

BUENA VISTA LAGOON ENHANCEMENT PROJECT

PRELIMINARY COST ESTIMATE FOR

CONSTRUCTION AND MAINTENANCE

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1. INTRODUCTION

The Buena Vista Lagoon Enhancement Project (BVLEP) is in the environmental review phase of project development. The four enhancement alternatives listed below are currently undergoing environmental impact evaluation in accordance with the California Environmental Quality Act (CEQA). Descriptions of these alternatives can be found in the Buena Vista Lagoon Enhancement Project Draft Environmental Impact Report (SANDAG 2015).

- I. Saltwater Alternative
- II. Freshwater Alternative
- III. Hybrid Alternative A (mix of saltwater and freshwater with channel in Weir Basin)
- IV. Hybrid Alternative B (mix of saltwater and freshwater without channel in Weir Basin)

The costs associated with each enhancement alternative will be an important consideration in the ultimate selection of a preferred alternative. To help address the economic feasibility, construction cost estimates were prepared for each of the four enhancement alternatives based on preliminary design plans prepared for each enhancement alternative. In addition, maintenance cost estimates were prepared to provide information regarding the long term costs associated with each enhancement alternative. The construction cost estimates are presented below followed by the maintenance cost estimates.

2. CONSTRUCTION COST ESTIMATE

2.1 Overview

Construction cost estimates were derived from estimated quantities and the unit costs associated with these quantities. Unit cost data used in the cost estimate were based on information from cost estimates and actual construction costs of similar projects within southern California (e.g., Bolsa Chica Wetlands, San Diego Bay Western Salt Ponds Restoration, San Dieguito Lagoon Restoration), RS Means (2014), Caltrans Cost Data Books, and Dredging Statistics Program of the U.S. Army Corps of Engineers (Corps 2014).

The largest component of the construction cost associated with each alternative is the disposal of fine-grained sediment excavated during project construction. Two approaches for disposal of these sediments were investigated to develop the construction cost estimate. The first approach, referred to as “Approach 1 – LA-5” would involve transporting fine-grained sediment by barge to the Los Angeles Ocean Dredged Material Disposal Site (LA-5 ODMDS) located off the coast of San Diego approximately six miles from Point Loma. The LA-5 ODMDS is an offshore site approved by the U.S. Environmental Protection Agency for the disposal of ocean dredged material. The second approach would involve the creation of an overdredge pit within the project site in a location devoid of beach-quality sand. The fine-

grained sediments in the overdredge pit deemed unsuitable for beach or nearshore placement would essentially be swapped for the deeper, beach-quality sand and then the beach-quality sand would be placed on nearby beaches or in nearshore waters where it would serve as beneficial use (beachfill). This approach is referred to as “Approach 2 – Overdredge Pit”. Considering two sediment disposal approaches for all four enhancement alternatives resulted in eight different construction cost estimate scenarios. The results of these eight construction cost estimate scenarios are presented below.

2.2 Construction Cost Estimate Background Information and Assumptions

The following background information and assumptions affect the construction cost estimates for the four enhancement alternatives and two disposal approaches. Previous geological investigations suggested that sediment underneath the current lagoon bottom is free of contaminants and falls into three categories: beach-quality sand, nearshore-quality fine sand and fine-grained sediment. It was assumed that sediment that contains less than 20% fine-grained sediment could be placed on the beach at North Oceanside Beach and Carlsbad Beaches. It was assumed that sediment that contains between 20% and 30% fine-grained sediment can be placed in nearshore waters just off the coast of Oceanside where the beach-quality sediment would be transported to the beach via wave action to provide a beneficial use (beachfill). Sediment which does not meet either of these criteria would be disposed of either at the LA-5 ODMS or in an overdredge pit created within the lagoon.

The construction cost estimate includes the following strategies, conditions, and assumptions.

- Costs are in 2014 US dollars with unit costs representing in-place costs, including contractor's overhead and profit. Costs derived from projects developed before 2014 were converted to 2014 costs using the cost indexes developed by the Engineering News Record (ENR, 2014).
- The cost estimates do not include costs to improve bridges and overcrossings for the NTCD Railroad and I-5. Each of these corridors crosses the Lagoon but other entities are in charge of planned improvements to the structures. The costs of embankment protection for these structures are not included in the construction cost estimate.
- Cattails and other vegetation that are planned for removal would be disposed at the El Corazon Compost Facility located in Oceanside, San Diego County approximately 4 miles from the project.
- Earthwork would be done by dredging and it is assumed that dewatering would not be required since all sediment would either be beneficially reused as beachfill with direct

beach placement or nearshore placement or disposed of via onsite placement in an overdredge pit or at offshore at the LA5 ODMDS.

- Earthwork quantities were estimated based on contours for the proposed enhancement alternatives prepared by Everest, and contours for existing condition prepared by Wootton Land Consultants (2005). Volume estimates were prepared with the aid of Autodesk Civil 3D terrain models.
- Costs do not include land acquisition, conservation easements, or post-construction monitoring.
- Mobilization and demobilization costs were based on 10% of the other construction costs for the lowest cost alternative given the same disposal approach.
- The following costs were estimated based on a percentage of other costs.
 - a. Contingency estimated at 25% of the construction cost.
 - b. Construction management estimated at 5% of the construction cost with contingency.
 - c. Environmental monitoring during construction estimated at 2% of the construction cost with contingency.
 - d. Final engineering/design estimated at 10% of the total construction cost.

2.3 Construction Cost Estimate Summary

The detailed construction breakdown for each enhancement alternative under each beneficial use/disposal approach is presented in Appendix 1. A summary of the total project construction costs by alternative and approach is shown in Table 1. The total project cost ranges from \$42.9 million to \$67.8 million. In general, the construction cost for the Hybrid Alternative is the highest while that for the Freshwater Alternative is the lowest. The Overdredge Pit Approach lowers the project cost by \$3.5 million to \$6.1 million.

Table 1. Construction Cost Summary (in 2014 Dollars)

ALTERNATIVE	APPROACH 1: LA-5	APPROACH 2: OVERDREDGE PIT
Saltwater	\$65,080,000	\$60,120,000
Freshwater	\$46,400,000	\$42,890,000
Hybrid-A	\$67,750,000	\$61,630,000
Hybrid-B	\$66,950,000	\$60,840,000

Under the Saltwater Alternative and Hybrid Alternative, the existing 29-foot long Carlsbad Boulevard Bridge would be replaced with a bridge over the proposed 110-foot wide channel. The width of the roadway would remain at 54 feet per discussions with City of Carlsbad staff, but would be elevated from +9.7 feet, NGVD to +14.0 feet, NGVD. Approaches extending approximately 300 feet north and south of the structure would be constructed to maintain sight lines for the proposed bridge. Bridge construction costs were prepared by AECOM and these cost estimates have been incorporated into the detailed cost estimates in Appendix 1. Under the Freshwater Alternative, no channel expansion would occur and there would be no changes to the existing bridge structure.

Upon completion of the major earthwork elements of the construction effort, planting in specific proposed habitat types would be required to facilitate success. Only some habitats, such as vegetated habitats and/or salt water dependent habitats, would require planting. Initial planting and plant maintenance needs for five years after construction have been included in the construction cost estimate. In calculating these costs, certain assumptions were made regarding the specific restoration tasks, required maintenance, and plant density involved in the enhancement of each habitat type under each alternative. The planting costs were prepared by AECOM and this information has been incorporated into the detailed cost estimates in Appendix 1.

3. MAINTENANCE COST ESTIMATE

3.1 Overview

Maintenance cost estimates were derived from estimated quantities of project features requiring maintenance, and the unit costs associated with these quantities. Unit cost data used in the cost estimate were based on information from cost estimates and actual construction costs of similar projects within southern California (e.g., Bolsa Chica Wetlands, San Diego Bay Western Salt Ponds Restoration, San Dieguito Lagoon Restoration), RS Means (2014), and Caltrans Cost Data Books.

Everest (2014) has shown that under the Saltwater Alternative and two Hybrid Alternatives littoral sediment is likely to deposit within the inlet channel, Weir Basin, and, possibly, the Railroad Basin. This deposition would likely accumulate over time until the inlet is effectively closed to tidal exchange. To maintain tidal exchange a maintenance program would be required to remove the deposited littoral sediment from the inlet channel. In addition, it is expected that fluvial (river) sediment would deposit within the lagoon over time in a manner similar to, albeit slower than, historical sedimentation. It is possible that fluvial sedimentation might keep pace with sea level rise in which case little to no maintenance would be required for fluvial sedimentation; however, given uncertainties in sea level rise and fluvial sedimentation it is prudent to plan for such sedimentation. Consequently, to maintain the

habitat distribution in the future a maintenance program could be required to remove the deposited fluvial sediment from the lagoon basins. Structural elements (e.g., channel guide) associated with each enhancement alternative would require maintenance in the future to maintain the function of these elements (e.g., channel slope protection). Other maintenance components could include trash removal, exotics removal, and predator control but these components are not considered further as it is assumed such components would be provided by the California Department of Fish and Wildlife and nonprofit organizations. The cost estimate associated with these maintenance components is presented below for the four enhancement alternatives.

3.2 Maintenance Cost Estimate Background and Assumptions

The following background information and assumptions affect the maintenance cost estimates for the various enhancement alternatives.

- Costs are in 2014 US dollars with unit costs representing in-place costs, including contractor's overhead and profit.
- The maintenance cost estimates do not include costs to maintain the bridges and overcrossings for Carlsbad Boulevard, NTCD Railroad, and I-5. Each of these corridors crosses the Lagoon but other entities are in charge of maintenance for these infrastructure components.
- The littoral sediment volume was estimated from the study conducted for this project as documented in, "Tidal Inlet Maintenance Memo" prepared by Everest 2014. It was estimated that the tidal inlet would require maintenance every 12 to 20 months so annual maintenance was assumed for development of the maintenance cost estimates. Littoral sediment would be suitable for beach placement upcoast and/or downcoast from the inlet under the Salt Water Alternative and two Hybrid Alternatives. Littoral sediment would be excavated using conventional, land-based construction equipment that would access the area via the inlet channel.
- The fluvial sedimentation volume was estimated from an analysis of historical bathymetric data conducted by Everest to support the maintenance cost estimate. Fluvial sedimentation is caused by relatively small base flow and urban runoff flows that occur throughout the year as well as relatively large storm flows that occur primarily during the wet season from October through March. Most sediment delivery to the lagoon is associated with the storm flows; hence, most fluvial sedimentation is associated with storm flows that occur on an episodic basis. A range of fluvial sedimentation was developed to capture the episodic nature of fluvial sedimentation. For the Saltwater Alternative, it was assumed that most of the fine-grained fluvial sediment would pass through the lagoon to the ocean so fluvial sedimentation would

be negligible; hence, it was assumed that no fluvial sedimentation maintenance would be required for the Saltwater Alternative. For the Freshwater Alternative and two Hybrid Alternatives a high and low range of fluvial sedimentation was identified and these values were carried through to develop both a high and low maintenance costs. High and low ranges were developed for other maintenance cost components to maintain consistency for this approach. It was assumed that maintenance of fluvial sediment would be required once every 25 years. It was assumed that the fluvial sediment would mostly be fine-grained sediment that would be dredged from the lagoon, dried onsite, and hauled to a nearby landfill for disposal using standard dump trucks.

- Annual vegetation maintenance costs were based on unit costs (\$ per acre) to conduct such maintenance from two sources applied over the proposed cattail maintenance area. The low cost estimate was based on a unit cost (updated to 2014 dollars) taken from a 1986 article titled, "Efficacy and Cost of Aquatic Weed Control in Small Ponds" in the Journal of American Water Resources Associates (Shireman 1986). The high cost estimate was based on a unit cost (updated to 2014 dollars) taken from the University of California Division of Agriculture and Natural Resources (UCANR 2015).
- Annual miscellaneous maintenance costs for various structures (e.g., weir) were expressed as a percentage of the initial structure cost. Such structures may not require significant maintenance for several years in a row, only to be damaged by periodic storm events. The structure maintenance costs are intended to represent an annualized cost for intermittent and/or long-term periodic maintenance and full replacement of damaged components. To develop this cost it was assumed that maintenance of water control structures would be conducted every 10 years to develop a high cost estimate or every 20 years to develop a low cost estimate.
- Mobilization and demobilization costs were estimated at 10% of the other maintenance costs.

3.3 Maintenance Cost Estimate Summary

Detailed maintenance cost estimate information for each enhancement alternative is provided in Appendix 2. The ranges in total estimated annual maintenance costs for each enhancement alternative are presented in Table 2. The total annual maintenance cost ranges from about \$152,000 to \$744,000. The maintenance cost for the Saltwater Alternative has the lowest estimated cost while the costs for the other alternatives are estimated at anywhere from about \$69,000 to \$592,000 higher than the cost for the Saltwater Alternative.

Table 2. Maintenance Cost Range Summary (in 2014 Dollars)

ALTERNATIVE	ANNUAL COST LOW END	ANNUAL COST HIGH END
Saltwater	\$152,000	\$233,000
Freshwater	\$221,000	\$504,000
Hybrid-A	\$377,000	\$744,000
Hybrid-B	\$374,000	\$733,000

4. REFERENCES

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APPENDIX 1

BVLEP Detailed Breakdown of Construction Cost Estimate

Appendix 1
Buena Vista Lagoon Enhancement Project - Design and Construction Cost Estimate Summary

Construction Item	Saltwater Alternative		Freshwater Alternative		Hybrid-A Alternative		Hybrid-B Alternative	
	Approach 1: LA-5 Disposal	Approach 2: Overdredge Pit	Approach 1: LA-5 Disposal	Approach 2: Overdredge Pit	Approach 1: LA-5 Disposal	Approach 2: Overdredge Pit	Approach 1: LA-5 Disposal	Approach 2: Overdredge Pit
Mobilization and Demobilization	\$ 2,900,000	\$ 2,700,000	\$ 2,900,000	\$ 2,700,000	\$ 2,900,000	\$ 2,700,000	\$ 2,900,000	\$ 2,700,000
General Site Preparation	\$ 1,449,325	\$ 1,677,850	\$ 1,366,600	\$ 1,567,425	\$ 1,512,700	\$ 1,727,375	\$ 1,512,700	\$ 1,727,375
Reed & Cattail Removal	\$ 3,064,250	\$ 3,064,250	\$ 1,868,500	\$ 1,868,500	\$ 2,114,750	\$ 2,114,750	\$ 2,114,750	\$ 2,114,750
Earthwork	\$ 32,248,258	\$ 28,816,288	\$ 24,669,888	\$ 22,264,228	\$ 33,931,478	\$ 29,735,738	\$ 33,931,478	\$ 29,735,738
Ocean Inlet/Weir/Water Control Structure/Channel Guides	\$ 757,176	\$ 757,176	\$ 225,000	\$ 225,000	\$ 1,801,322	\$ 1,801,322	\$ 1,257,176	\$ 1,257,176
Lagoon Planting	\$ 111,969	\$ 111,969	\$ 69,257	\$ 69,257	\$ 89,234	\$ 89,234	\$ 89,234	\$ 89,234
Plant Maintenance during First 5-Year Establishment Period	\$ 1,187,964	\$ 1,187,964	\$ 635,544	\$ 635,544	\$ 1,187,544	\$ 1,187,544	\$ 1,187,544	\$ 1,187,544
Carlsbad Boulevard Bridge (54' Wide Single Span)	\$ 2,784,870	\$ 2,784,870	\$ -	\$ -	\$ 2,784,870	\$ 2,784,870	\$ 2,784,870	\$ 2,784,870
Construction Cost without Contingency	\$ 44,500,000	\$ 41,100,000	\$ 31,730,000	\$ 29,330,000	\$ 46,320,000	\$ 42,140,000	\$ 45,780,000	\$ 41,600,000
Contingency (25%)	\$ 11,130,000	\$ 10,280,000	\$ 7,930,000	\$ 7,330,000	\$ 11,580,000	\$ 10,540,000	\$ 11,450,000	\$ 10,400,000
Construction Cost with Contingency	\$ 55,630,000	\$ 51,380,000	\$ 39,660,000	\$ 36,660,000	\$ 57,900,000	\$ 52,680,000	\$ 57,230,000	\$ 52,000,000
Construction Management (5%)	\$ 2,780,000	\$ 2,570,000	\$ 1,980,000	\$ 1,830,000	\$ 2,900,000	\$ 2,630,000	\$ 2,860,000	\$ 2,600,000
Environmental Monitoring during Construction (2%)	\$ 1,110,000	\$ 1,030,000	\$ 790,000	\$ 730,000	\$ 1,160,000	\$ 1,050,000	\$ 1,140,000	\$ 1,040,000
Final Engineering/Design (10%)	\$ 5,560,000	\$ 5,140,000	\$ 3,970,000	\$ 3,670,000	\$ 5,790,000	\$ 5,270,000	\$ 5,720,000	\$ 5,200,000
Total	\$ 65,080,000	\$ 60,120,000	\$ 46,400,000	\$ 42,890,000	\$ 67,750,000	\$ 61,630,000	\$ 66,950,000	\$ 60,840,000

APPENDIX 1
Buena Vista Lagoon Enhancement Project - Design and Construction Cost Estimate

Saltwater Alternative LA-5 Disposal Approach				
Item	Unit	Unit Price	Quantity	Cost
<i>Mobilization and Demobilization</i>	LS	\$ 2,900,000.00	1	\$ 2,900,000
<i>General Site Preparation</i>				
Clearing & Grubbing Site in General (Not Incl. Some Specifics)	AC	\$ 1,900.00	154	\$ 292,600
Utilities Protection/Relocation	LS	\$ 50,000.00	1	\$ 50,000
Protect/Intercept Storm Drains from Clogging	EA	\$ 10,000.00	27	\$ 270,000
Protect Overhead Utilities	LF	\$ 17.00	7,900	\$ 134,300
Construction Survey	LS	\$ 200,000.00	1	\$ 200,000
Water Quality Protection	LS	\$ 30,000.00	1	\$ 30,000
Environmental Protection & Monitoring	LS	\$ 30,000.00	1	\$ 30,000
Maintain Railroad Operation	LS	\$ 20,000.00	1	\$ 20,000
Haul Road Maintenance (Throughout Project)	Day	\$ 1,385.00	305	\$ 422,425
<i>Reed & Cattail Removal</i>				
Remove Cattail	AC	\$ 3,000.00	84	\$ 252,000
Stockpile for Drying	CY	\$ 0.50	211,100	\$ 105,550
Load on Truck and Haul to Nearby Recycling Facility (16 Cy Truck)	CY	\$ 7.00	211,100	\$ 1,477,700
Green Waste Facility Tipping Fee	Tons	\$ 40.00	30,725	\$ 1,229,000
<i>Earthwork Weir Basin</i>				
Construct Access Roads & Staging Areas	SY	\$ 3.15	6,078	\$ 19,147
Temporary Dredge-Barge Dock	LF	\$ 290.00	100	\$ 29,000
Dredge and Place Beach Sand to Oceanside Beach (2.5 Mi)	CY	\$ 15.00	27,000	\$ 405,000
Dredge and Place Fine Sand to Nearshore (2 Mi)	CY	\$ 28.00	39,750	\$ 1,113,000
Final Grade	AC	\$ 6,000.00	11.6	\$ 69,572
<i>Earthwork Railroad Basin</i>				
Clear & Grub Railroad Trestle Channel	LS	\$ 20,000.00	1	\$ 20,000
Construct Access Roads & Staging Areas	SY	\$ 3.15	10,737	\$ 33,822
Temporary Dredge-Barge Dock	LF	\$ 290.00	100	\$ 29,000
Dredge and Place Beach Sand to Oceanside Beach (2.5 Mi)	CY	\$ 15.00	64,550	\$ 968,250
Dredge and Dispose Fines to LA-5 By Barge	CY	\$ 44.00	36,360	\$ 1,599,840
Final Grade	AC	\$ 6,000.00	17.7	\$ 106,306
<i>Earthwork CH Basin</i>				
Clear & Grub Carlsbad Blvd Bridge Channel	LS	\$ 20,000.00	1	\$ 20,000
Construct Access Roads & Staging Areas	SY	\$ 3.15	10,698	\$ 33,698
Temporary Dredge-Barge Dock	LF	\$ 290.00	430	\$ 124,700
Dredge and Place Beach Sand to Oceanside Beach (2.5 Mi)	CY	\$ 15.00	18,230	\$ 273,450
Dredge and Place Fine Sand to Nearshore (2 Mi)	CY	\$ 28.00	8,790	\$ 246,120
Dredge and Dispose Fines to LA-5 By Barge	CY	\$ 44.00	265,650	\$ 11,688,600
Final Grade	AC	\$ 6,000.00	112.1	\$ 672,789

APPENDIX 1
Buena Vista Lagoon Enhancement Project - Design and Construction Cost Estimate

Saltwater Alternative LA-5 Disposal Approach				
Item	Unit	Unit Price	Quantity	Cost
<i>Earthwork I-5 Basin</i>				
Clear & Grub Carlsbad I-5 Bridge Channel	LS	\$ 20,000.00	1	\$ 20,000
Construct Access Roads & Staging Areas	SY	\$ 3.15	8,776	\$ 27,644
Temporary Dredge-Barge Dock	LF	\$ 290.00	100	\$ 29,000
Temporary Rip-Rap Channel Protection at Staging Area	LF	\$ 171.20	200	\$ 34,240
Dredge and Dispose Fines To LA-5 By Barge	CY	\$ 44.00	320,620	\$ 14,107,280
Final Grade	AC	\$ 6,000.00	96.3	\$ 577,800
<i>Construct Ocean Inlet (Between San Malo & Carlsbad)</i>				
Demolish Existing Weir	LS	\$ 25,000.00	1	\$ 25,000
Final Inlet Grading	AC	\$ 6,000.00	1.4	\$ 8,226
Upgrade San Malo Revetment (Allowance)	LS	\$ 200,000.00	1	\$ 200,000
<i>Construct Channel Guide (Buried Levee) on Carlsbad Side</i>				
Excavation & Grading	LF	\$ 356.40	525	\$ 187,110
Armor Stone, 8-Ton	LF	\$ 335.40	525	\$ 176,085
Armor Stone, 1/2 Ton	LF	\$ 72.50	525	\$ 38,063
Rip Rap / Quarry Run	LF	\$ 924.00	125	\$ 115,500
Geotextile	LF	\$ 13.70	525	\$ 7,193
<i>Lagoon Planting</i>				
Diegan Coastal Sage Scrub	LS	\$ 7,266.00	1	\$ 7,266
Riparian Enhancement	LS	\$ 31,860.00	1	\$ 31,860
High Salt Marsh (non-tidal)	LS	\$ 7,441.00	1	\$ 7,441
High Salt Marsh	LS	\$ 39,796.00	1	\$ 39,796
Mid Salt Marsh	LS	\$ 25,606.00	1	\$ 25,606
<i>Plant Maintenance during First 5-Year Establishment Period</i>				
Diegan Coastal Sage Scrub	LS	\$ 154,552.00	1	\$ 154,552
Riparian Enhancement	LS	\$ 154,552.00	1	\$ 154,552
High Salt Marsh (non-tidal)	LS	\$ 204,430.00	1	\$ 204,430
High Salt Marsh	LS	\$ 275,440.00	1	\$ 275,440
Mid Salt Marsh	LS	\$ 275,440.00	1	\$ 275,440
Low Salt Marsh	LS	\$ 123,550.00	1	\$ 123,550

APPENDIX 1

Buena Vista Lagoon Enhancement Project - Design and Construction Cost Estimate

Saltwater Alternative LA-5 Disposal Approach				
Item	Unit	Unit Price	Quantity	Cost
<i>Carlsbad Boulevard Bridge (54' Wide Single Span)</i>				
Mobilization (5% of the total construction cost)	LS	\$ 126,585.00	1	\$ 126,585
Traffic Control (5% of the total construction cost)	LS	\$ 126,585.00	1	\$ 126,585
Remove Bridge	SF	\$ 14.00	1,350	\$ 18,900
Remove Asphalt Concrete	SF	\$ 5.00	29,700	\$ 148,500
Clearing and Grubbing	LS	\$ 50,000.00	1	\$ 50,000
Earthwork - Roadway Excavation & Recompaction	CY	\$ 32.00	400	\$ 12,800
Imported Borrow	CY	\$ 35.00	3,000	\$ 105,000
Replace Fence	LF	\$ 32.00	400	\$ 12,800
Aggregate Base, Class 2, 11" New Roadway	SF	\$ 2.00	23,800	\$ 47,600
Asphalt Concrete - 5.5" Roadway	SF	\$ 4.00	23,800	\$ 95,200
Minor Concrete - Curb & Gutter, SDRSD G-2, Type G	LF	\$ 40.00	900	\$ 36,000
Minor Concrete - Sidewalk, SDRSD G-7	SF	\$ 8.00	2,200	\$ 17,600
Bridge (54' wide X 110' long)	SF	\$ 190.00	5,940	\$ 1,128,600
Curb Inlet, Type B-1	EA	\$ 5,000.00	8	\$ 40,000
Reinforced Concrete Pipe - 18"	LF	\$ 180.00	800	\$ 144,000
Curb Inlet Filter	EA	\$ 845.00	8	\$ 6,760
Bioretention Basin	LS	\$ 25,000.00	1	\$ 25,000
Retaining Wall	SF	\$ 35.00	3,000	\$ 105,000
Roadside Signs	EA	\$ 295.00	12	\$ 3,540
Street Light, SDRSD E-1	EA	\$ 12,500.00	12	\$ 150,000
Traffic Striping	LS	\$ 25,000.00	1	\$ 25,000
Crash Cushion Modules	EA	\$ 15,000.00	4	\$ 60,000
WPC - SWPPP	LS	\$ 15,000.00	1	\$ 15,000
WPC - Construction Site Management	LS	\$ 25,000.00	1	\$ 25,000
Utility Relocation (Power lines)	LS	\$ 200,000.00	1	\$ 200,000
Erosion Control	SF	\$ 2.00	29,700	\$ 59,400
Construction Cost without Contingency				\$ 44,500,000
Contingency (25%)				\$ 11,130,000
Construction Cost with Contingency				\$ 55,630,000
Construction Management (5%)				\$ 2,780,000
Environmental Monitoring during Construction (2%)				\$ 1,110,000
Final Engineering/Design (10%)				\$ 5,560,000
Saltwater Alt - LA-5 Disposal Approach Total				\$ 65,080,000

APPENDIX 1
Buena Vista Lagoon Enhancement Project - Design and Construction Cost Estimate

Saltwater Alternative Overdredge Pit Disposal Approach				
Item	Unit	Unit Price	Quantity	Cost
<i>Mobilization and Demobilization</i>	LS	\$ 2,700,000.00	1	\$ 2,700,000
<i>General Site Preparation</i>				
Clearing & Grubbing Site in General (Not Incl. Some Specifics)	AC	\$ 1,900.00	154	\$ 292,600
Utilities Protection/Relocation	LS	\$ 50,000.00	1	\$ 50,000
Protect/Intercept Storm Drains from Clogging	EA	\$ 10,000.00	27	\$ 270,000
Protect Overhead Utilities	LF	\$ 17.00	7,900	\$ 134,300
Construction Survey	LS	\$ 200,000.00	1	\$ 200,000
Water Quality Protection	LS	\$ 30,000.00	1	\$ 30,000
Environmental Protection & Monitoring	LS	\$ 30,000.00	1	\$ 30,000
Maintain Railroad Operation	LS	\$ 20,000.00	1	\$ 20,000
Haul Road Maintenance (Throughout Project)	Day	\$ 1,385.00	470	\$ 650,950
<i>Reed & Cattail Removal</i>				
Remove Cattail	AC	\$ 3,000.00	84	\$ 252,000
Stockpile for Drying	CY	\$ 0.50	211,100	\$ 105,550
Load on Truck and Haul to Nearby Recycling Facility (16 Cy Truck)	CY	\$ 7.00	211,100	\$ 1,477,700
Green Waste Facility Tipping Fee	Tons	\$ 40.00	30,725	\$ 1,229,000
<i>Earthwork Weir Basin</i>				
Construct Access Roads & Staging Areas	SY	\$ 3.15	6,078	\$ 19,147
Temporary Dredge-Barge Dock	LF	\$ 290.00	100	\$ 29,000
Dredge and Place Beach Sand to Oceanside Beach (2.5 Mi)	CY	\$ 15.00	27,000	\$ 405,000
Dredge and Place Fine Sand to Nearshore (2 Mi)	CY	\$ 28.00	39,750	\$ 1,113,000
Final Grade	AC	\$ 6,000.00	11.6	\$ 69,572
<i>Earthwork Railroad Basin</i>				
Clear & Grub Railroad Trestle Channel	LS	\$ 20,000.00	1	\$ 20,000
Construct Access Roads & Staging Areas	SY	\$ 3.15	10,737	\$ 33,822
Temporary Dredge-Barge Dock	LF	\$ 290.00	100	\$ 29,000
Dredge and Place Beach Sand to Oceanside Beach (2.5 Mi)	CY	\$ 15.00	64,550	\$ 968,250
Dredge and Dispose Fines to Overdredge Pit	CY	\$ 10.00	36,360	\$363,600
Final Grade	AC	\$ 6,000.00	17.7	\$ 106,306
<i>Earthwork CH Basin</i>				
Clear & Grub Carlsbad Blvd Bridge Channel	LS	\$ 20,000.00	1	\$ 20,000
Construct Access Roads & Staging Areas	SY	\$ 3.15	10,698	\$ 33,698
Temporary Dredge-Barge Dock	LF	\$ 290.00	430	\$ 124,700
Dredge and Place Beach Sand to Oceanside Beach (2.5 Mi)	CY	\$ 15.00	140,900	\$ 2,113,500
Dredge and Place Fine Sand to Nearshore (2 Mi)	CY	\$ 28.00	508,740	\$ 14,244,720
Dredge and Temporary Stockpile Fines to Create Overdredge Pit	CY	\$ 10.00	135,700	\$1,357,000
Move Stockpiled Fines and Dispose to Overdredge Pit	CY	\$ 9.00	135,700	\$1,221,300
Dredge and Dispose Fines to Overdredge Pit	CY	\$ 10.00	197,700	\$1,977,000
Final Grade	AC	\$ 6,000.00	112.1	\$ 672,789

APPENDIX 1
Buena Vista Lagoon Enhancement Project - Design and Construction Cost Estimate

Saltwater Alternative Overdredge Pit Disposal Approach				
Item	Unit	Unit Price	Quantity	Cost
Earthwork I-5 Basin				
Clear & Grub Carlsbad I-5 Bridge Channel	LS	\$ 20,000.00	1	\$ 20,000
Construct Access Roads & Staging Areas	SY	\$ 3.15	8,776	\$ 27,644
Temporary Dredge-Barge Dock	LF	\$ 290.00	100	\$ 29,000
Temporary Rip-Rap Channel Protection at Staging Area	LF	\$ 171.20	200	\$ 34,240
Dredge and Dispose Fines To Overdredge Pit	CY	\$ 10.00	320,620	\$3,206,200
Final Grade	AC	\$ 6,000.00	96.3	\$ 577,800
Construct Ocean Inlet (Between San Malo & Carlsbad)				
Demolish Existing Weir	LS	\$ 25,000.00	1	\$ 25,000
Final Inlet Grading	Ac	\$ 6,000.00	1.4	\$ 8,226
Upgrade San Malo Revetment (Allowance)	LS	\$ 200,000.00	1	\$ 200,000
Construct Channel Guide (Buried Levee) on Carlsbad Side				
Excavation & Grading	LF	\$ 356.40	525	\$ 187,110
Armor Stone, 8-Ton	LF	\$ 335.40	525	\$ 176,085
Armor Stone, 1/2 Ton	LF	\$ 72.50	525	\$ 38,063
Rip Rap / Quarry Run	LF	\$ 924.00	125	\$ 115,500
Geotextile	LF	\$ 13.70	525	\$ 7,193
Lagoon Planting				
Diegan Coastal Sage Scrub	LS	\$ 7,266.00	1	\$ 7,266
Riparian Enhancement	LS	\$ 31,860.00	1	\$ 31,860
High Salt Marsh (non-tidal)	LS	\$ 7,441.00	1	\$ 7,441
High Salt Marsh	LS	\$ 39,796.00	1	\$ 39,796
Mid Salt Marsh	LS	\$ 25,606.00	1	\$ 25,606
Plant Maintenance during First 5-Year Establishment Period				
Diegan Coastal Sage Scrub	LS	\$ 154,552.00	1	\$ 154,552
Riparian Enhancement	LS	\$ 154,552.00	1	\$ 154,552
High Salt Marsh (non-tidal)	LS	\$ 204,430.00	1	\$ 204,430
High Salt Marsh	LS	\$ 275,440.00	1	\$ 275,440
Mid Salt Marsh	LS	\$ 275,440.00	1	\$ 275,440
Low Salt Marsh	LS	\$ 123,550.00	1	\$ 123,550

APPENDIX 1

Buena Vista Lagoon Enhancement Project - Design and Construction Cost Estimate

Saltwater Alternative Overdredge Pit Disposal Approach				
Item	Unit	Unit Price	Quantity	Cost
<i>Carlsbad Boulevard Bridge (54' Wide Single Span)</i>				
Mobilization (5% of the total construction cost)	LS	\$ 126,585.00	1	\$ 126,585
Traffic Control (5% of the total construction cost)	LS	\$ 126,585.00	1	\$ 126,585
Remove Bridge	SF	\$ 14.00	1,350	\$ 18,900
Remove Asphalt Concrete	SF	\$ 5.00	29,700	\$ 148,500
Clearing and Grubbing	LS	\$ 50,000.00	1	\$ 50,000
Earthwork - Roadway Excavation & Recompaction	CY	\$ 32.00	400	\$ 12,800
Imported Borrow	CY	\$ 35.00	3,000	\$ 105,000
Replace Fence	LF	\$ 32.00	400	\$ 12,800
Aggregate Base, Class 2, 11" New Roadway	SF	\$ 2.00	23,800	\$ 47,600
Asphalt Concrete - 5.5" Roadway	SF	\$ 4.00	23,800	\$ 95,200
Minor Concrete - Curb & Gutter, SDRSD G-2, Type G	LF	\$ 40.00	900	\$ 36,000
Minor Concrete - Sidewalk, SDRSD G-7	SF	\$ 8.00	2,200	\$ 17,600
Bridge (54' wide X 110' long)	SF	\$ 190.00	5,940	\$ 1,128,600
Curb Inlet, Type B-1	EA	\$ 5,000.00	8	\$ 40,000
Reinforced Concrete Pipe - 18"	LF	\$ 180.00	800	\$ 144,000
Curb Inlet Filter	EA	\$ 845.00	8	\$ 6,760
Bioretention Basin	LS	\$ 25,000.00	1	\$ 25,000
Retaining Wall	SF	\$ 35.00	3,000	\$ 105,000
Roadside Signs	EA	\$ 295.00	12	\$ 3,540
Street Light, SDRSD E-1	EA	\$ 12,500.00	12	\$ 150,000
Traffic Striping	LS	\$ 25,000.00	1	\$ 25,000
Crash Cushion Modules	EA	\$ 15,000.00	4	\$ 60,000
WPC - SWPPP	LS	\$ 15,000.00	1	\$ 15,000
WPC - Construction Site Management	LS	\$ 25,000.00	1	\$ 25,000
Utility Relocation (Power lines)	LS	\$ 200,000.00	1	\$ 200,000
Erosion Control	SF	\$ 2.00	29,700	\$ 59,400
Construction Cost without Contingency				\$ 41,100,000
Contingency (25%)				\$ 10,280,000
Construction Cost with Contingency				\$ 51,380,000
Construction Management (5%)				\$ 2,570,000
Environmental Monitoring during Construction (2%)				\$ 1,030,000
Final Engineering/Design (10%)				\$ 5,140,000
Saltwater Alt - Overdredge Pit Disposal Approach Total				\$ 60,120,000

APPENDIX 1
Buena Vista Lagoon Enhancement Project - Design and Construction Cost Estimate

Freshwater Alternative LA-5 Disposal Approach				
Item	Unit	Unit Price	Quantity	Cost
<i>Mobilization and Demobilization</i>	LS	\$ 2,900,000.00	1	\$ 2,900,000
<i>General Site Preparation</i>				
Clearing & Grubbing Site in General (Not Incl. Some Specifics)	AC	\$ 1,900.00	187	\$ 355,300
Utilities Protection/Relocation	LS	\$ 50,000.00	1	\$ 50,000
Protect/Intercept Storm Drains from Clogging	EA	\$ 10,000.00	27	\$ 270,000
Protect Overhead Utilities	LF	\$ 17.00	7,900	\$ 134,300
Construction Survey	LS	\$ 200,000.00	1	\$ 200,000
Water Quality Protection	LS	\$ 30,000.00	1	\$ 30,000
Environmental Protection & Monitoring	LS	\$ 30,000.00	1	\$ 30,000
Maintain Railroad Operation	LS	\$ 20,000.00	1	\$ 20,000
Haul Road Maintenance (Throughout Project)	Day	\$ 1,385.00	200	\$ 277,000
<i>Reed & Cattail Removal</i>				
Remove Cattail	AC	\$ 3,000.00	51	\$ 153,000
Stockpile for Drying	CY	\$ 0.50	129,000	\$ 64,500
Load on Truck and Haul to Nearby Recycling Facility (16 Cy Truck)	CY	\$ 7.00	129,000	\$ 903,000
Green Waste Facility Tipping Fee	Tons	\$ 40.00	18,700	\$ 748,000
<i>Earthwork Weir Basin</i>				
Construct Access Roads & Staging Areas	SY	\$ 3.15	6,078	\$ 19,147
Temporary Dredge-Barge Dock	LF	\$ 290.00	100	\$ 29,000
Dredge and Place Beach Sand to Oceanside Beach (2.5 Mi)	CY	\$ 15.00	3,570	\$ 53,550
Dredge and Place Fine Sand to Nearshore (2 Mi)	CY	\$ 28.00	17,220	\$ 482,160
Final Grade	AC	\$ 6,000.00	11.6	\$ 69,572
<i>Earthwork Railroad Basin</i>				
Clear & Grub Railroad Trestle Channel	LS	\$ 20,000.00	1	\$ 20,000
Construct Access Roads & Staging Areas	SY	\$ 3.15	10,737	\$ 33,822
Temporary Dredge-Barge Dock	LF	\$ 290.00	100	\$ 29,000
Dredge and Place Beach Sand to Oceanside Beach (2.5 Mi)	CY	\$ 15.00	31,920	\$ 478,800
Dredge and Dispose Fines to LA-5 By Barge	CY	\$ 44.00	30,600	\$ 1,346,400
Final Grade	AC	\$ 6,000.00	17.7	\$ 106,306
<i>Earthwork CH Basin</i>				
Clear & Grub Carlsbad Blvd Bridge Channel	LS	\$ 20,000.00	1	\$ 20,000
Construct Access Roads & Staging Areas	SY	\$ 3.15	10,698	\$ 33,698
Temporary Dredge-Barge Dock	LF	\$ 290.00	430	\$ 124,700
Dredge and Place Beach Sand to Oceanside Beach (2.5 Mi)	CY	\$ 15.00	13,540	\$ 203,100
Dredge and Place Fine Sand to Nearshore (2 Mi)	CY	\$ 28.00	12,470	\$ 349,160
Dredge and Dispose Fines to LA-5 By Barge	CY	\$ 44.00	264,500	\$ 11,638,000
Final Grade	AC	\$ 6,000.00	112.1	\$ 672,789

APPENDIX 1
Buena Vista Lagoon Enhancement Project - Design and Construction Cost Estimate

Freshwater Alternative LA-5 Disposal Approach				
Item	Unit	Unit Price	Quantity	Cost
<i>Earthwork I-5 Basin</i>				
Clear & Grub Carlsbad I-5 Bridge Channel	LS	\$ 20,000.00	1	\$ 20,000
Construct Access Roads & Staging Areas	SY	\$ 3.15	8,776	\$ 27,644
Temporary Dredge-Barge Dock	LF	\$ 290.00	100	\$ 29,000
Temporary Rip-Rap Channel Protection at Staging Area	LF	\$ 171.20	200	\$ 34,240
Dredge and Dispose Fines To LA-5 By Barge	CY	\$ 44.00	188,000	\$ 8,272,000
Final Grade	AC	\$ 6,000.00	96.3	\$ 577,800
<i>Replace Weir at Ocean Inlet</i>				
Demolish Existing Weir	LS	\$ 25,000.00	1	\$25,000
Construct New Weir	LS	\$ 200,000.00	1	\$200,000
<i>Lagoon Planting</i>				
Alkali Marsh/Freshwater Habitat Transition Zone	LS	\$ 31,286.00	1	\$31,286
Diegan Coastal Sage Scrub	LS	\$ 7,546.00	1	\$ 7,546
Riparian Enhancement	LS	\$ 30,425.00	1	\$ 30,425
<i>Plant Maintenance during First 5-Year Establishment Period</i>				
Alkali Marsh/Freshwater Habitat Transition Zone	LS	\$ 326,440.00	1	\$326,440
Diegan Coastal Sage Scrub	LS	\$ 154,552.00	1	\$ 154,552
Riparian Enhancement	LS	\$ 154,552.00	1	\$ 154,552
Construction Cost without Contingency				\$ 31,730,000
Contingency (25%)				\$ 7,930,000
Construction Cost with Contingency				\$ 39,660,000
Construction Management (5%)				\$ 1,980,000
Environmental Monitoring during Construction (2%)				\$ 790,000
Final Engineering/Design (10%)				\$ 3,970,000
Freshwater Alt - LA-5 Disposal Approach Total				\$ 46,400,000

APPENDIX 1
Buena Vista Lagoon Enhancement Project - Design and Construction Cost Estimate

Freshwater Alternative Overdredge Pit Disposal Approach				
Item	Unit	Unit Price	Quantity	Cost
<i>Mobilization and Demobilization</i>	LS	\$ 2,700,000.00	1	\$ 2,700,000
<i>General Site Preparation</i>				
Clearing & Grubbing Site in General (Not Incl. Some Specifics)	AC	\$ 1,900.00	187	\$ 355,300
Utilities Protection/Relocation	LS	\$ 50,000.00	1	\$ 50,000
Protect/Intercept Storm Drains from Clogging	EA	\$ 10,000.00	27	\$ 270,000
Protect Overhead Utilities	LF	\$ 17.00	7,900	\$ 134,300
Construction Survey	LS	\$ 200,000.00	1	\$ 200,000
Water Quality Protection	LS	\$ 30,000.00	1	\$ 30,000
Environmental Protection & Monitoring	LS	\$ 30,000.00	1	\$ 30,000
Maintain Railroad Operation	LS	\$ 20,000.00	1	\$ 20,000
Haul Road Maintenance (Throughout Project)	Day	\$ 1,385.00	345	\$ 477,825
<i>Reed & Cattail Removal</i>				
Remove Cattail	AC	\$ 3,000.00	51	\$ 153,000
Stockpile for Drying	CY	\$ 0.50	129,000	\$ 64,500
Load on Truck and Haul to Nearby Recycling Facility (16 Cy Truck)	CY	\$ 7.00	129,000	\$ 903,000
Green Waste Facility Tipping Fee	Tons	\$ 40.00	18,700	\$ 748,000
<i>Earthwork Weir Basin</i>				
Construct Access Roads & Staging Areas	SY	\$ 3.15	6,078	\$ 19,147
Temporary Dredge-Barge Dock	LF	\$ 290.00	100	\$ 29,000
Dredge and Place Beach Sand to Oceanside Beach (2.5 Mi)	CY	\$ 15.00	3,570	\$ 53,550
Dredge and Place Fine Sand to Nearshore (2 Mi)	CY	\$ 28.00	17,220	\$ 482,160
Final Grade	AC	\$ 6,000.00	11.6	\$ 69,572
<i>Earthwork Railroad Basin</i>				
Clear & Grub Railroad Trestle Channel	LS	\$ 20,000.00	1	\$ 20,000
Construct Access Roads & Staging Areas	SY	\$ 3.15	10,737	\$ 33,822
Temporary Dredge-Barge Dock	LF	\$ 290.00	100	\$ 29,000
Dredge and Place Beach Sand to Oceanside Beach (2.5 Mi)	CY	\$ 15.00	31,920	\$ 478,800
Dredge and Dispose Fines to Overdredge Pit	CY	\$ 10.00	30,600	\$306,000
Final Grade	AC	\$ 6,000.00	17.7	\$ 106,306
<i>Earthwork CH Basin</i>				
Clear & Grub Carlsbad Blvd Bridge Channel	LS	\$ 20,000.00	1	\$ 20,000
Construct Access Roads & Staging Areas	SY	\$ 3.15	10,698	\$ 33,698
Temporary Dredge-Barge Dock	LF	\$ 290.00	430	\$ 124,700
Dredge and Place Beach Sand to Oceanside Beach (2.5 Mi)	CY	\$ 15.00	139,400	\$ 2,091,000
Dredge and Place Fine Sand to Nearshore (2 Mi)	CY	\$ 28.00	369,600	\$ 10,348,800
Dredge and Temporary Stockpile Fines to Create Overdredge Pit	CY	\$ 10.00	135,700	\$1,357,000
Move Stockpiled Fines and Dispose to Overdredge Pit	CY	\$ 9.00	135,700	\$1,221,300
Dredge and Dispose Fines to Overdredge Pit	CY	\$ 10.00	219,890	\$2,198,900
Final Grade	AC	\$ 6,000.00	112.1	\$ 672,789

APPENDIX 1
Buena Vista Lagoon Enhancement Project - Design and Construction Cost Estimate

Freshwater Alternative Overdredge Pit Disposal Approach				
Item	Unit	Unit Price	Quantity	Cost
Earthwork I-5 Basin				
Clear & Grub Carlsbad I-5 Bridge Channel	LS	\$ 20,000.00	1	\$ 20,000
Construct Access Roads & Staging Areas	SY	\$ 3.15	8,776	\$ 27,644
Temporary Dredge-Barge Dock	LF	\$ 290.00	100	\$ 29,000
Temporary Rip-Rap Channel Protection at Staging Area	LF	\$ 171.20	200	\$ 34,240
Dredge and Dispose Fines To Overdredge Pit	CY	\$ 10.00	188,000	\$1,880,000
Final Grade	AC	\$ 6,000.00	96.3	\$ 577,800
Replace Weir at Ocean Inlet				
Demolish Existing Weir	LS	\$ 25,000.00	1	\$25,000
Construct New Weir	LS	\$ 200,000.00	1	\$200,000
Lagoon Planting				
Alkali Marsh/Freshwater Habitat Transition Zone	LS	\$ 31,286.00	1	\$31,286
Diegan Coastal Sage Scrub	LS	\$ 7,546.00	1	\$ 7,546
Riparian Enhancement	LS	\$ 30,425.00	1	\$ 30,425
Plant Maintenance during First 5-Year Establishment Period				
Alkali Marsh/Freshwater Habitat Transition Zone	LS	\$ 326,440.00	1	\$326,440
Diegan Coastal Sage Scrub	LS	\$ 154,552.00	1	\$ 154,552
Riparian Enhancement	LS	\$ 154,552.00	1	\$ 154,552
Construction Cost without Contingency				\$ 29,330,000
Contingency (25%)				\$ 7,330,000
Construction Cost with Contingency				\$ 36,660,000
Construction Management (5%)				\$ 1,830,000
Environmental Monitoring during Construction (2%)				\$ 730,000
Final Engineering/Design (10%)				\$ 3,670,000
Freshwater Alt - Overdredge Pit Disposal Approach Total				\$ 42,890,000

APPENDIX 1
Buena Vista Lagoon Enhancement Project - Design and Construction Cost Estimate

Hybrid Alternative A LA-5 Disposal Approach				
Item	Unit	Unit Price	Quantity	Cost
<i>Mobilization and Demobilization</i>	LS	\$ 2,900,000.00	1	\$ 2,900,000
<i>General Site Preparation</i>				
Clearing & Grubbing Site in General (Not Incl. Some Specifics)	AC	\$ 1,900.00	191	\$ 362,900
Utilities Protection/Relocation	LS	\$ 50,000.00	1	\$ 50,000
Protect/Intercept Storm Drains from Clogging	EA	\$ 10,000.00	27	\$ 270,000
Protect Overhead Utilities	LF	\$ 17.00	7,900	\$ 134,300
Construction Survey	LS	\$ 200,000.00	1	\$ 200,000
Water Quality Protection	LS	\$ 30,000.00	1	\$ 30,000
Environmental Protection & Monitoring	LS	\$ 30,000.00	1	\$ 30,000
Maintain Railroad Operation	LS	\$ 20,000.00	1	\$ 20,000
Haul Road Maintenance (Throughout Project)	Day	\$ 1,385.00	300	\$ 415,500
<i>Reed & Cattail Removal</i>				
Remove Cattail	AC	\$ 3,000.00	47	\$ 141,000
Stockpile for Drying	CY	\$ 0.50	148,500	\$ 74,250
Load on Truck and Haul to Nearby Recycling Facility (16 Cy Truck)	CY	\$ 7.00	148,500	\$ 1,039,500
Green Waste Facility Tipping Fee	Tons	\$ 40.00	21,500	\$ 860,000
<i>Earthwork Weir Basin</i>				
Construct Access Roads & Staging Areas	SY	\$ 3.15	6,078	\$ 19,147
Temporary Dredge-Barge Dock	LF	\$ 290.00	100	\$ 29,000
Dredge and Place Beach Sand to Oceanside Beach (2.5 Mi)	CY	\$ 15.00	24,200	\$ 363,000
Dredge and Place Fine Sand to Nearshore (2 Mi)	CY	\$ 28.00	37,500	\$ 1,050,000
Final Grade	AC	\$ 6,000.00	11.6	\$ 69,572
<i>Earthwork Railroad Basin</i>				
Clear & Grub Railroad Trestle Channel	LS	\$ 20,000.00	1	\$ 20,000
Construct Access Roads & Staging Areas	SY	\$ 3.15	10,737	\$ 33,822
Temporary Dredge-Barge Dock	LF	\$ 290.00	100	\$ 29,000
Dredge and Place Beach Sand to Oceanside Beach (2.5 Mi)	CY	\$ 15.00	61,120	\$ 916,800
Dredge and Dispose Fines to LA-5 By Barge	CY	\$ 44.00	34,120	\$ 1,501,280
Final Grade	AC	\$ 6,000.00	17.7	\$ 106,306
<i>Earthwork CH Basin</i>				
Clear & Grub Carlsbad Blvd Bridge Channel	LS	\$ 20,000.00	1	\$ 20,000
Construct Access Roads & Staging Areas	SY	\$ 3.15	10,698	\$ 33,698
Temporary Dredge-Barge Dock	LF	\$ 290.00	430	\$ 124,700
Dredge and Place Beach Sand to Oceanside Beach (2.5 Mi)	CY	\$ 15.00	44,080	\$ 661,200
Dredge and Place Fine Sand to Nearshore (2 Mi)	CY	\$ 28.00	13,800	\$ 386,400
Dredge and Dispose Fines to LA-5 By Barge	CY	\$ 44.00	430,320	\$ 18,934,080
Final Grade	AC	\$ 6,000.00	112.1	\$ 672,789
<i>Earthwork I-5 Basin</i>				
Clear & Grub Carlsbad I-5 Bridge Channel	LS	\$ 20,000.00	1	\$ 20,000
Construct Access Roads & Staging Areas	SY	\$ 3.15	8,776	\$ 27,644
Temporary Dredge-Barge Dock	LF	\$ 290.00	100	\$ 29,000
Temporary Rip-Rap Channel Protection at Staging Area	LF	\$ 171.20	200	\$ 34,240
Dredge and Dispose Fines To LA-5 By Barge	CY	\$ 44.00	188,000	\$ 8,272,000
Final Grade	AC	\$ 6,000.00	96.3	\$ 577,800

APPENDIX 1
Buena Vista Lagoon Enhancement Project - Design and Construction Cost Estimate

Hybrid Alternative A LA-5 Disposal Approach				
Item	Unit	Unit Price	Quantity	Cost
<i>Construct Ocean Inlet (Between San Malo & Carlsbad)</i>				
Demolish Existing Weir	LS	\$ 25,000.00	1	\$ 25,000
Final Inlet Grading	AC	\$ 6,000.00	1.4	\$ 8,226
Upgrade San Malo Revetment (Allowance)	LS	\$ 200,000.00	1	\$ 200,000
<i>Construct Channel Guide (Buried Levee) on Carlsbad Side</i>				
Excavation & Grading	LF	\$ 356.40	525	\$ 187,110
Armor Stone, 8-Ton	LF	\$ 335.40	525	\$ 176,085
Armor Stone, 1/2 Ton	LF	\$ 72.50	525	\$ 38,063
Rip Rap / Quarry Run	LF	\$ 924.00	125	\$ 115,500
Geotextile	LF	\$ 13.70	525	\$ 7,193
<i>Water Control Structure at I-5 Bridge</i>				
Water Control at I-5 Bridge Channel	LS	\$ 500,000.00	1	\$500,000
<i>Construct Channel Guide for Hybrid A</i>				
Temporary Cofferdam & Dewatering	LS	\$ 20,000.00	1	\$20,000
Armor Stone, 1/2-ton	LF	\$ 266.60	630	\$167,958
Armor Stone, 1/4 ton	LF	\$ 72.50	630	\$45,675
Rip Rap / Quarry Run	LF	\$ 115.50	630	\$72,765
Geotextile	LF	\$ 19.35	630	\$12,192
<i>Construct Revetment on south side of Weir Basin for Hybrid A</i>				
Armor Stone, 1/2-ton	LF	\$ 335.40	535	\$179,439
Armor Stone, 1/4 ton	LF	\$ 72.50	535	\$38,788
Geotextile	LF	\$ 13.70	535	\$7,330
<i>Lagoon Planting</i>				
Diegan Coastal Sage Scrub	LS	\$ 7,266.00	1	\$ 7,266
Riparian Enhancement	LS	\$ 30,425.00	1	\$ 30,425
High Salt Marsh (non-tidal)	LS	\$ 5,121.00	1	\$ 5,121
High Salt Marsh	LS	\$ 21,341.00	1	\$ 21,341
Mid Salt Marsh	LS	\$ 7,301.00	1	\$ 7,301
Low Salt Marsh	LS	\$ 17,780.00	1	\$17,780
<i>Plant Maintenance during First 5-Year Establishment Period</i>				
Diegan Coastal Sage Scrub	LS	\$ 154,552.00	1	\$ 154,552
Riparian Enhancement	LS	\$ 154,552.00	1	\$ 154,552
High Salt Marsh (non-tidal)	LS	\$ 204,430.00	1	\$ 204,430
High Salt Marsh	LS	\$ 275,440.00	1	\$ 275,440
Mid Salt Marsh	LS	\$ 275,020.00	1	\$ 275,020
Low Salt Marsh	LS	\$ 123,550.00	1	\$ 123,550

APPENDIX 1

Buena Vista Lagoon Enhancement Project - Design and Construction Cost Estimate

Hybrid Alternative A LA-5 Disposal Approach				
Item	Unit	Unit Price	Quantity	Cost
Carlsbad Boulevard Bridge (54' Wide Single Span)				
Mobilization (5% of the total construction cost)	LS	\$ 126,585.00	1	\$ 126,585
Traffic Control (5% of the total construction cost)	LS	\$ 126,585.00	1	\$ 126,585
Remove Bridge	SF	\$ 14.00	1,350	\$ 18,900
Remove Asphalt Concrete	SF	\$ 5.00	29,700	\$ 148,500
Clearing and Grubbing	LS	\$ 50,000.00	1	\$ 50,000
Earthwork - Roadway Excavation & Recompaction	CY	\$ 32.00	400	\$ 12,800
Imported Borrow	CY	\$ 35.00	3,000	\$ 105,000
Replace Fence	LF	\$ 32.00	400	\$ 12,800
Aggregate Base, Class 2, 11" New Roadway	SF	\$ 2.00	23,800	\$ 47,600
Asphalt Concrete - 5.5" Roadway	SF	\$ 4.00	23,800	\$ 95,200
Minor Concrete - Curb & Gutter, SDRSD G-2, Type G	LF	\$ 40.00	900	\$ 36,000
Minor Concrete - Sidewalk, SDRSD G-7	SF	\$ 8.00	2,200	\$ 17,600
Bridge (54' wide X 110' long)	SF	\$ 190.00	5,940	\$ 1,128,600
Curb Inlet, Type B-1	EA	\$ 5,000.00	8	\$ 40,000
Reinforced Concrete Pipe - 18"	LF	\$ 180.00	800	\$ 144,000
Curb Inlet Filter	EA	\$ 845.00	8	\$ 6,760
Bioretention Basin	LS	\$ 25,000.00	1	\$ 25,000
Retaining Wall	SF	\$ 35.00	3,000	\$ 105,000
Roadside Signs	EA	\$ 295.00	12	\$ 3,540
Street Light, SDRSD E-1	EA	\$ 12,500.00	12	\$ 150,000
Traffic Striping	LS	\$ 25,000.00	1	\$ 25,000
Crash Cushion Modules	EA	\$ 15,000.00	4	\$ 60,000
WPC - SWPPP	LS	\$ 15,000.00	1	\$ 15,000
WPC - Construction Site Management	LS	\$ 25,000.00	1	\$ 25,000
Utility Relocation (Power lines)	LS	\$ 200,000.00	1	\$ 200,000
Erosion Control	SF	\$ 2.00	29,700	\$ 59,400
Construction Cost without Contingency				\$ 46,320,000
Contingency (25%)				\$ 11,580,000
Construction Cost with Contingency				\$ 57,900,000
Construction Management (5%)				\$ 2,900,000
Environmental Monitoring during Construction (2%)				\$ 1,160,000
Final Engineering/Design (10%)				\$ 5,790,000
Hybrid Alt A - LA-5 Disposal Approach Total				\$ 67,750,000

APPENDIX 1
Buena Vista Lagoon Enhancement Project - Design and Construction Cost Estimate

Hybrid Alternative A				
Overdredge Pit Disposal Approach				
Item	Unit	Unit Price	Quantity	Cost
Mobilization and Demobilization				
	LS	\$ 2,700,000.00	1	\$ 2,700,000
General Site Preparation				
Clearing & Grubbing Site in General (Not Incl. Some Specifics)	AC	\$ 1,900.00	191	\$ 362,900
Utilities Protection/Relocation	LS	\$ 50,000.00	1	\$ 50,000
Protect/Intercept Storm Drains from Clogging	EA	\$ 10,000.00	27	\$ 270,000
Protect Overhead Utilities	LF	\$ 17.00	7,900	\$ 134,300
Construction Survey	LS	\$ 200,000.00	1	\$ 200,000
Water Quality Protection	LS	\$ 30,000.00	1	\$ 30,000
Environmental Protection & Monitoring	LS	\$ 30,000.00	1	\$ 30,000
Maintain Railroad Operation	LS	\$ 20,000.00	1	\$ 20,000
Haul Road Maintenance (Throughout Project)	Day	\$ 1,385.00	455	\$ 630,175
Reed & Cattail Removal				
Remove Cattail	AC	\$ 3,000.00	47	\$ 141,000
Stockpile for Drying	CY	\$ 0.50	148,500	\$ 74,250
Load on Truck and Haul to Nearby Recycling Facility (16 Cy Truck)	CY	\$ 7.00	148,500	\$ 1,039,500
Green Waste Facility Tipping Fee	Tons	\$ 40.00	21,500	\$ 860,000
Earthwork Weir Basin				
Construct Access Roads & Staging Areas	SY	\$ 3.15	6,078	\$ 19,147
Temporary Dredge-Barge Dock	LF	\$ 290.00	100	\$ 29,000
Dredge and Place Beach Sand to Oceanside Beach (2.5 Mi)	CY	\$ 15.00	24,200	\$ 363,000
Dredge and Place Fine Sand to Nearshore (2 Mi)	CY	\$ 28.00	37,490	\$ 1,049,720
Final Grade	AC	\$ 6,000.00	11.6	\$ 69,572
Earthwork Railroad Basin				
Clear & Grub Railroad Trestle Channel	LS	\$ 20,000.00	1	\$ 20,000
Construct Access Roads & Staging Areas	SY	\$ 3.15	10,737	\$ 33,822
Temporary Dredge-Barge Dock	LF	\$ 290.00	100	\$ 29,000
Dredge and Place Beach Sand to Oceanside Beach (2.5 Mi)	CY	\$ 15.00	61,120	\$ 916,800
Dredge and Dispose Fines to Overdredge Pit	CY	\$ 10.00	34,100	\$341,000
Final Grade	AC	\$ 6,000.00	17.7	\$ 106,306
Earthwork CH Basin				
Clear & Grub Carlsbad Blvd Bridge Channel	LS	\$ 20,000.00	1	\$ 20,000
Construct Access Roads & Staging Areas	SY	\$ 3.15	10,698	\$ 33,698
Temporary Dredge-Barge Dock	LF	\$ 290.00	430	\$ 124,700
Dredge and Place Beach Sand to Oceanside Beach (2.5 Mi)	CY	\$ 15.00	170,000	\$ 2,550,000
Dredge and Place Fine Sand to Nearshore (2 Mi)	CY	\$ 28.00	540,400	\$ 15,131,200
Dredge and Temporary Stockpile Fines to Create Overdredge Pit	CY	\$ 10.00	135,700	\$1,357,000
Move Stockpiled Fines and Dispose to Overdredge Pit	CY	\$ 9.00	135,700	\$1,221,300
Dredge and Dispose Fines to Overdredge Pit	CY	\$ 10.00	307,900	\$3,079,000
Final Grade	AC	\$ 6,000.00	112.1	\$ 672,789
Earthwork I-5 Basin				
Clear & Grub Carlsbad I-5 Bridge Channel	LS	\$ 20,000.00	1	\$ 20,000
Construct Access Roads & Staging Areas	SY	\$ 3.15	8,776	\$ 27,644
Temporary Dredge-Barge Dock	LF	\$ 290.00	100	\$ 29,000
Temporary Rip-Rap Channel Protection at Staging Area	LF	\$ 171.20	200	\$ 34,240
Dredge and Dispose Fines To Overdredge Pit	CY	\$ 10.00	188,000	\$1,880,000
Final Grade	AC	\$ 6,000.00	96.3	\$ 577,800

APPENDIX 1
Buena Vista Lagoon Enhancement Project - Design and Construction Cost Estimate

Hybrid Alternative A				
Overdredge Pit Disposal Approach				
Item	Unit	Unit Price	Quantity	Cost
<i>Construct Ocean Inlet (Between San Malo & Carlsbad)</i>				
Demolish Existing Weir	LS	\$ 25,000.00	1	\$ 25,000
Final Inlet Grading	AC	\$ 6,000.00	1.4	\$ 8,226
Upgrade San Malo Revetment (Allowance)	LS	\$ 200,000.00	1	\$ 200,000
<i>Construct Channel Guide (Buried Levee) on Carlsbad Side</i>				
Excavation & Grading	LF	\$ 356.40	525	\$ 187,110
Armor Stone, 8-Ton	LF	\$ 335.40	525	\$ 176,085
Armor Stone, 1/2 Ton	LF	\$ 72.50	525	\$ 38,063
Rip Rap / Quarry Run	LF	\$ 924.00	125	\$ 115,500
Geotextile	LF	\$ 13.70	525	\$ 7,193
<i>Water Control Structure at I-5 Bridge</i>				
Water Control at I-5 Bridge Channel	LS	\$ 500,000.00	1	\$500,000
<i>Construct Channel Guide for Hybrid A</i>				
Temporary Cofferdam & Dewatering	LS	\$ 20,000.00	1	\$20,000
Armor Stone, 1/2-ton	LF	\$ 266.60	630	\$167,958
Armor Stone, 1/4 ton	LF	\$ 72.50	630	\$45,675
Rip Rap / Quarry Run	LF	\$ 115.50	630	\$72,765
Geotextile	LF	\$ 19.35	630	\$12,192
<i>Construct Revetment on south side of Weir Basin for Hybrid A</i>				
Armor Stone, 8-ton	LF	\$ 335.40	535	\$179,439
Armor Stone, 1/2 ton	LF	\$ 72.50	535	\$38,788
Geotextile	LF	\$ 13.70	535	\$7,330
<i>Lagoon Planting</i>				
Diegan Coastal Sage Scrub	LS	\$ 7,266.00	1	\$ 7,266
Riparian Enhancement	LS	\$ 30,425.00	1	\$ 30,425
High Salt Marsh (non-tidal)	LS	\$ 5,121.00	1	\$ 5,121
High Salt Marsh	LS	\$ 21,341.00	1	\$ 21,341
Mid Salt Marsh	LS	\$ 7,301.00	1	\$ 7,301
Low Salt Marsh	LS	\$ 17,780.00	1	\$17,780
<i>Plant Maintenance during First 5-Year Establishment Period</i>				
Diegan Coastal Sage Scrub	LS	\$ 154,552.00	1	\$ 154,552
Riparian Enhancement	LS	\$ 154,552.00	1	\$ 154,552
High Salt Marsh (non-tidal)	LS	\$ 204,430.00	1	\$ 204,430
High Salt Marsh	LS	\$ 275,440.00	1	\$ 275,440
Mid Salt Marsh	LS	\$ 275,020.00	1	\$ 275,020
Low Salt Marsh	LS	\$ 123,550.00	1	\$ 123,550

APPENDIX 1

Buena Vista Lagoon Enhancement Project - Design and Construction Cost Estimate

Hybrid Alternative A Overdredge Pit Disposal Approach				
Item	Unit	Unit Price	Quantity	Cost
<i>Carlsbad Boulevard Bridge (54' Wide Single Span)</i>				
Mobilization (5% of the total construction cost)	LS	\$ 126,585.00	1	\$ 126,585
Traffic Control (5% of the total construction cost)	LS	\$ 126,585.00	1	\$ 126,585
Remove Bridge	SF	\$ 14.00	1,350	\$ 18,900
Remove Asphalt Concrete	SF	\$ 5.00	29,700	\$ 148,500
Clearing and Grubbing	LS	\$ 50,000.00	1	\$ 50,000
Earthwork - Roadway Excavation & Recomaction	CY	\$ 32.00	400	\$ 12,800
Imported Borrow	CY	\$ 35.00	3,000	\$ 105,000
Replace Fence	LF	\$ 32.00	400	\$ 12,800
Aggregate Base, Class 2, 11" New Roadway	SF	\$ 2.00	23,800	\$ 47,600
Asphalt Concrete - 5.5" Roadway	SF	\$ 4.00	23,800	\$ 95,200
Minor Concrete - Curb & Gutter, SDRSD G-2, Type G	LF	\$ 40.00	900	\$ 36,000
Minor Concrete - Sidewalk, SDRSD G-7	SF	\$ 8.00	2,200	\$ 17,600
Bridge (54' wide X 110' long)	SF	\$ 190.00	5,940	\$ 1,128,600
Curb Inlet, Type B-1	EA	\$ 5,000.00	8	\$ 40,000
Reinforced Concrete Pipe - 18"	LF	\$ 180.00	800	\$ 144,000
Curb Inlet Filter	EA	\$ 845.00	8	\$ 6,760
Bioretention Basin	LS	\$ 25,000.00	1	\$ 25,000
Retaining Wall	SF	\$ 35.00	3,000	\$ 105,000
Roadside Signs	EA	\$ 295.00	12	\$ 3,540
Street Light, SDRSD E-1	EA	\$ 12,500.00	12	\$ 150,000
Traffic Striping	LS	\$ 25,000.00	1	\$ 25,000
Crash Cushion Modules	EA	\$ 15,000.00	4	\$ 60,000
WPC - SWPPP	LS	\$ 15,000.00	1	\$ 15,000
WPC - Construction Site Management	LS	\$ 25,000.00	1	\$ 25,000
Utility Relocation (Power lines)	LS	\$ 200,000.00	1	\$ 200,000
Erosion Control	SF	\$ 2.00	29,700	\$ 59,400
Construction Cost without Contingency				\$ 42,140,000
Contingency (25%)				\$ 10,540,000
Construction Cost with Contingency				\$ 52,680,000
Construction Management (5%)				\$ 2,630,000
Environmental Monitoring during Construction (2%)				\$ 1,050,000
Final Engineering/Design (10%)				\$ 5,270,000
Hybrid Alt A - Overdredge Pit Disposal Approach Total				\$ 61,630,000

APPENDIX 1
Buena Vista Lagoon Enhancement Project - Design and Construction Cost Estimate

Hybrid Alternative B LA-5 Disposal Approach				
Item	Unit	Unit Price	Quantity	Cost
<i>Mobilization and Demobilization</i>	LS	\$ 2,900,000.00	1	\$ 2,900,000
<i>General Site Preparation</i>				
Clearing & Grubbing Site in General (Not Incl. Some Specifics)	AC	\$ 1,900.00	191	\$ 362,900
Utilities Protection/Relocation	LS	\$ 50,000.00	1	\$ 50,000
Protect/Intercept Storm Drains from Clogging	EA	\$ 10,000.00	27	\$ 270,000
Protect Overhead Utilities	LF	\$ 17.00	7,900	\$ 134,300
Construction Survey	LS	\$ 200,000.00	1	\$ 200,000
Water Quality Protection	LS	\$ 30,000.00	1	\$ 30,000
Environmental Protection & Monitoring	LS	\$ 30,000.00	1	\$ 30,000
Maintain Railroad Operation	LS	\$ 20,000.00	1	\$ 20,000
Haul Road Maintenance (Throughout Project)	Day	\$ 1,385.00	300	\$ 415,500
<i>Reed & Cattail Removal</i>				
Remove Cattail	AC	\$ 3,000.00	47	\$ 141,000
Stockpile for Drying	CY	\$ 0.50	148,500	\$ 74,250
Load on Truck and Haul to Nearby Recycling Facility (16 Cy Truck)	CY	\$ 7.00	148,500	\$ 1,039,500
Green Waste Facility Tipping Fee	Tons	\$ 40.00	21,500	\$ 860,000
<i>Earthwork Weir Basin</i>				
Construct Access Roads & Staging Areas	SY	\$ 3.15	6,078	\$ 19,147
Temporary Dredge-Barge Dock	LF	\$ 290.00	100	\$ 29,000
Dredge and Place Beach Sand to Oceanside Beach (2.5 Mi)	CY	\$ 15.00	24,200	\$ 363,000
Dredge and Place Fine Sand to Nearshore (2 Mi)	CY	\$ 28.00	37,500	\$ 1,050,000
Final Grade	AC	\$ 6,000.00	11.6	\$ 69,572
<i>Earthwork Railroad Basin</i>				
Clear & Grub Railroad Trestle Channel	LS	\$ 20,000.00	1	\$ 20,000
Construct Access Roads & Staging Areas	SY	\$ 3.15	10,737	\$ 33,822
Temporary Dredge-Barge Dock	LF	\$ 290.00	100	\$ 29,000
Dredge and Place Beach Sand to Oceanside Beach (2.5 Mi)	CY	\$ 15.00	61,120	\$ 916,800
Dredge and Dispose Fines to LA-5 By Barge	CY	\$ 44.00	34,120	\$ 1,501,280
Final Grade	AC	\$ 6,000.00	17.7	\$ 106,306
<i>Earthwork CH Basin</i>				
Clear & Grub Carlsbad Blvd Bridge Channel	LS	\$ 20,000.00	1	\$ 20,000
Construct Access Roads & Staging Areas	SY	\$ 3.15	10,698	\$ 33,698
Temporary Dredge-Barge Dock	LF	\$ 290.00	430	\$ 124,700
Dredge and Place Beach Sand to Oceanside Beach (2.5 Mi)	CY	\$ 15.00	44,080	\$ 661,200
Dredge and Place Fine Sand to Nearshore (2 Mi)	CY	\$ 28.00	13,800	\$ 386,400
Dredge and Dispose Fines to LA-5 By Barge	CY	\$ 44.00	430,320	\$ 18,934,080
Final Grade	AC	\$ 6,000.00	112.1	\$ 672,789
<i>Earthwork I-5 Basin</i>				
Clear & Grub Carlsbad I-5 Bridge Channel	LS	\$ 20,000.00	1	\$ 20,000
Construct Access Roads & Staging Areas	SY	\$ 3.15	8,776	\$ 27,644
Temporary Dredge-Barge Dock	LF	\$ 290.00	100	\$ 29,000
Temporary Rip-Rap Channel Protection at Staging Area	LF	\$ 171.20	200	\$ 34,240
Dredge and Dispose Fines To LA-5 By Barge	CY	\$ 44.00	188,000	\$ 8,272,000
Final Grade	AC	\$ 6,000.00	96.3	\$ 577,800

APPENDIX 1
Buena Vista Lagoon Enhancement Project - Design and Construction Cost Estimate

Hybrid Alternative B LA-5 Disposal Approach				
Item	Unit	Unit Price	Quantity	Cost
<i>Construct Ocean Inlet (Between San Malo & Carlsbad)</i>				
Demolish Existing Weir	LS	\$ 25,000.00	1	\$ 25,000
Final Inlet Grading	AC	\$ 6,000.00	1.4	\$ 8,226
Upgrade San Malo Revetment (Allowance)	LS	\$ 200,000.00	1	\$ 200,000
<i>Construct Channel Guide (Buried Levee) on Carlsbad Side</i>				
Excavation & Grading	LF	\$ 356.40	525	\$ 187,110
Armor Stone, 8-Ton	LF	\$ 335.40	525	\$ 176,085
Armor Stone, 1/2 Ton	LF	\$ 72.50	525	\$ 38,063
Rip Rap / Quarry Run	LF	\$ 924.00	125	\$ 115,500
Geotextile	LF	\$ 13.70	525	\$ 7,193
<i>Water Control Structure at I-5 Bridge</i>				
Water Control at I-5 Bridge Channel	LS	\$ 500,000.00	1	\$500,000
<i>Lagoon Planting</i>				
Diegan Coastal Sage Scrub	LS	\$ 7,266.00	1	\$ 7,266
Riparian Enhancement	LS	\$ 30,425.00	1	\$ 30,425
High Salt Marsh (non-tidal)	LS	\$ 5,121.00	1	\$ 5,121
High Salt Marsh	LS	\$ 21,341.00	1	\$ 21,341
Mid Salt Marsh	LS	\$ 7,301.00	1	\$ 7,301
Low Salt Marsh	LS	\$ 17,780.00	1	\$17,780
<i>Plant Maintenance during First 5-Year Establishment Period</i>				
Diegan Coastal Sage Scrub	LS	\$ 154,552.00	1	\$ 154,552
Riparian Enhancement	LS	\$ 154,552.00	1	\$ 154,552
High Salt Marsh (non-tidal)	LS	\$ 204,430.00	1	\$ 204,430
High Salt Marsh	LS	\$ 275,440.00	1	\$ 275,440
Mid Salt Marsh	LS	\$ 275,020.00	1	\$ 275,020
Low Salt Marsh	LS	\$ 123,550.00	1	\$ 123,550

APPENDIX 1

Buena Vista Lagoon Enhancement Project - Design and Construction Cost Estimate

Hybrid Alternative B LA-5 Disposal Approach				
Item	Unit	Unit Price	Quantity	Cost
<i>Carlsbad Boulevard Bridge (54' Wide Single Span)</i>				
Mobilization (5% of the total construction cost)	LS	\$ 126,585.00	1	\$ 126,585
Traffic Control (5% of the total construction cost)	LS	\$ 126,585.00	1	\$ 126,585
Remove Bridge	SF	\$ 14.00	1,350	\$ 18,900
Remove Asphalt Concrete	SF	\$ 5.00	29,700	\$ 148,500
Clearing and Grubbing	LS	\$ 50,000.00	1	\$ 50,000
Earthwork - Roadway Excavation & Recompaction	CY	\$ 32.00	400	\$ 12,800
Imported Borrow	CY	\$ 35.00	3,000	\$ 105,000
Replace Fence	LF	\$ 32.00	400	\$ 12,800
Aggregate Base, Class 2, 11" New Roadway	SF	\$ 2.00	23,800	\$ 47,600
Asphalt Concrete - 5.5" Roadway	SF	\$ 4.00	23,800	\$ 95,200
Minor Concrete - Curb & Gutter, SDRSD G-2, Type G	LF	\$ 40.00	900	\$ 36,000
Minor Concrete - Sidewalk, SDRSD G-7	SF	\$ 8.00	2,200	\$ 17,600
Bridge (54' wide X 110' long)	SF	\$ 190.00	5,940	\$ 1,128,600
Curb Inlet, Type B-1	EA	\$ 5,000.00	8	\$ 40,000
Reinforced Concrete Pipe - 18"	LF	\$ 180.00	800	\$ 144,000
Curb Inlet Filter	EA	\$ 845.00	8	\$ 6,760
Bioretention Basin	LS	\$ 25,000.00	1	\$ 25,000
Retaining Wall	SF	\$ 35.00	3,000	\$ 105,000
Roadside Signs	EA	\$ 295.00	12	\$ 3,540
Street Light, SDRSD E-1	EA	\$ 12,500.00	12	\$ 150,000
Traffic Striping	LS	\$ 25,000.00	1	\$ 25,000
Crash Cushion Modules	EA	\$ 15,000.00	4	\$ 60,000
WPC - SWPPP	LS	\$ 15,000.00	1	\$ 15,000
WPC - Construction Site Management	LS	\$ 25,000.00	1	\$ 25,000
Utility Relocation (Power lines)	LS	\$ 200,000.00	1	\$ 200,000
Erosion Control	SF	\$ 2.00	29,700	\$ 59,400
Construction Cost without Contingency				\$ 45,780,000
Contingency (25%)				\$ 11,450,000
Construction Cost with Contingency				\$ 57,230,000
Construction Management (5%)				\$ 2,860,000
Environmental Monitoring during Construction (2%)				\$ 1,140,000
Final Engineering/Design (10%)				\$ 5,720,000
Hybrid Alt B - LA-5 Disposal Approach Total				\$ 66,950,000

APPENDIX 1
Buena Vista Lagoon Enhancement Project - Design and Construction Cost Estimate

Hybrid Alternative B				
Overdredge Pit Disposal Approach				
Item	Unit	Unit Price	Quantity	Cost
<i>Mobilization and Demobilization</i>	LS	\$ 2,700,000.00	1	\$ 2,700,000
<i>General Site Preparation</i>				
Clearing & Grubbing Site in General (Not Incl. Some Specifics)	AC	\$ 1,900.00	191	\$ 362,900
Utilities Protection/Relocation	LS	\$ 50,000.00	1	\$ 50,000
Protect/Intercept Storm Drains from Clogging	EA	\$ 10,000.00	27	\$ 270,000
Protect Overhead Utilities	LF	\$ 17.00	7,900	\$ 134,300
Construction Survey	LS	\$ 200,000.00	1	\$ 200,000
Water Quality Protection	LS	\$ 30,000.00	1	\$ 30,000
Environmental Protection & Monitoring	LS	\$ 30,000.00	1	\$ 30,000
Maintain Railroad Operation	LS	\$ 20,000.00	1	\$ 20,000
Haul Road Maintenance (Throughout Project)	Day	\$ 1,385.00	455	\$ 630,175
<i>Reed & Cattail Removal</i>				
Remove Cattail	AC	\$ 3,000.00	47	\$ 141,000
Stockpile for Drying	CY	\$ 0.50	148,500	\$ 74,250
Load on Truck and Haul to Nearby Recycling Facility (16 Cy Truck)	CY	\$ 7.00	148,500	\$ 1,039,500
Green Waste Facility Tipping Fee	Tons	\$ 40.00	21,500	\$ 860,000
<i>Earthwork Weir Basin</i>				
Construct Access Roads & Staging Areas	SY	\$ 3.15	6,078	\$ 19,147
Temporary Dredge-Barge Dock	LF	\$ 290.00	100	\$ 29,000
Dredge and Place Beach Sand to Oceanside Beach (2.5 Mi)	CY	\$ 15.00	24,200	\$ 363,000
Dredge and Place Fine Sand to Nearshore (2 Mi)	CY	\$ 28.00	37,490	\$ 1,049,720
Final Grade	AC	\$ 6,000.00	11.6	\$ 69,572
<i>Earthwork Railroad Basin</i>				
Clear & Grub Railroad Trestle Channel	LS	\$ 20,000.00	1	\$ 20,000
Construct Access Roads & Staging Areas	SY	\$ 3.15	10,737	\$ 33,822
Temporary Dredge-Barge Dock	LF	\$ 290.00	100	\$ 29,000
Dredge and Place Beach Sand to Oceanside Beach (2.5 Mi)	CY	\$ 15.00	61,120	\$ 916,800
Dredge and Dispose Fines to Overdredge Pit	CY	\$ 10.00	34,100	\$341,000
Final Grade	AC	\$ 6,000.00	17.7	\$ 106,306
<i>Earthwork CH Basin</i>				
Clear & Grub Carlsbad Blvd Bridge Channel	LS	\$ 20,000.00	1	\$ 20,000
Construct Access Roads & Staging Areas	SY	\$ 3.15	10,698	\$ 33,698
Temporary Dredge-Barge Dock	LF	\$ 290.00	430	\$ 124,700
Dredge and Place Beach Sand to Oceanside Beach (2.5 Mi)	CY	\$ 15.00	170,000	\$ 2,550,000
Dredge and Place Fine Sand to Nearshore (2 Mi)	CY	\$ 28.00	540,400	\$ 15,131,200
Dredge and Temporary Stockpile Fines to Create Overdredge Pit	CY	\$ 10.00	135,700	\$1,357,000
Move Stockpiled Fines and Dispose to Overdredge Pit	CY	\$ 9.00	135,700	\$1,221,300
Dredge and Dispose Fines to Overdredge Pit	CY	\$ 10.00	307,900	\$3,079,000
Final Grade	AC	\$ 6,000.00	112.1	\$ 672,789
<i>Earthwork I-5 Basin</i>				
Clear & Grub Carlsbad I-5 Bridge Channel	LS	\$ 20,000.00	1	\$ 20,000
Construct Access Roads & Staging Areas	SY	\$ 3.15	8,776	\$ 27,644
Temporary Dredge-Barge Dock	LF	\$ 290.00	100	\$ 29,000
Temporary Rip-Rap Channel Protection at Staging Area	LF	\$ 171.20	200	\$ 34,240
Dredge and Dispose Fines To Overdredge Pit	CY	\$ 10.00	188,000	\$1,880,000
Final Grade	AC	\$ 6,000.00	96.3	\$ 577,800

APPENDIX 1
Buena Vista Lagoon Enhancement Project - Design and Construction Cost Estimate

Hybrid Alternative B				
Overdredge Pit Disposal Approach				
Item	Unit	Unit Price	Quantity	Cost
<i>Construct Ocean Inlet (Between San Malo & Carlsbad)</i>				
Demolish Existing Weir	LS	\$ 25,000.00	1	\$ 25,000
Final Inlet Grading	AC	\$ 6,000.00	1.4	\$ 8,226
Upgrade San Malo Revetment (Allowance)	LS	\$ 200,000.00	1	\$ 200,000
<i>Construct Channel Guide (Buried Levee) on Carlsbad Side</i>				
Excavation & Grading	LF	\$ 356.40	525	\$ 187,110
Armor Stone, 8-Ton	LF	\$ 335.40	525	\$ 176,085
Armor Stone, 1/2 Ton	LF	\$ 72.50	525	\$ 38,063
Rip Rap / Quarry Run	LF	\$ 924.00	125	\$ 115,500
Geotextile	LF	\$ 13.70	525	\$ 7,193
<i>Water Control Structure at I-5 Bridge</i>				
Water Control at I-5 Bridge Channel	LS	\$ 500,000.00	1	\$500,000
<i>Lagoon Planting</i>				
Diegan Coastal Sage Scrub	LS	\$ 7,266.00	1	\$ 7,266
Riparian Enhancement	LS	\$ 30,425.00	1	\$ 30,425
High Salt Marsh (non-tidal)	LS	\$ 5,121.00	1	\$ 5,121
High Salt Marsh	LS	\$ 21,341.00	1	\$ 21,341
Mid Salt Marsh	LS	\$ 7,301.00	1	\$ 7,301
Low Salt Marsh	LS	\$ 17,780.00	1	\$17,780
<i>Plant Maintenance during First 5-Year Establishment Period</i>				
Diegan Coastal Sage Scrub	LS	\$ 154,552.00	1	\$ 154,552
Riparian Enhancement	LS	\$ 154,552.00	1	\$ 154,552
High Salt Marsh (non-tidal)	LS	\$ 204,430.00	1	\$ 204,430
High Salt Marsh	LS	\$ 275,440.00	1	\$ 275,440
Mid Salt Marsh	LS	\$ 275,020.00	1	\$ 275,020
Low Salt Marsh	LS	\$ 123,550.00	1	\$ 123,550

APPENDIX 1

Buena Vista Lagoon Enhancement Project - Design and Construction Cost Estimate

Hybrid Alternative B Overdredge Pit Disposal Approach				
Item	Unit	Unit Price	Quantity	Cost
<i>Carlsbad Boulevard Bridge (54' Wide Single Span)</i>				
Mobilization (5% of the total construction cost)	LS	\$ 126,585.00	1	\$ 126,585
Traffic Control (5% of the total construction cost)	LS	\$ 126,585.00	1	\$ 126,585
Remove Bridge	SF	\$ 14.00	1,350	\$ 18,900
Remove Asphalt Concrete	SF	\$ 5.00	29,700	\$ 148,500
Clearing and Grubbing	LS	\$ 50,000.00	1	\$ 50,000
Earthwork - Roadway Excavation & Recompaction	CY	\$ 32.00	400	\$ 12,800
Imported Borrow	CY	\$ 35.00	3,000	\$ 105,000
Replace Fence	LF	\$ 32.00	400	\$ 12,800
Aggregate Base, Class 2, 11" New Roadway	SF	\$ 2.00	23,800	\$ 47,600
Asphalt Concrete - 5.5" Roadway	SF	\$ 4.00	23,800	\$ 95,200
Minor Concrete - Curb & Gutter, SDRSD G-2, Type G	LF	\$ 40.00	900	\$ 36,000
Minor Concrete - Sidewalk, SDRSD G-7	SF	\$ 8.00	2,200	\$ 17,600
Bridge (54' wide X 110' long)	SF	\$ 190.00	5,940	\$ 1,128,600
Curb Inlet, Type B-1	EA	\$ 5,000.00	8	\$ 40,000
Reinforced Concrete Pipe - 18"	LF	\$ 180.00	800	\$ 144,000
Curb Inlet Filter	EA	\$ 845.00	8	\$ 6,760
Bioretention Basin	LS	\$ 25,000.00	1	\$ 25,000
Retaining Wall	SF	\$ 35.00	3,000	\$ 105,000
Roadside Signs	EA	\$ 295.00	12	\$ 3,540
Street Light, SDRSD E-1	EA	\$ 12,500.00	12	\$ 150,000
Traffic Striping	LS	\$ 25,000.00	1	\$ 25,000
Crash Cushion Modules	EA	\$ 15,000.00	4	\$ 60,000
WPC - SWPPP	LS	\$ 15,000.00	1	\$ 15,000
WPC - Construction Site Management	LS	\$ 25,000.00	1	\$ 25,000
Utility Relocation (Power lines)	LS	\$ 200,000.00	1	\$ 200,000
Erosion Control	SF	\$ 2.00	29,700	\$ 59,400
Construction Cost without Contingency				\$ 41,600,000
Contingency (25%)				\$ 10,400,000
Construction Cost with Contingency				\$ 52,000,000
Construction Management (5%)				\$ 2,600,000
Environmental Monitoring during Construction (2%)				\$ 1,040,000
Final Engineering/Design (10%)				\$ 5,200,000
Hybrid Alt B - Overdredge Pit Disposal Approach Total				\$ 60,840,000

APPENDIX 1
Buena Vista Lagoon Enhancement Project - Design and Construction Cost Estimate

Notes

1. Earthwork quantities were estimated Autodesk Civil 3D based on proposed alternatives contours and existing condition contours prepared by Wootton (2005).
2. Construction cost estimates do not include the following components.
 - a. Boardwalk along Coast Highway.
 - b. Land acquisition and/or conservation easement.
 - c. Post-construction maintenance, except costs for first five years of plant establishment.
3. Mobilization and demobilization costs are based on 10% of the other construction costs for the lowest cost alternative given the same disposal option.
4. It is assumed that dewatering is not required since all materials will be beneficially reused as beachfill, disposed of offshore (LA-5 ODMDs), and/or placed in the lagoon either by grading or in an overdredge pit.
5. Excavated materials assumed suitable for the beneficial use and/or disposal options above.
6. Costs below estimated as a percentage of other costs as follows:
 - a. Contingency = 25% of construction cost
 - b. Construction Management = 5% of construction cost with contingency
 - c. Environmental Monitoring during Construction = 2% of construction cost with contingency
 - d. Final Engineering/Design = 10% of construction cost with contingency
7. Costs are in 2014 US dollars with unit costs representing in-place costs, including contractor's overhead and profit.
8. This estimate is provided as a service to our client for comparative purposes only and is based on prices current at the time this estimate was prepared. Actual costs and quantities may vary due to a number of circumstances including but not limited to: changes in field conditions, more precise quantities estimates developed in association with detailed restoration planning, availability and/or cost of materials, methods and/or timing of construction, and inflation. No cost guarantee is expressed or implied.

Abbreviations

AC	Acre	LA5	Los Angeles 5 Ocean Dredged Material Disposal Site
Alt	Alternative	LF	Linear foot
CH	Coast Highway	LS	Lump sum
CY	Cubic yard	Mi	Mile
EA	Each	ODPit	Over Dredge Pit
FW	Freshwater Alternative	SF	Square foot
HYA	Hybrid Alternative A	SW	Saltwater Alternative
HYB	Hybrid Alternative B	SY	Square yard
Incl.	Include		

APPENDIX 2

BVLEP Detailed Breakdown of Maintenance Cost Estimate

APPENDIX 2

FINAL

Buena Vista Lagoon Enhancement Project
Annual Maintenance Cost Estimate

Item	Unit	Unit Price	Maintenance Interval (Years)	Saltwater Alternative		Freshwater Alternative		Hybrid A Alternative		Hybrid B Alternative	
				Quantity	Cost	Quantity	Cost	Quantity	Cost	Quantity	Cost
<u>Littoral Sand Maintenance (Low)</u>											
Mobilize and demobilize equipment	LS	Varies		1	\$14,000	-	\$0	1	\$14,000	1	\$14,000
Excavate, haul, and place on beach	CY	\$5.00		27,000	\$135,000	-	\$0	27,000	\$135,000	27,000	\$135,000
Total Event Cost - Littoral Sand Maintenance (Low)					\$149,000		\$0		\$149,000		\$149,000
Average Annual Cost - Littoral Sand Maintenance (Low)			1		\$149,000		\$0		\$149,000		\$149,000
<u>Littoral Sand Maintenance (High)</u>											
Mobilize and demobilize equipment	LS	Varies		1	\$20,000	-	\$0	1	\$20,000	1	\$20,000
Excavate, haul, and place on beach	CY	\$7.50		27,000	\$202,500	-	\$0	27,000	\$202,500	27,000	\$202,500
Total Event Cost - Littoral Sand Maintenance (High)					\$223,000		\$0		\$223,000		\$223,000
Average Annual Cost - Littoral Sand Maintenance (High)			1		\$223,000		\$0		\$223,000		\$223,000
<u>Fluvial Sediment Maintenance (Low)</u>											
Mobilization and demobilization	LS	\$ 374,000		-	\$0	1	\$374,000	1	\$374,000	1	\$374,000
Dredge, transport, and dispose at LA-5 O	CY	\$44		-	\$0	85,000	\$3,740,000	85,000	\$3,740,000	85,000	\$3,740,000
Total Event Cost - Fluvial Sediment Maintenance (Low)					\$0		\$4,114,000		\$4,114,000		\$4,114,000
Average Annual Cost - Fluvial Sediment Maintenance (Low)			25		\$0		\$160,000		\$160,000		\$160,000
<u>Fluvial Sediment Maintenance (High)</u>											
Mobilize and demobilize equipment	LS	\$ 299,000		-	\$0	1	\$299,000	1	\$299,000	1	\$299,000
Dredge, transport, and dispose at landfill	CY	\$70		-	\$0	140,000	\$9,800,000	140,000	\$9,800,000	140,000	\$9,800,000
Total Event Cost - Fluvial Sediment Maintenance (High)					\$0		\$10,099,000		\$10,099,000		\$10,099,000
Average Annual Cost - Fluvial Sediment Maintenance (High)			25		\$0		\$400,000		\$400,000		\$400,000

APPENDIX 2

FINAL

Buena Vista Lagoon Enhancement Project
Annual Maintenance Cost Estimate

Item	Unit	Unit Price	Maintenance Interval (Years)	Saltwater Alternative		Freshwater Alternative		Hybrid A Alternative		Hybrid B Alternative		
				Quantity	Cost	Quantity	Cost	Quantity	Cost	Quantity	Cost	
Vegetation Maintenance (Low)												
Trim cattails annually	Acres	\$1,830		-	\$0	33	\$60,207	31	\$55,815	31	\$55,815	
Average Annual Cost - Vegetation Maintenance (Low)			1		\$0		\$60,000		\$60,000		\$60,000	
Vegetation Maintenance (High)												
Trim cattails annually	Acres	\$3,000		-	\$0	33	\$98,700	31	\$91,500	31	\$91,500	
Average Annual Cost - Vegetation Maintenance (High)			1		\$0		\$100,000		\$90,000		\$90,000	
Miscellaneous Maintenance (Low)												
Maintain inlet channel	LS	\$50,000		1	\$50,000	-	\$0	1	\$50,000	1	\$50,000	
Maintain weir	LS	\$20,000		-	\$0	1	\$20,000	-	\$0	-	\$0	
Maintain I-5 water control structure	LS	\$50,000		-	\$0	-	\$0	1	\$50,000	1	\$50,000	
Maintain channel guide	LS	\$55,000		-	\$0	-	\$0	1	\$55,000	-	\$0	
Total Event Cost - Miscellaneous Maintenance (Low)					\$50,000		\$20,000		\$155,000		\$100,000	
Average Annual Cost - Miscellaneous Maintenance (Low)			20		\$3,000		\$1,000		\$8,000		\$5,000	
Miscellaneous Maintenance (High)												
Maintain inlet channel	LS	\$100,000		1	\$100,000	-	\$0	1	\$100,000	1	\$100,000	
Maintain weir	LS	\$40,000		-	\$0	1	\$40,000	-	\$0	-	\$0	
Maintain I-5 water control structure	LS	\$100,000		-	\$0	-	\$0	1	\$100,000	1	\$100,000	
Maintain channel guide	LS	\$110,000		-	\$0	-	\$0	1	\$110,000	-	\$0	
Total Event Cost - Miscellaneous Maintenance (High)					\$100,000		\$40,000		\$310,000		\$200,000	
Average Annual Cost - Miscellaneous Maintenance (High)			10		\$10,000		\$4,000		\$31,000		\$20,000	
Total Average Annual Maintenance Cost in 2014 Dollars (Low)						\$152,000		\$221,000		\$377,000		\$374,000
Total Average Annual Maintenance Cost in 2014 Dollars (High)						\$233,000		\$504,000		\$744,000		\$733,000