
Pickup Truck - 3/4 Ton	1 EA	$16.84 /HR	1,215 Hours	$20,461					
Challenger w/Can or Disc	6 EA	$140.00 /HR	1,215 Hours	$1,020,600					
Cat D8 Dozer	2 EA	$169.85 /HR	1,215 Hours	$412,736					
SD 170 Compactor	1 EA	$72.85 /HR	1,215 Hours	$88,513					
Subtotal of Equipment Cost									**$1,542,309**

Item & Description	Quantity	Unit Cost	Duration/Size	Equipment Total	STS Total	Labor Total	Permanent Material Total	Subcontractor Total	Subtotals
Foreman	1 EA	$78.29 /HR	1,215 Hours			$95,120			
Operator	9 EA	$67.70 /HR	1,215 Hours			$740,336			
Subtotal of Labor Cost									**$835,456**
4. Place fabric	**193,900 SY at**	**27,000 SY/Week =**	**7.2 Weeks**						
8 Weeks @	**45 Hours per Week =**		**360 Hours**						
Pickup Truck - 3/4 Ton	1 EA	$16.84 /HR	360 Hours	$6,062					
Cat 966 Loader	1 EA	$92.00 /HR	360 Hours	$33,120					
Subtotal of Equipment Cost									**$39,182**
Foreman	1 EA	$78.29 /HR	360 Hours			$28,184			
Labor	4 EA	$49.75 /HR	360 Hours			$71,635			
Operator	1 EA	$67.70 /HR	360 Hours			$24,373			
Subtotal of Labor Cost									**$124,192**
Geo-grid Fabric	193,900 SY	$4.00 /SY	1 EA		$775,600				
Subtotal of STS Cost									**$775,600**
5. Summary of Habitat Pond Construction Costs				$3,037,167	$775,600	$1,754,613	$0	$0	**$5,567,380**

Total Fixed Cost of Constructing Habitat Pond = $5,567,380

Habitat Pond Size = 500 Acres

Variable Unit Cost of Constructing Habitat Ponds = $11,135 /Acre

ITEM WORK SHEET

Project: Salton Sea
Type of Work: Slurry Wall

Estimator: Mike Pauletto
Date: 8/29/2006

DESCRIPTION (REFERENCE)		Short Depth	Medium Depth
		UNIT COST	UNIT COST
Slurry Wall		$5.00 /SF	$8.75 /SF
Labor Support		$0.45 /SF	$0.45 /SF
Subtotal		$5.45 /SF	$9.20 /SF
General Contractor Markup @	10%	$0.55 /SF	$0.92 /SF
Total Unit Price =		$6.00 /SF	$10.12 /SF