UPDATE OF

RESTORED SAN DIEGUITO LAGOON
INLET CHANNEL EXCAVATION AND DREDGING PLAN

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1.0 INTRODUCTION

This report presents an update of the initial inlet channel dredging plan and maintenance plan for the San Dieguito Lagoon. These plans were submitted to the City of Del Mar and California Coastal Commission in March 2006 (Coastal Environments, 2006a) and were approved by the City of Del Mar and California Coastal Commission (CCC). The proposed initial inlet dredging will begin in fall 2010. Figure 1-1 shows the locations of San Dieguito Lagoon and the inlet channel. The restoration project has increased the lagoon area by at least 160 acres. The objective of the dredging plans is to maintain the lagoon in a condition that is open to continuous tidal flushing. Figure 1-2 shows the lagoon before and after restoration (Southern California Edison Company, 2005).

The dredging plan presented in this report is based on previous plans described by Elwany et al. (1994, 1998a) aimed at keeping the lagoon open and well mixed at minimal cost and with minimal environmental disturbance. The specifications for width, depth, area, and frequency of dredging in the West Channel were chosen in order to maintain satisfactory tidal mixing in the lagoon, while avoiding the excessive channel deepening that would lead to accelerated sand incursion and the need for additional costly dredging.

The initial inlet dredging is part of a plan that calls for an initial one-time restorative dredging of the inlet channel to remove sand that has recently advanced east of the Railroad Bridge and to bring the lagoon entrance into a state that is larger than the near-equilibrium state of early 1994. The purpose of the slight over-deepening of the inlet channel west of the Railroad Bridge is to minimize the future incursion of sand east of the Railroad Bridge by trapping it before it can reach the area.

This plan also requires a program of regular maintenance dredging to keep the entire channel in the desired state described above. Since the desired configuration is close to equilibrium, the required rate of sand removal and consequent dredging cost will be the lowest compatible with the goal of trapping the sand before it advances east of the Railroad Bridge.

The dredging plan consists of the single initial inlet dredging removal of the sand that has accumulated in the channel (Section 6.3.1), followed by periodic maintenance excavations of approximately 16,000 yd^3 every eight months from the inlet channel west of the Railroad Bridge, and if needed, another 5,000 yd^3 from the inlet channel east of the Railroad Bridge to maintain a stable channel depth (Chapter 7). The plan is designed to minimize sand deposition east of the Railroad Bridge and prevent sand incursion in the channel east of the Jimmy Durante Bridge.

All the horizontal coordinates presented in this report are California State Plane, Zone 6, NAD 83. Vertical datum is referenced to NGVD 29 (National Geodetic Datum 29). NGVD datum can be converted to NAVD88 datum by adding 2.1 ft.

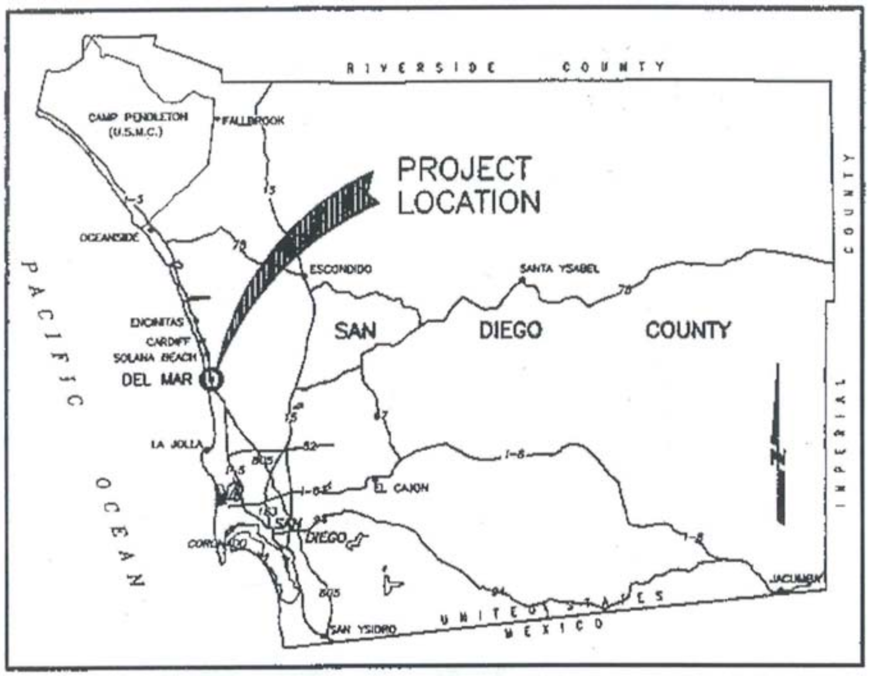


Figure 1-1. **Map showing location of San Dieguito Lagoon inlet (left) and photo of San Dieguito Lagoon inlet area and adjacent beaches (right).**

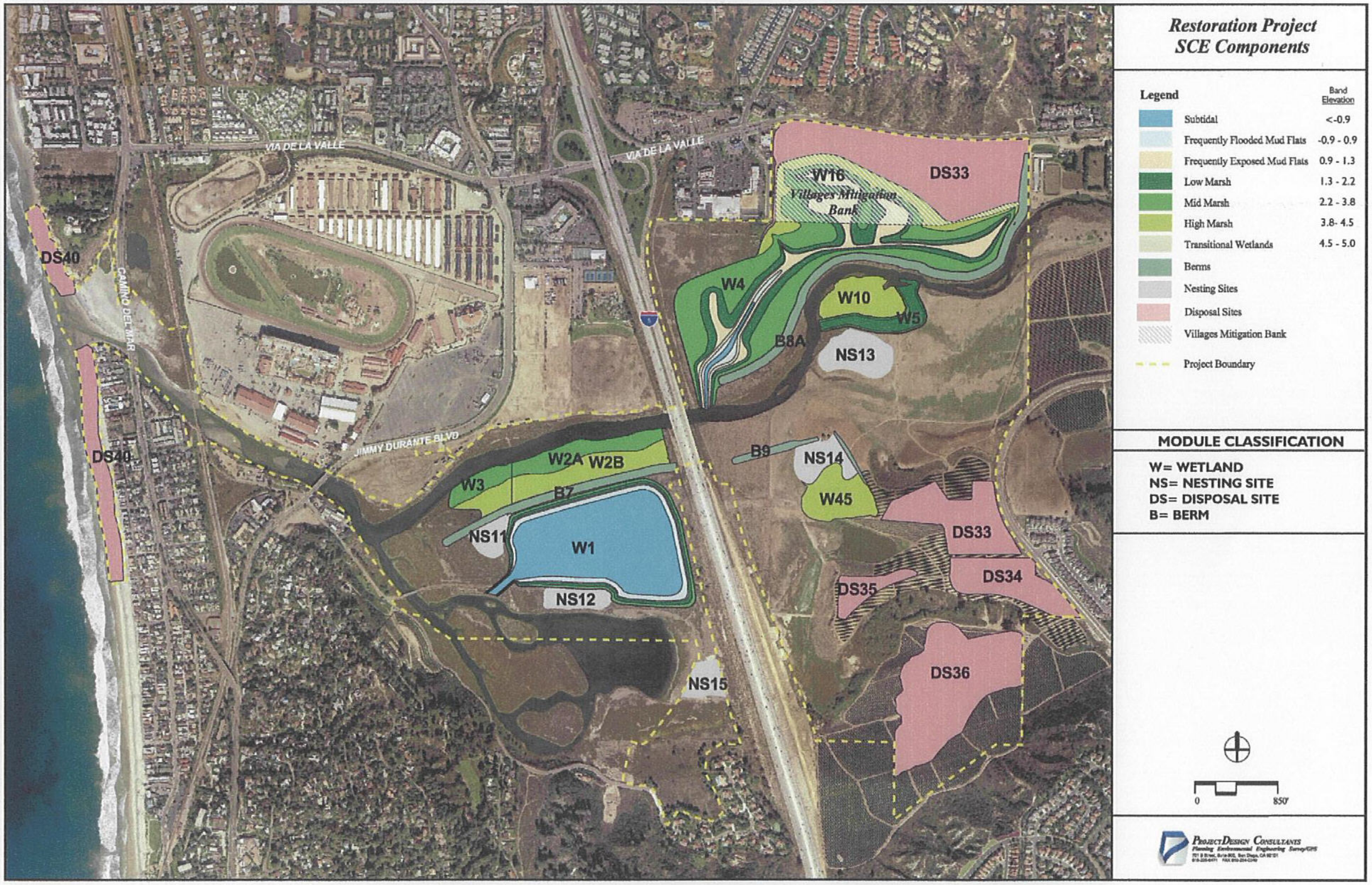


Figure 1-2. San Dieguito Lagoon before and after restoration, with restored areas shown in blue, white, and green. Gray areas are nesting sites, and pink areas are disposal sites.

The initial inlet dredging is scheduled to be carried out in fall 2010, and it is estimated that about 65,000 yd^3 will be removed from the lagoon channel. Updates to the dredging plans include extending the initial inlet dredging east of the Jimmy Durante Bridge and slightly into the North Channel as the sand from the littoral drift extends into these areas due to the marginal condition of the inlet. Sand will not be placed on the beach prior to Labor Day.

The need for inlet channel maintenance at San Dieguito Lagoon arose because the lagoon in its present condition has a relatively small tidal prism of 180 to 280 acre-ft. In its original state (before the turn of the 20^{th} century), San Dieguito Lagoon had an extensive salt marsh of about 600 acres (Mudie at al., 1976). Filling for construction has reduced the lagoon to about 160 acres (measured at 5 ft, NGVD). NGVD refers to the National Geodetic Vertical Datum, which is close to mean sea level. The restored lagoon will increase the potential tidal prism to approximately 135% to 150% of the existing tidal prism (Jenkins and Wasyl, 1998). Recent studies by Jenkins and Wasyl (1998) and Goodwin and Florsheim (1997) indicate that dredging will be needed to maintain an open lagoon despite the increased tidal prism.

This report consists of 10 chapters and 2 appendices. Chapter 2 describes the San Dieguito Lagoon and inlet channel. Chapter 3 discusses the source of the sand that fills the inlet channel. Chapter 4 presents the results of 20 samples collected from the inlet channel for grain size analysis and seven water and sediment samples analyzed for fecal coliforms, total coliforms, and *Enterococcus*. Chapter 5 presents the results of a marine biological survey conducted in September and October 2004 during low tides to document any biological resources at risk from sand placement on the beach. Chapters 6 and 7 present the initial and periodic dredging plans. Chapter 8 discusses possible dredging methods and their implementation. A plan for future monitoring of the lagoon to assess its condition is presented in Chapter 9. A reference list is presented in Chapter 10. A detailed grain size analysis for 20 samples is presented in Appendix A. The Sediment Sampling Plan (Coastal Environments, 2005) and its results (Coastal Environments, 2006b) were prepared and submitted to USACE. These two reports were approved by the USACOE and were the basis for the issuance of USACOE Permit No. 200500293-RRS.

2.0 DESCRIPTION OF SAN DIEGUITO LAGOON INLET AND CHANNEL

Figure 2-1 is a map of the San Dieguito Lagoon before restoration. In this report, the "inlet channel" refers to the inlet area (between the ocean and Highway 101) and the West Channel, which extends from Highway 101 to the intersection of the North and South Channels southeast of the Jimmy Durante Bridge. The lagoon extends eastward up to the El Camino Real Bridge. Figure 2-1 shows the North Channel, which is the bed of the San Dieguito River, and the South Channel, which is a restored wetland created by CDFG (California Department of Fish and Game) excavation in 1982 (Sample, 1980; Sea Science/PBS, 1980).

2.1 THE INLET CHANNEL

Figure 2-2 is a detailed map of the inlet channel. Within this area, we have delineated four particular areas separated by bridges. In this report, these areas are termed Area 1, which refers to the inlet mouth (inlet), extending from the ocean across the beach to Highway 101; Area 2, which refers to the portion of the West Channel from Highway 101 (Hwy 101) to the Railroad Bridge; and Area 3, which refers to the section of the West Channel from the Railroad Bridge to the Jimmy Durante Bridge. Area 4 extends east of the Jimmy Durante Bridge to the channel intersections and 400 feet into the North Channel.

2.1.1 Area 1

The inlet is located west of Highway 101 (Figure 2-3) and connects the lagoon with the ocean via a shifting channel that cuts through the beach. Depending on beach width, a variable length of this channel is confined by riprap on the south and by cliffs on the north. At present, the main channel runs more directly under the south side of the bridge. The meandering of the inlet channel has been described in detail by Elwany (2000).

2.1.2 Area 2

The south bank of Area 2 is armored with riprap to protect a nearby condominium development. The bottom profile of the channel throughout this reach is consistently deeper at the riprap, rising to the north toward an extensive set of intertidal sandbars located at elevations of between +1 ft and +3 ft. Adjacent to the north edge of Area 2 is a small, sandy wetland and a pond (North Pond) confined between the high embankments of Highway 101 and the railroad dike.

2.1.3 Area 3

This is a straight reach with a relatively unimpeded channel between steep earthen banks rising to an elevation of about +5 ft. There is some riprap near the bridge abutments and also at some locations along the south bank.

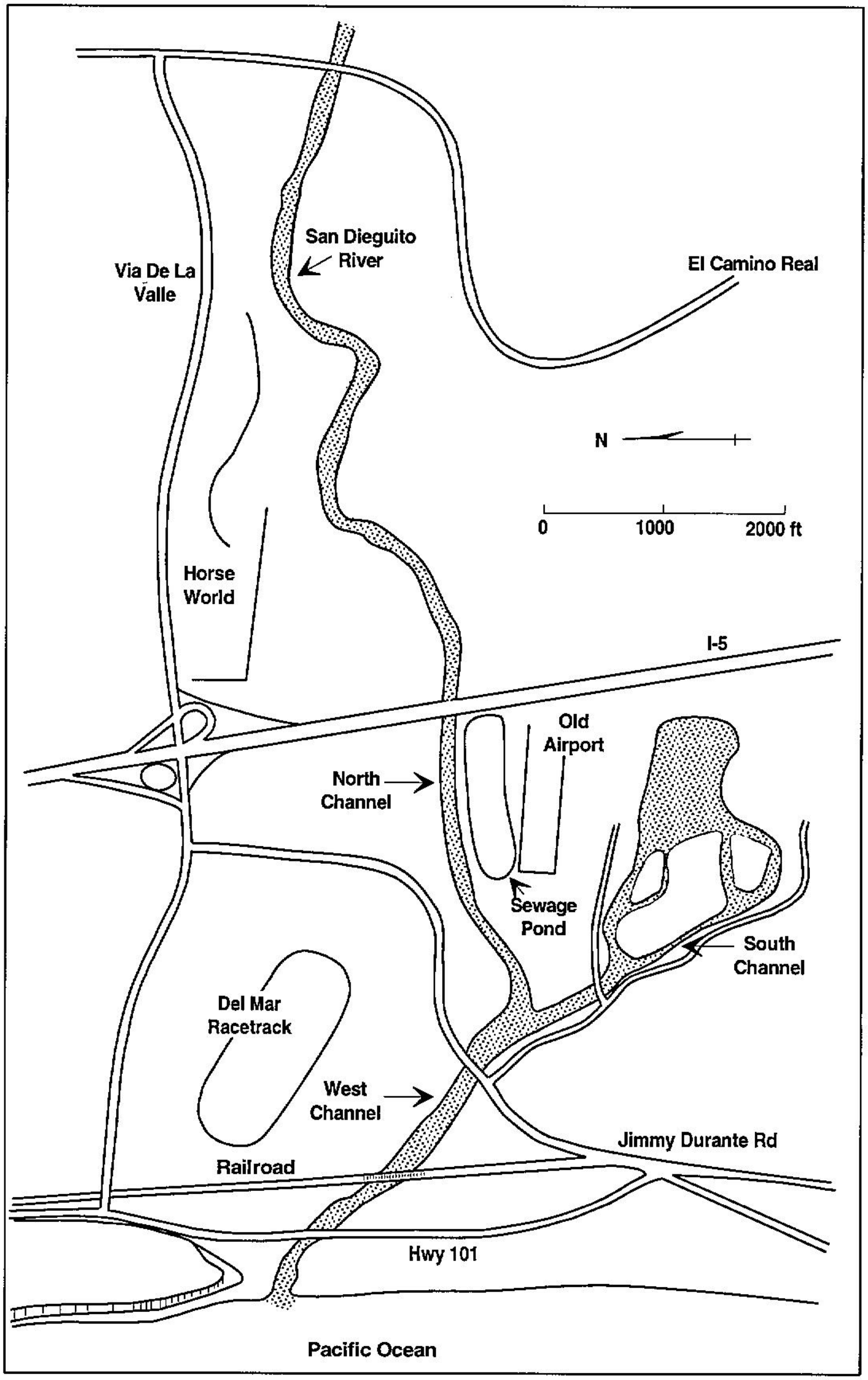


Figure 2-1. Map of San Dieguito Lagoon prior to restoration showing main lagoon channels.

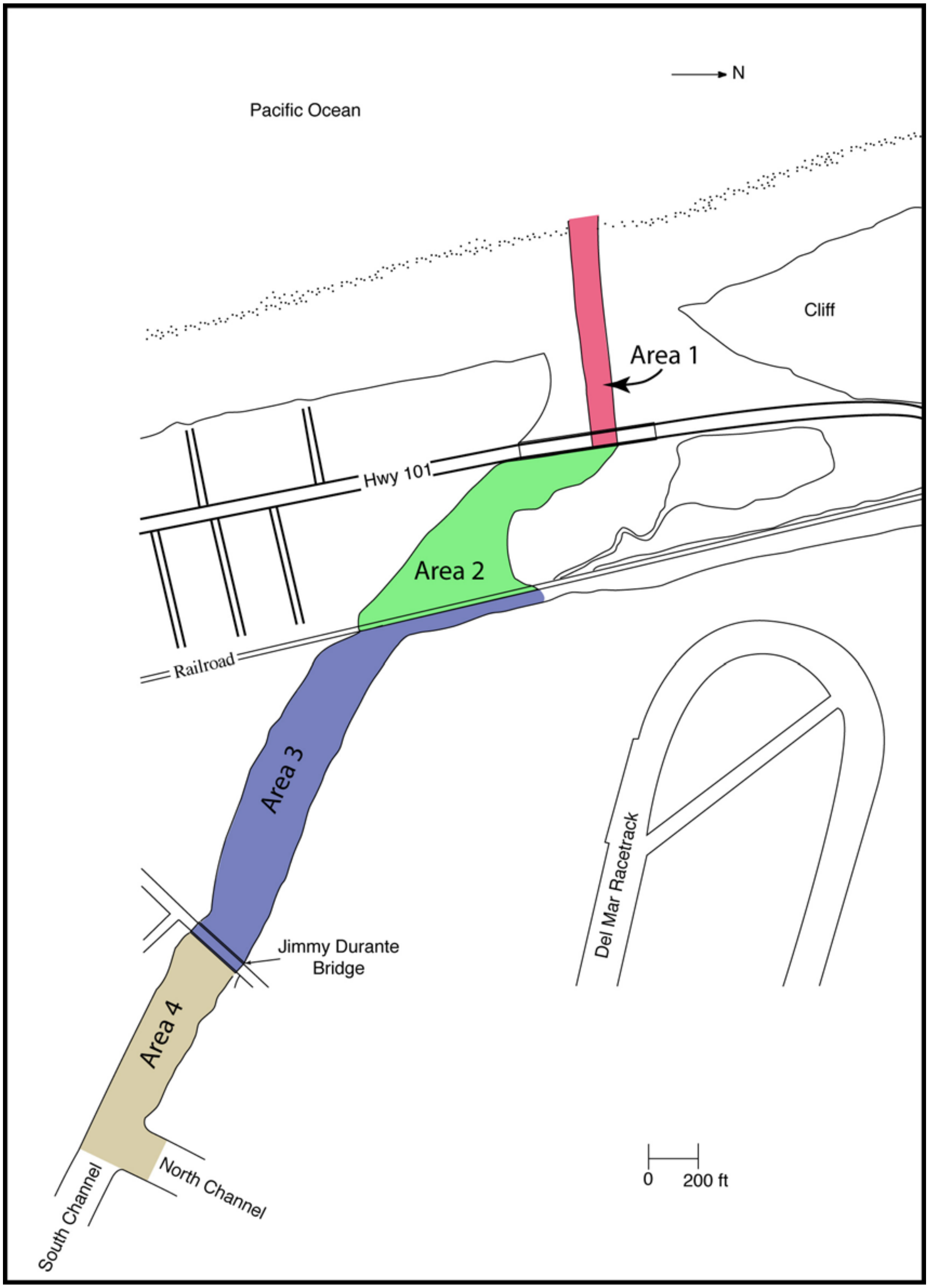


Figure 2-2. Map of inlet channel showing bridges and Areas 1, 2, 3, and 4.

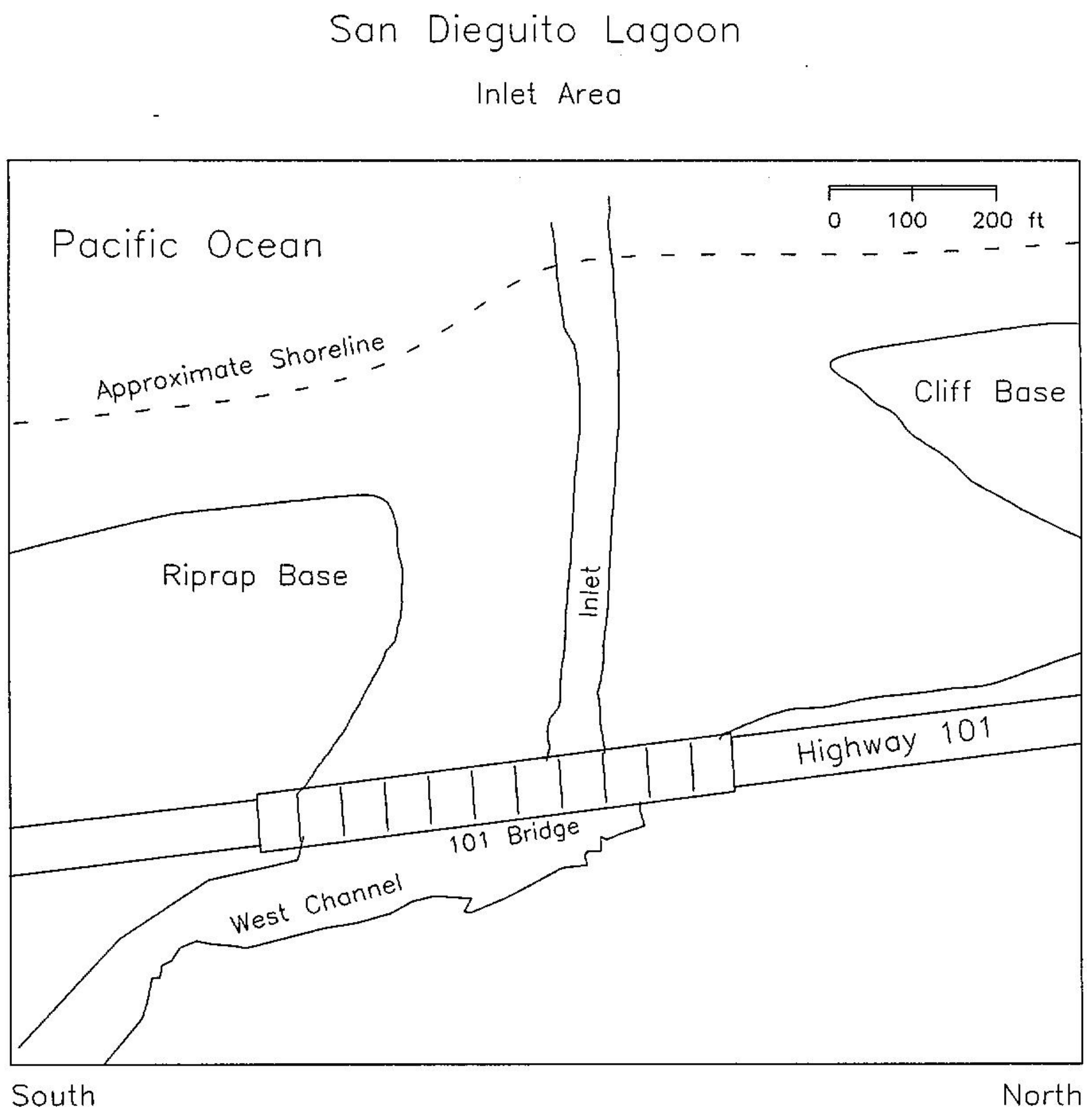


Figure 2-3. Map of inlet showing the supports and abutments of the Highway 101 Bridge.

2.1.4 Area 4

Area 4 consists of the section of the inlet channel that extends from the Jimmy Durante Bridge to the channel intersection and 400 feet into the North Channel.

2.1.5 Bridges

There are three bridges over the inlet channel: the Highway 101 Bridge, the Railroad Bridge, and the Jimmy Durante Bridge. The Railroad and Highway 101 Bridges were constructed in the 1880s and 1910s, respectively.

The Highway 101 Bridge (Figure 2-4) has large concrete supports oriented obliquely to overall channel direction. The bridge is 570 feet long and has 12 supports, each about 52 feet apart. The bridge is aligned parallel to the shoreline, which is oriented approximately 14° west of north. The bridge's support structures interact with the ebb flow and direct it into the channels between the support walls.

The Railroad Bridge is 1,028 feet long and about 18 feet wide. The bridge deck is supported by 73 wooden pilings and cross-braces set in rows about 12 feet apart and oriented obliquely to the channel. Figure 2-5 contains photographs showing the Railroad Bridge.

The Jimmy Durante Bridge is 210 feet long and 50 feet wide (Figure 2-6). It has five rows of concrete pilings about 24 feet apart and does not constitute an appreciable hydraulic obstruction. East of the Jimmy Durante Bridge, the high banks diverge, and there are wetlands on both sides of the channel.

Figure 2-4. Photograph of Highway 101 Bridge looking west.

Figure 2-5. Photograph of Railroad Bridge looking east.

Figure 2-6. Photograph of Jimmy Durante Bridge looking east.

3.0 SOURCE OF INLET FILL SAND

The dynamics of small, shallow lagoon inlets are highly complex (Bruun, 1978; Kjerfve and Magill, 1989; Inman and Dolan, 1989; Elwany et al., 1994,1995, 1997, and 1998a,b). The source of the sand that fills the inlet channel of the San Dieguito Lagoon is littoral sand (not river-borne), which was washed into the inlet by tidal flow and wave surges, filling the entrance and exterior portions of the lagoon channel. This has been described in detail by Elwany et al. (1994 & 1998a). For convenience, in this section we will summarize the important parts of these studies.

The typical inlet opening and closing sequence that is observed at San Dieguito Lagoon begins when a major river flood scours the lagoon and its inlet channels. Figure 3-1 shows the locations of selected traverses surveyed by Coastal Environments between January 1992 and the present. Figure 3-2 shows the channel cross-sections at traverses TR2, TR7 and TR11. The cross-sections of the inlet channel at these traverses increased as a result of floods in January and February 1993, reaching depths of about -6 ft, NGVD. This is below the equilibrium depth that can be sustained by the maximum available tidal prism (Elwany et al., 1994). Littoral sand rapidly filled the entrance portion of the lagoon channel and propagated later to the interior. By December 1993, the inlet at TR2 (Figure 3-2) had filled with sand to a near-equilibrium depth of about -3 ft, NGVD. The inlet channel at TR7 had also filled with littoral sand to about the same depth (Figure 3-2). At TR11, about ½ mile inland from the beach, the channel remained essentially unchanged between April and November 1993, as shown in Figure 3-2. This confirms that the exterior channels fill with littoral sand over a period of several months, some time before the sand reaches the lagoon interior. The interior channels fill slowly over a period of 2 to 5 years, decreasing the tidal prism and eventually leading to relatively sudden closure of the lagoon. The sand that fills the inlet channel has the same physical and chemical characteristics as the littoral sand that constitutes the beach fronting the lagoon and is clear of contaminants.

The sand that migrates into the lagoon has a similar grain size distribution as that of typical beach sand (Section 4) and is free of bacteria.

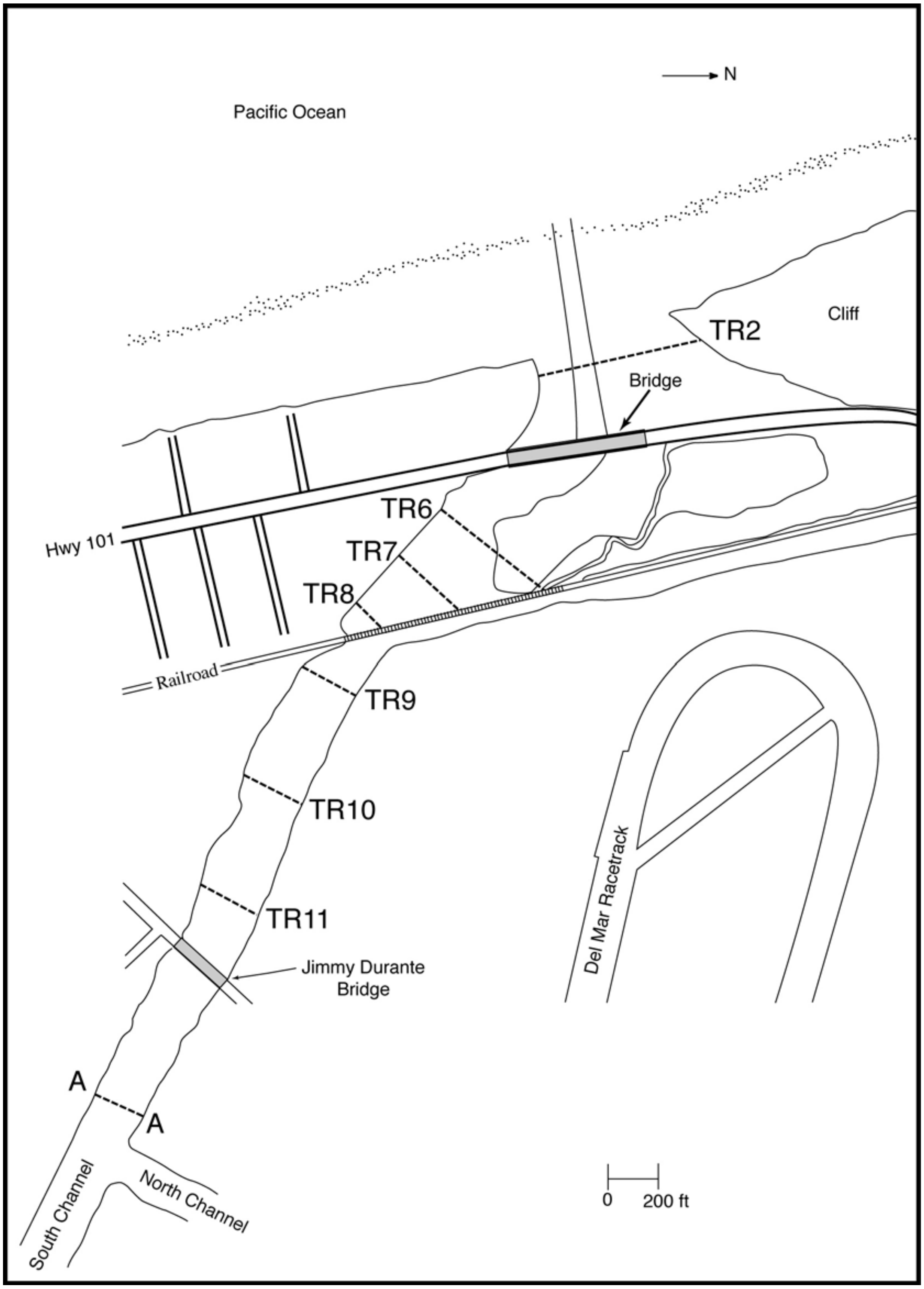


Figure 3-1. Locations of selected traverses in Areas 1, 2, 3, and 4.

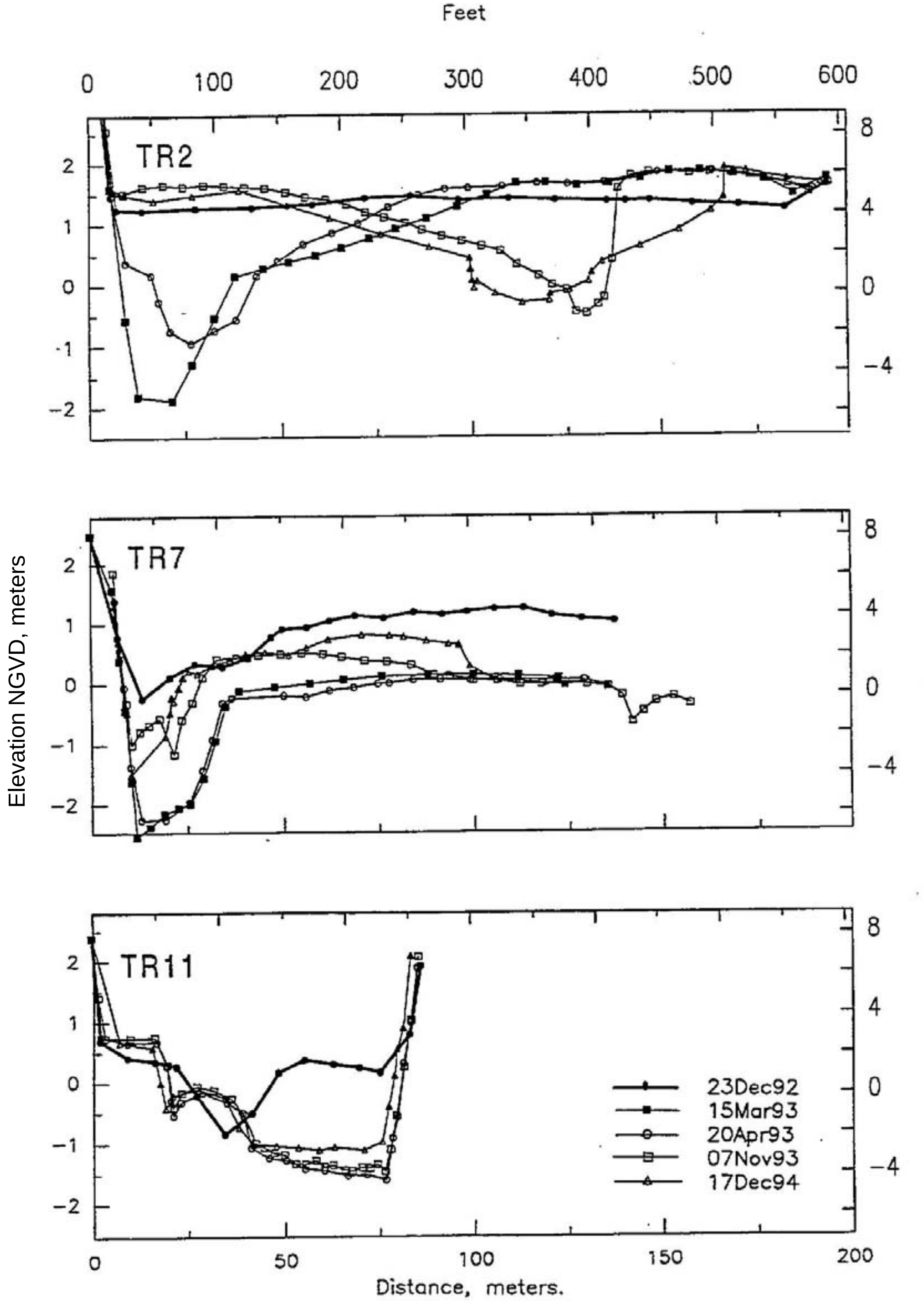


Figure 3-2. Channel cross-sections at traverses TR2, TR7, and TR11.

4.0 SEDIMENT ANALYSIS

4.1 GRAIN SIZE

4.1.1 Results of 8 October 2004 Sediment Samples

Beach material is composed of particles of various sizes. The U.S. Army Corps of Engineers' (USACOE) standard for material classification is presented in Table 4-1. Twenty sediment samples were collected by CE at locations extending from the beach to the Jimmy Durante Bridge on 8 October 2004 (Figure 4-1). These core samples, which were 1 inch in diameter and 20 inches deep, were taken at the surface.

The samples were then analyzed by CORE Laboratories of Bakersfield, California, for grain size distribution. They were dried, disaggregated, and passed through a series of five screens to determine the quantity and size intervals of materials greater than 20 mesh (0.033 inch). To determine the size distribution of the remaining material (smaller than 20 mesh), the laser-diffraction technique (analysis method ASTM D-4464) was used.

While the classical methods of fine sediment analysis, pipette, and hydrometer require rigorous, tedious sample preparation (such as disaggregation with hydrogen peroxide), and therefore are extremely time-consuming, the laser-diffraction technique involves very little preparation, requiring only several minutes for the analysis of one sample. However, none of these methods measures particle size directly. Rather, they utilize indirect methods based on settling velocity, specific gravity of particles, and various other parameters. Singer et al. (1988) provide an assessment of the laser-diffraction technique in relation to other procedures.

Table 4-2 summarizes the results of the grain size analysis for the 20 samples. It presents the median, mean, percentage of sand, percentage of silt, and percentage of clay for each sample. The sample averaged mean and median were 0.218 mm and 0.217 mm, respectively. The percentage of sand ranged between 100% and 96.01% with an average of 98.30%. The combined percentage of silt and clay for each sample was less than 4%, with an average value of 1.7%.

Table 4-3 presents the average values for the median, mean, percentage of sand, and percentage of clay of the analyzed samples by area. Table 4-3 also shows the number of samples (N) used for calculating the averages. In general, the sand present on the beach foreshore and in Areas 1, 2, and 3 had similar characteristics. This provides further evidence that the source of the sand filling the inlet channel was sand moving along the beach inside the surf zone. Appendix A presents, in detail, the results of the sieve and laser particle size analysis for each sample by weight.

4.1.2 Results of 2 November 2005 Sediment Samples

Nine samples were collected by CE (2006) at locations extending from the beach to the Jimmy Durante Bridge on 2 November 2005 (Figure 4-2). All samples were taken by hand core. Core samples S1, S2, S3, and S4 were 2 inches in diameter and 6 feet deep, while core samples

Table 4-1. USACOE standard for sediment classification.

Type	Size
Boulders	Larger than 200 mm
Cobbles	76 to 200 mm
Coarse Gravel	19 to 76 mm
Fine Gravel	5 to 19 mm
Coarse Sand	2 to 5 mm
Medium Sand	0.4 to 2 mm
Fine Sand	0.07 to 0.4 mm
Silt or Clay	Less than 0.07

Figure 4-1. Locations of 20 sediment samples collected by CE at the lagoon.

Table 4-2. Results of grain size analysis for 20 samples (samples taken on 8 October 2004).

Sample	Location 1	Grain Size Analysis				
		Median (mm)	Mean (mm)	% Sand	% Silt	% Clay
1	Beach	0.207	0.206	97.79	1.52	0.69
2	Beach	0.203	0.201	98.24	1.13	0.63
3	Area 1	0.217	0.215	97.33	2.16	0.51
4	Area 1	0.197	0.195	97.75	1.54	0.71
5	Area 1	0.194	0.193	98.03	1.33	0.64
6	Area 2	0.231	0.229	99.39	0.61	0
7	Area 2	0.307	0.308	99.54	0.46	0
8	Area 2	0.21	0.208	98.97	1.03	0
9	Area 2	0.29	0.293	99.71	0.29	0
10	Area 2	0.281	0.282	100	0	0
11	Area 2	0.208	0.205	98.9	1.1	0
12	Area 2	0.18	0.179	98.1	1.27	0.63
13	Area 2	0.232	0.231	98.95	1.05	0
14	Area 3	0.28	0.279	99.51	0.49	0
15	Area 3	0.28	0.281	100	0	0
16	Area 3	0.196	0.192	96.01	3.26	0.73
17	Area 3	0.215	0.21	99.43	0.57	0
18	Area 3	0.222	0.219	99.59	0.41	0
19	Area 3	0.199	0.195	98.16	1.31	0.53
20	Area 3	0.156	0.155	95.32	3.79	0.89

Table 4-3. Averages of median and mean grain size, and percentages of sand, silt, and clay by area (samples taken on 8 October 2004).

Location	Median (mm)	Mean (mm)	% Sand	% Silt + Clay	Number of Samples (N)
Beach Foreshore	0.205	0.204	98.02	1.98	2
Area 1	0.203	0.201	97.7	2.3	3
Area 2	0.242	0.242	99.2	0.8	8
Area 3	0.221	0.219	98.29	1.71	7
Average	0.218	0.217	98.3	1.7	

Figure 4-2. Location of sediment samples collected in San Dieguito Lagoon in November 2005.

S5, S6, S7, S8 and S9 were 2 inches in diameter and 4 feet deep. The latter five samples were taken from the surface to below dredging depth. All nine core samples were individually mixed, and a combined sample from each core was sent to CORE Laboratories of Bakersfield, California, for grain size distribution analysis. There they were dried, disaggregated, and passed through a series of five screens to determine the quantity and size of materials greater than 20 mesh (0.033 inch).

Table 4-4 summarizes the results of the grain size analysis for the nine samples. It presents the median, mean, percentage of sand, percentage of silt, and percentage of clay for each sample. The percentages of clay and silt for samples S5, S6, S7, S8 and S9 were less than 5% with an average value of 1.6.

4.2 SEDIMENT SAMPLES TAKEN IN 2009 AND 2010

Seventeen sediment samples were taken from the lagoon on 15 December 2009 at low tide from the surface to the dredging depth (6-foot-long cores). The samples covered the four areas to be dredged. Visual inspection of the samples after they were dried indicated that the sediment from all of the samples was sand with a very small percentage of silt and/or clay, if any.

In addition, two samples were taken from Area 4 (S10 and S11) on 20 April 2010 (Figure 4-3). These samples were analyzed for grain size and chemical analysis. The mean and median grain sizes for Sample S10 were 0.31 mm and 0.32 mm, and for Sample S11, they were 0.32 mm and 0.33 mm. The percentage of silt and clay in both samples was less than 4%. The lab results for these two samples are presented in Appendix A.

Appendix B presents the complete chemical analysis results for S10 and S11. Only metals were presented in detectable levels. No organochlorine pesticides or TPHs were detected. The results of metal concentrations are presented in Table 4-5 along with the EPA-reported ERLs. All metal concentrations detected were well below ERL limits (effects range-low) (EPA, 1997).

Before dredging, 11 sediment samples will be taken from the lagoon at locations S1 through S11 and analyzed for grain size distribution and percentage of clay.

Table 4-4. Results of grain size analysis for the sediment samples.

Sample	Location	Grain Size Analysis				
		Median (mm)	Mean (mm)	% Sand	% Silt	% Clay
S1	Beach (Berm)	0.197	0.195	98.38	0.98	0.64
S2	Beach (Intertidal)	0.232	0.232	99.37	0.63	0
S3	Beach (Berm)	0.262	0.273	99.13	0.87	0
S4	Beach (Intertidal)	0.241	0.239	99.53	0.47	0
S5	Area 1	0.221	0.221	98.43	0.98	0.59
S6	Area 2	0.324	0.345	99.49	0.51	0
S7	Area 2	0.236	0.235	99.28	0.72	0
S8	Area 3	0.255	0.255	98.56	1	0.44
S9	Area 3	0.174	0.172	95.22	3.82	0.96

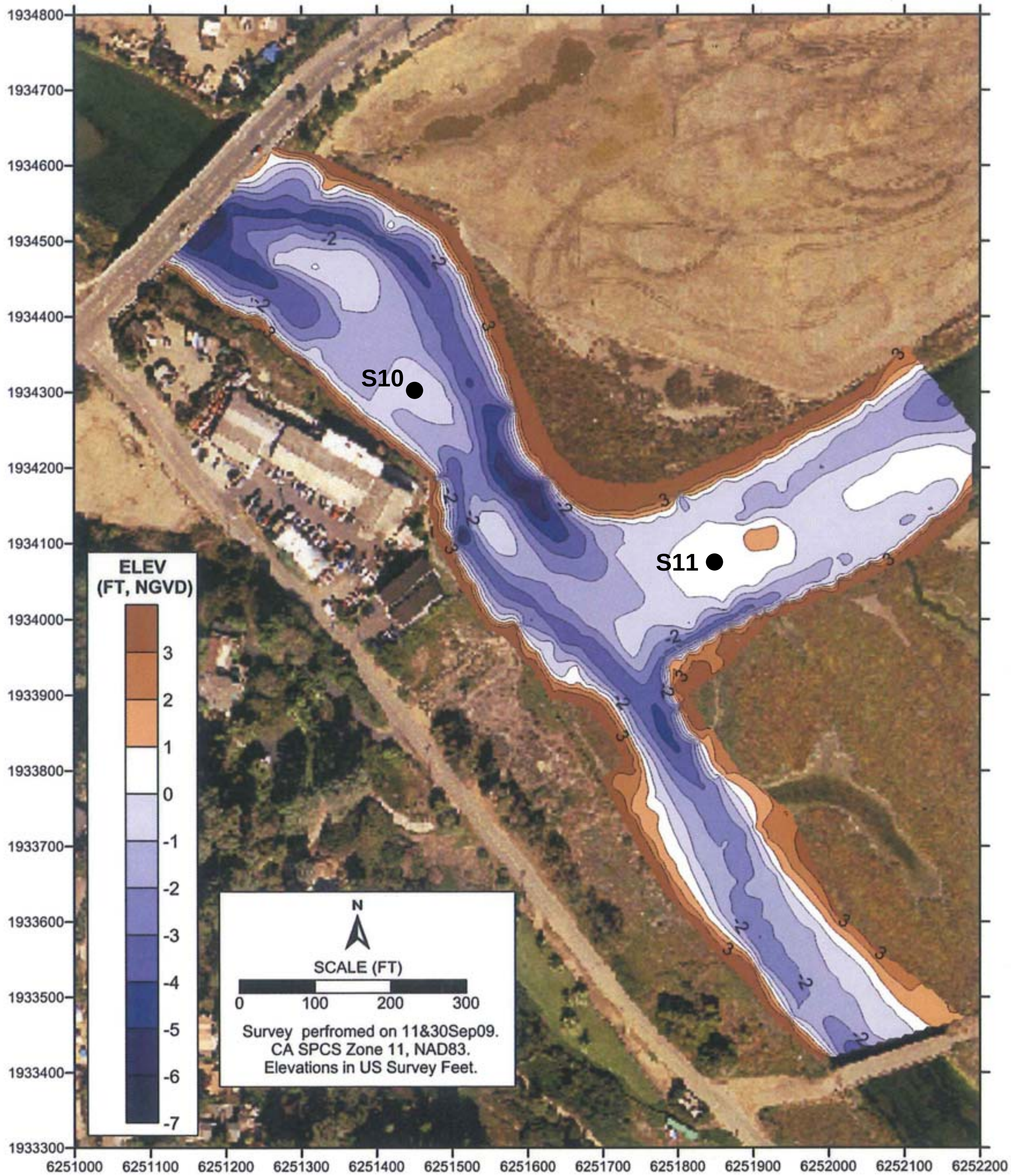


Figure 4-3. Locations of samples S10 and S11 at Area 4.

Table 4-5. Concentrations of metals and percent solids in sediment samples from San Dieguito Lagoon (values in parentheses are detection limits for non-detectable chemicals).

Metals (mg/kg)	Sediment Sample		ERL (ppm)
	S10	S11	
Mercury	ND (0.18)	ND (0.18)	0.15
Arsenic	0.928	0.736	8.2
Cadmium	ND (0.136)	ND (0.129)	1.2
Chromium	6.43	5.01	81
Copper	2.95	2.44	34
Lead	1.28	0.917	46.7
Nickel	3.29	2.44	20.9
Selenium	ND (0.271)	ND (0.258)	Not reported
Silver	ND (0.136)	ND (0.129)	1
Zinc	53.7	12.8	150
% Solids	73.7	77.5	

ND = Not detected at or above reporting limits.
ERL = Effects range-low (EPA, 1997).
( ) = Values in parentheses represent detection limits for non-detectable chemicals.

4.3 BACTERIAL ANALYSIS OF WATER AND SEDIMENT SAMPLES

Water and sediment samples were taken from the San Dieguito Lagoon on 25 August 2004. The locations of these samples are shown in Figure 4-4. These samples were analyzed for fecal coliforms, total coliforms, and Enterococcus. Table 4-6 gives bacterial concentration measurements for sediment and water. The results are presented in MPN/100 ml units. MPN/100 ml refers to the Most Probable Number of organisms per 100 ml sample. Numbers greater than 400 MPN/100 ml exceed state limits for fecal coliforms; numbers greater than 10,000MPN/100 ml exceed state limits for total coliforms; and numbers greater than 104 MPN/100 ml exceed state limits for Enterococcus. These values are for a single water sample. At present, no standards exist for bacterial concentrations in sediment. Lab results reveal very low concentrations of bacteria for the water and sediment samples collected during this survey.

Several water bacteriological surveys were conducted by Coastal Environments between July 2001 and August 2004 and from September 2006 until the present (Figure 4-5). Measurements made bi-monthly during periods when the lagoon was open and closed showed that lagoon water bacterial concentrations for the three indicators were within limits except during flood or rain events (Coastal Environments, 2003a,b, 2004a,b, 2008b,c, 2009a,b). During such events, ocean water exhibits bacterial concentrations that are above state limits. It is customary for the Public Health Department to post signs on the beaches when the lagoon is reopened after being closed for five days to ensure lower bacterial concentrations in the water.

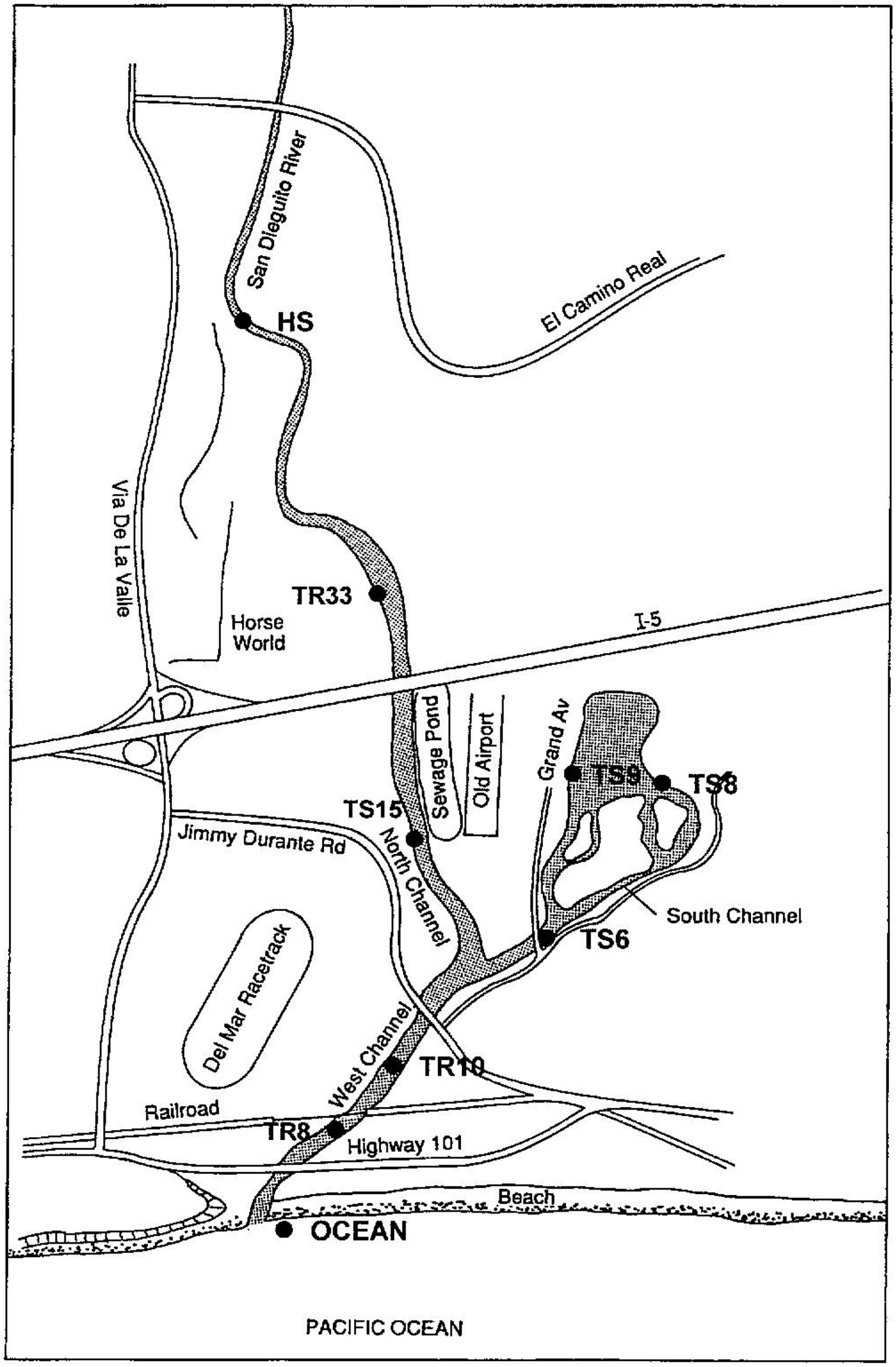


Figure 4-4. Locations of water and sediment samples for bacteria analysis.

Table 4-6. Results of bacterial measurements in sediment and water samples collected on 25 August 2004.

Station	Sample	Fecal Coliforms (MPN/100 ml)	Total Coliforms (MPN/100 ml)	*Enterococcus* (MPN/100 ml)
Ocean	Sediment Water	ND ND	ND ND	ND ND
TR8	Sediment Water	7 23	27 170	9 4
TR10	Sediment Water	ND 4	ND 4	130 7
TS6	Sediment Water	ND ND	ND ND	9 12
TS15	Sediment Water	ND ND	ND ND	ND ND
TR33	Sediment Water	ND ND	ND ND	2 8
HS	Sediment Water	ND 70	4 300	8 2

ND = Analyte not detected at or above the reporting limits.

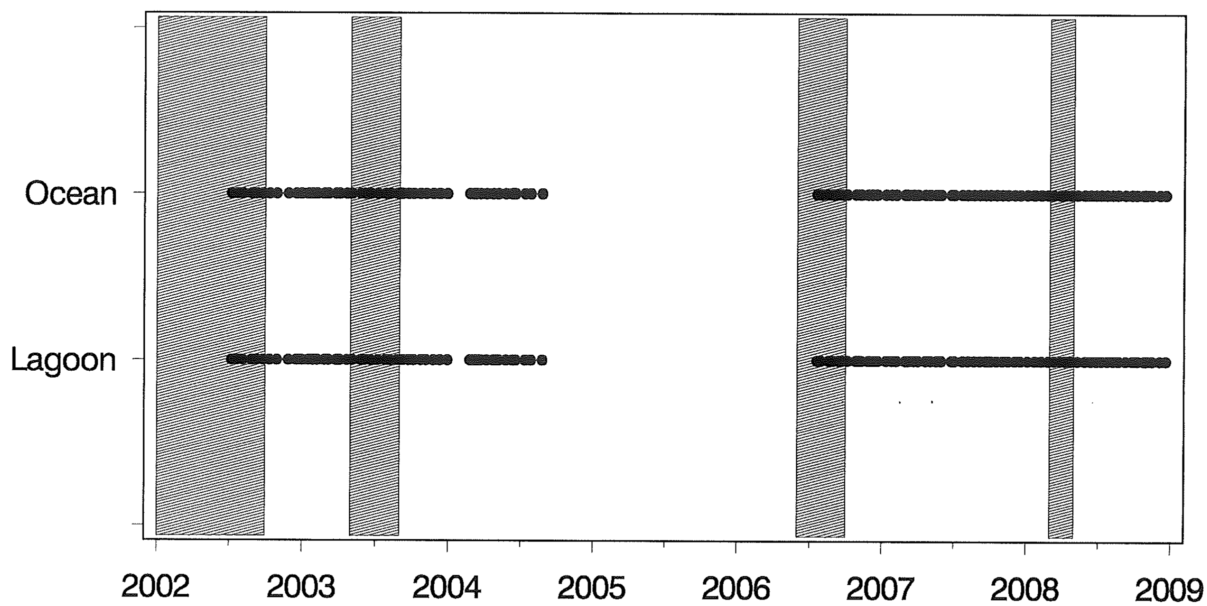


Figure 4-5. Timeline plot for water bacteria measurements at San Dieguito Lagoon from 2002 through 2008.

5.0 MARINE BIOLOGICAL SURVEYS

The beach area ranging from one mile south of the San Dieguito Lagoon mouth (15th Street in Del Mar) to approximately 0.4 miles north of the mouth (southernmost public stairs in Solana Beach) was first surveyed on September 29-30 and October 14, 2004. Several visits to the beach and nearshore area during low tides were made between 2004 and 2009. These visits indicated no significant changes in the biological resources in the beach area described in the report prepared by Coastal Environments (2004c). The purpose of the surveys was to determine whether biological resources or substantial rocky areas were present along the beach or whether shallow subtidal areas existed (no deeper than –5 ft NGVD), which would be at risk if the beach were to receive sand from lagoon dredging.

The survey was conducted by walking along the beach and taking GPS locations and photographs of any resources or sites of interest. Biological resources observed along the beach were noted. Each 0.1 mile was marked by taking a GPS reading and photographs toward land, toward the lagoon mouth, and offshore.

No rocky areas were visible south of the lagoon mouth, and there was no evidence of substrate other than sand out to about – 4 ft NGVD. The only biological resource observed in this area was the common pea clam, *Donax gouldii*, which was present in large numbers. This clam lives in large aggregations in the wave wash zone and moves up and down the beach slope as the tide changes. It is common only at certain times of the year, usually late summer and early fall. Thus, placement of sand will not damage the long-term populations of these organisms. The aggregations presently occupying the beach are unlikely to be damaged unless the sand is deposited directly on top of them. Future populations should not be reduced by sand replenishment, as the beach will be recolonized.

The area north of the lagoon mouth contains both sand and exposed rock. The first rocky area encountered north of the lagoon mouth is located offshore of the north edge of the bluff. The outcropping (~10 ft x 20 ft and 1.5 ft above the sand) is surrounded by sand (Figure 5-1). Biota found in this area included mussels, anemones, and algae, including greens (*Ulva* or *Enteromorpha*) and reds (coralline algae). Offshore of this rock and located in the surfzone during the low tide of –0.4 ft were a series of low, rocky ledges apparently leading farther out into the water.

Farther north (405 ft north of the north edge of the mouth), a few small rocks were present in the surfzone. These appeared to be covered with coralline algae.

Small patches of rock were present approximately 449 ft north of the north edge of the mouth (Figure 5-2). These were approximately 6 inches above the sand. Several small patches of surfgrass (*Phyllospadix spp*.) were attached to the rocks on the inshore edge.

One rock was present slightly more than a tenth of a mile north of the north edge of the mouth. It was approximately 230 ft offshore of the bluff. It appeared that additional rocks continued offshore. No biota were observed at this site.

Figure 5-1. First rock observed north of inlet area. Rock is about 10 ft by 20 ft and above sand level by 1.5 ft. Notice that it is surrounded by sand.

Figure 5-2. Small patches of surfgrass observed 449 ft north of inlet area.

A large rock (approximately 55 ft by 13 ft; see Figure 5-3) was present 0.15 mile north of the north edge of the mouth. This rock was surrounded by sand, approximately 8 inches above sand level, and approximately 80 ft from the bluff. Biota on this rock included mussels, sea anemones, coralline algae, and two patches of surfgrass. The area of the rock measured on 14 October 2004 was at least twice that estimated on 30 September 2004, indicating considerable sand movement around the rock.

Another rock was present 0.17 mile north of the north edge of the mouth (Figure 5-4) and slightly north of the previous rock. A small patch of surfgrass was attached to the outer part of the rock.

Sandy beaches are unstable habitats characterized by seasonal cycles of sand deposition and erosion as well as daily disturbances due to the tidal cycle and wave action. Species characteristic of these areas tend to be motile, allowing them to change position as needed. In addition, beach species are generally short-lived, and there is year-to-year variability in the populations. Rocky substrate within the intertidal is similarly affected by daily water level changes, wave action, and seasonal sand movement. Species in these areas are well adapted to quickly colonize available habitats (MEC, 2000).

The species found along the beach are common intertidal organisms in the Southern California Bight. They are not considered at risk, and should be able to quickly recover from any impact due to additional sand placed on the beach.

Based on existing maps and previous studies (e.g., MEC, 2000), there are no significant hard substrate areas offshore of the sand disposal site DS40 (Figure 1-1) within 1,650 ft north and 5,000 ft south of the inlet.

During the SANDAG Regional Beach Project EIR/EA (MEC, 2000), no grunion eggs were observed in the shovel samples collected during the May 1999 survey, which was a period of predicted grunion runs. However, a few shorebirds were observed during the survey foraging and resting on the beach in Solana Beach and Del Mar.

In summary, these surveys indicate the following:

- The beach south of the southern breakwater wall does not include any rocky areas that would preclude placement of sand on the beach.
- The beach north of the lagoon mouth does contain several rocky areas that could be buried by sand placement on the beach. Most of the biota present on these rocks are not considered at risk and should begin to recolonize quickly when the rocks are exposed again.
- The only species observed that is considered at risk is surfgrass, which is present on some of the rocks in very small patches. None of the rocks observed (out to approximately –3.5 ft, NGVD) had substantial surfgrass populations.
- There were no significant hard substrate areas offshore of the sand disposal site DS40 (Figure 1-1).
- Placement of sand on the beach around the inlet of the San Dieguito Lagoon should not result in long-term impacts to the biota in the area.

Figure 5-3. Large rock observed 0.15 miles north of inlet area. Biota on rock included mussels, sea anemones, coralline algae, and two small patches of surfgrass.

Figure 5-4. Rock observed 0.17 mile north of inlet area. Notice small patch of surfgrass attached to outer part of rock.

6.0 INITIAL DREDGING PLAN

6.1 DEPTHS AND VALUES OF DREDGING LOCATIONS

Figure 6-1 shows the locations of the initial dredging in Areas 1, 2, 3 and 4 and the recommended post-dredging channel bed elevations. Figures 6-2 to 6-5 present cross-section profiles for the proposed dredged inlet channel at Areas 1, 2, 3 and 4 in comparison to the October 2009 lagoon inlet channel profiles. Bathymetry contours before and after dredging are shown in Figure 6-6.

6.2 SCHEDULING

The initial dredging of the inlet channel will be conducted in fall 2010 and scheduled to avoid holiday periods, the Del Mar Fair and horse-racing seasons at the Del Mar Fairgrounds, the peak months of public beach use (i.e., summer and Spring Break), and periods of heightened biological activity (i.e., the grunion run, bird nesting). Construction of the inlet will commence after restoring the wetland areas east and west of I-5. We anticipate that construction efforts will end in mid-February 2011.

6.3 SEDIMENT DISPOSAL

6.3.1 Sand Volume

The volume of sand dredged from the lagoon will depend on the existing inlet channel condition. Based on channel surveys conducted in October 2009, we anticipate that about 65,000 yd^3 will be excavated, which will include 6,000 yd^3 from Area 1, 33,000 yd^3 from Area 2, 20,000 yd^3 from Area 3, and 6,000 yd^3 from Area 4. These volumes are estimates of the required volumes calculated from the channel surveys of September 1994 and October 2009, and therefore, they allow for the lapse of time before actual dredging is undertaken. The exact volumes will be determined based on the need and inlet condition at the time of construction.

6.3.2 Beach Profile Characteristics

Del Mar Beach is a narrow-to-medium, sandy beach that extends about a mile south of San Dieguito Lagoon. The beach fronts what used to be a barrier dune system, separating the lagoon from the ocean. Housing now completely covers the dune, with a nearly continuous row of seawalls on the ocean side. Sand depths at and south of the lagoon mouth are deeper than on most area beaches in the Oceanside Littoral Cell, because this reach is located in the San Dieguito River Valley, which was cut out during periods of lower sea level.

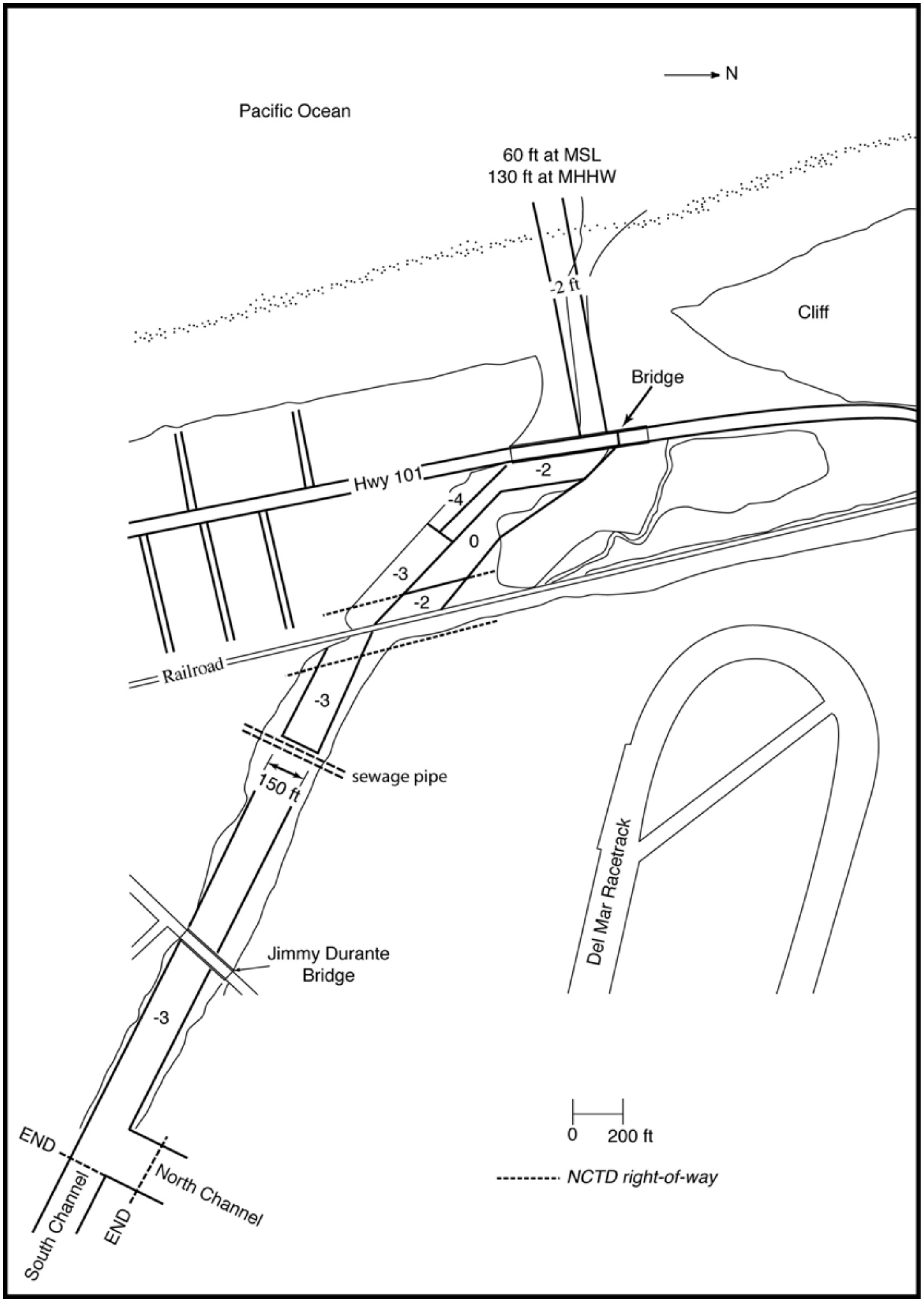


Figure 6-1. Map showing locations, elevations, and dredging areas for recommended initial dredging in San Dieguito Lagoon.

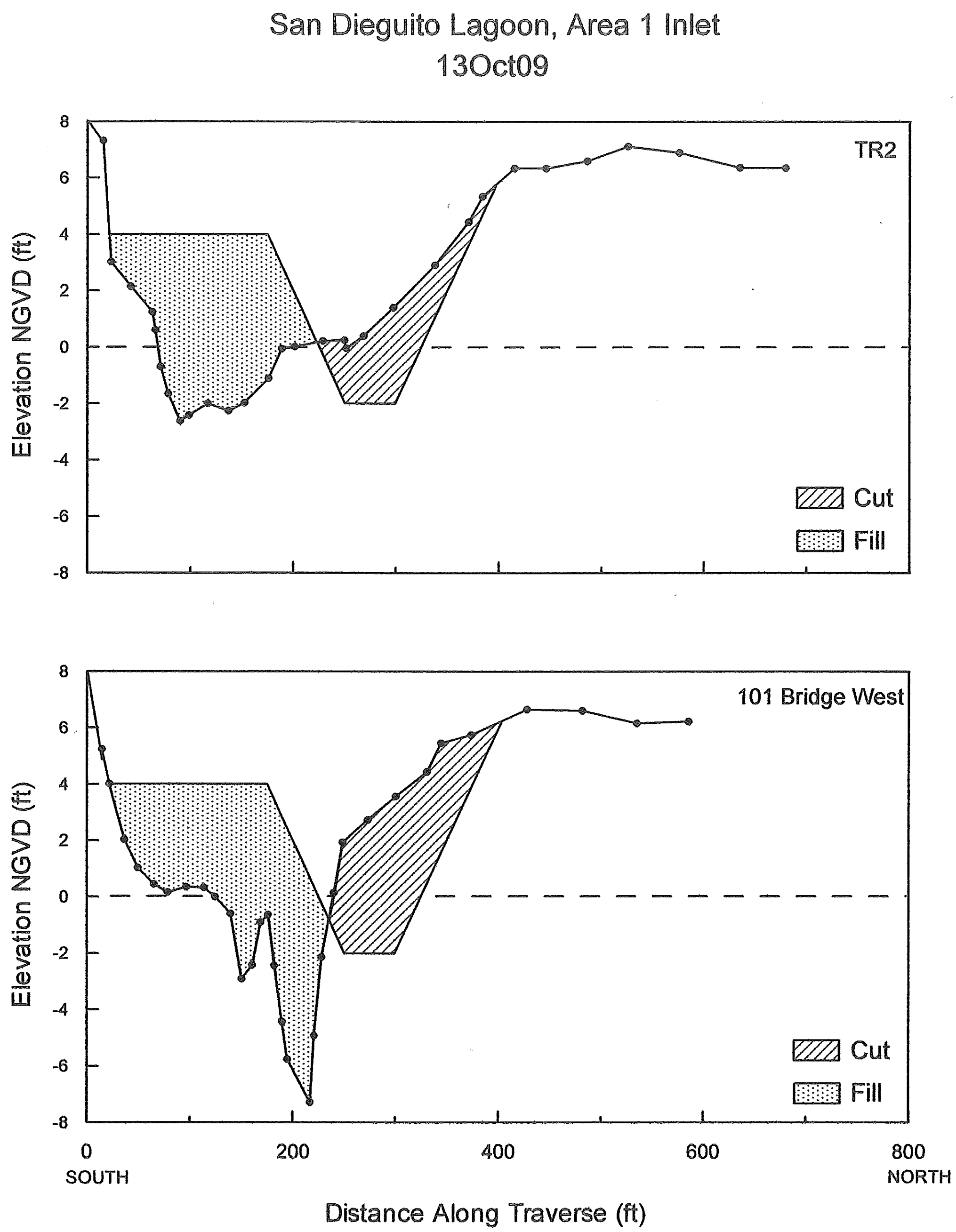


Figure 6-2. **Channel cross-sections at TR2 and west of Highway 101 Bridge before and after dredging when the lagoon was closed.**

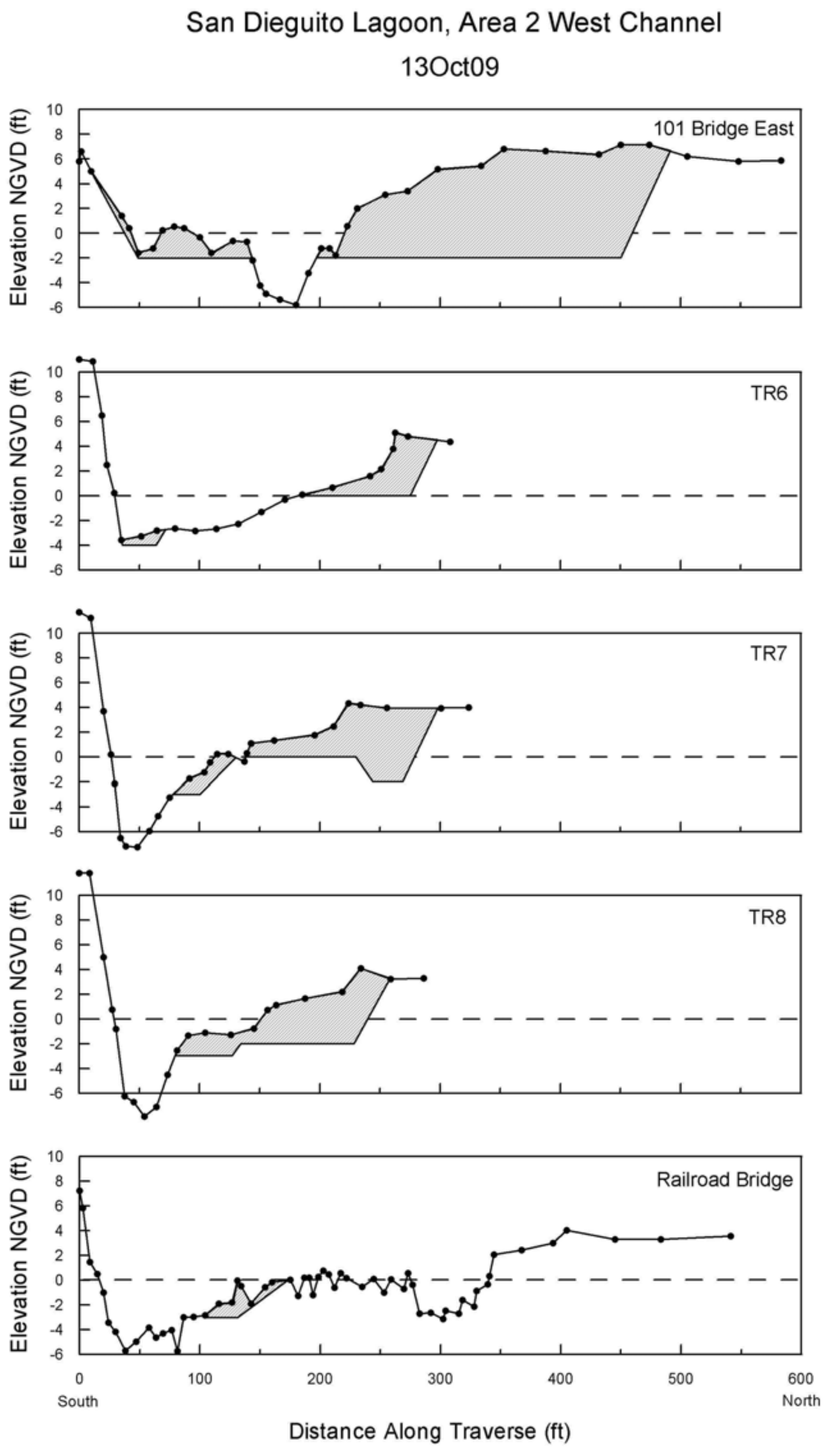


Figure 6-3. Channel cross-sections east of Highway 101, at TR6, TR7, TR8, and west of Railroad Bridge before and after dredging. Data from 13 October 2009 were used to represent channel cross-sections before dredging.

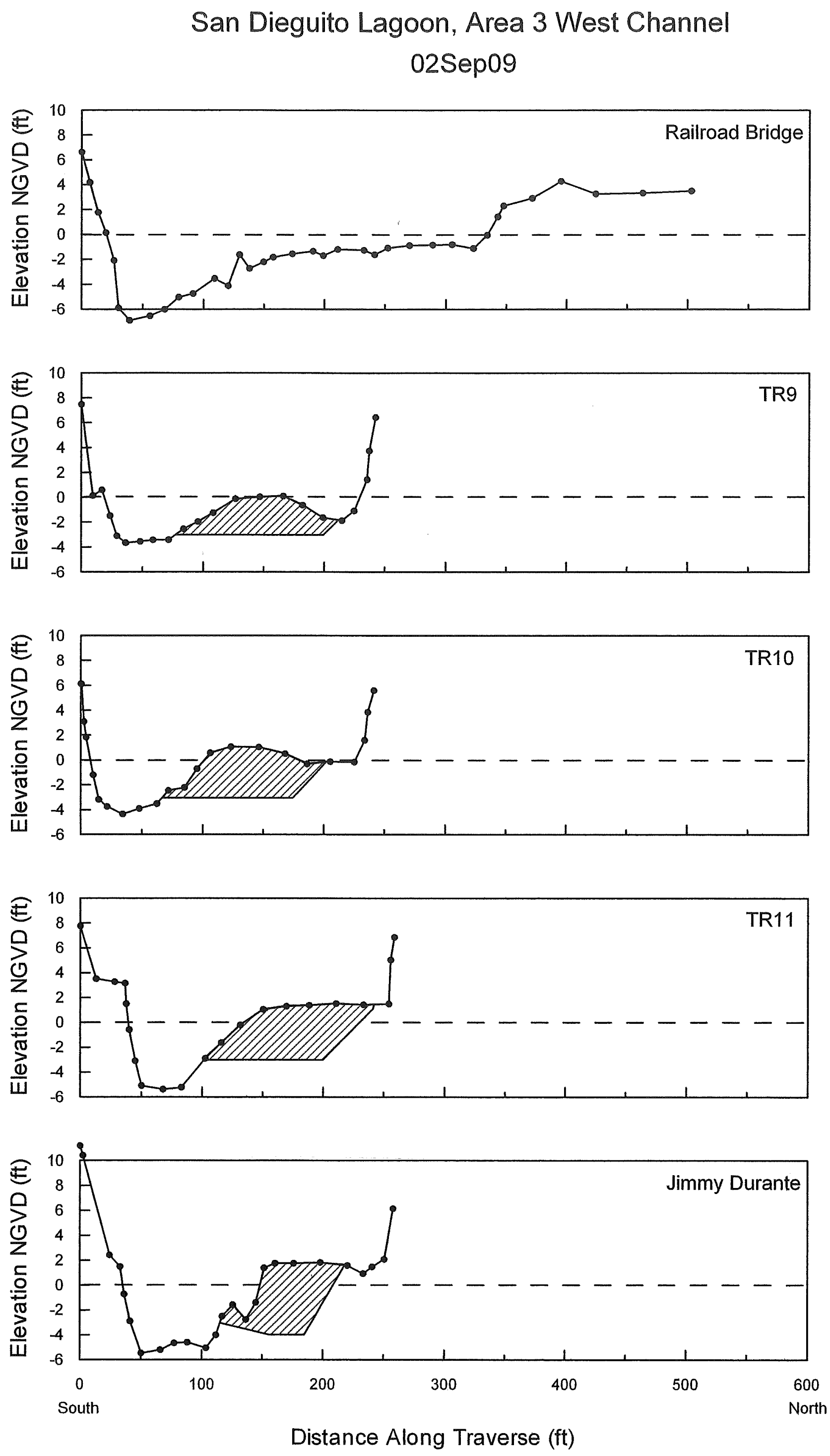


Figure 6-4. Channel cross-sections east of Highway 101, at TR9, TR10, TR11, and Jimmy Durante Bridge before and after dredging. Data from 02 September 2009 were used to represent channel cross-sections before dredging.

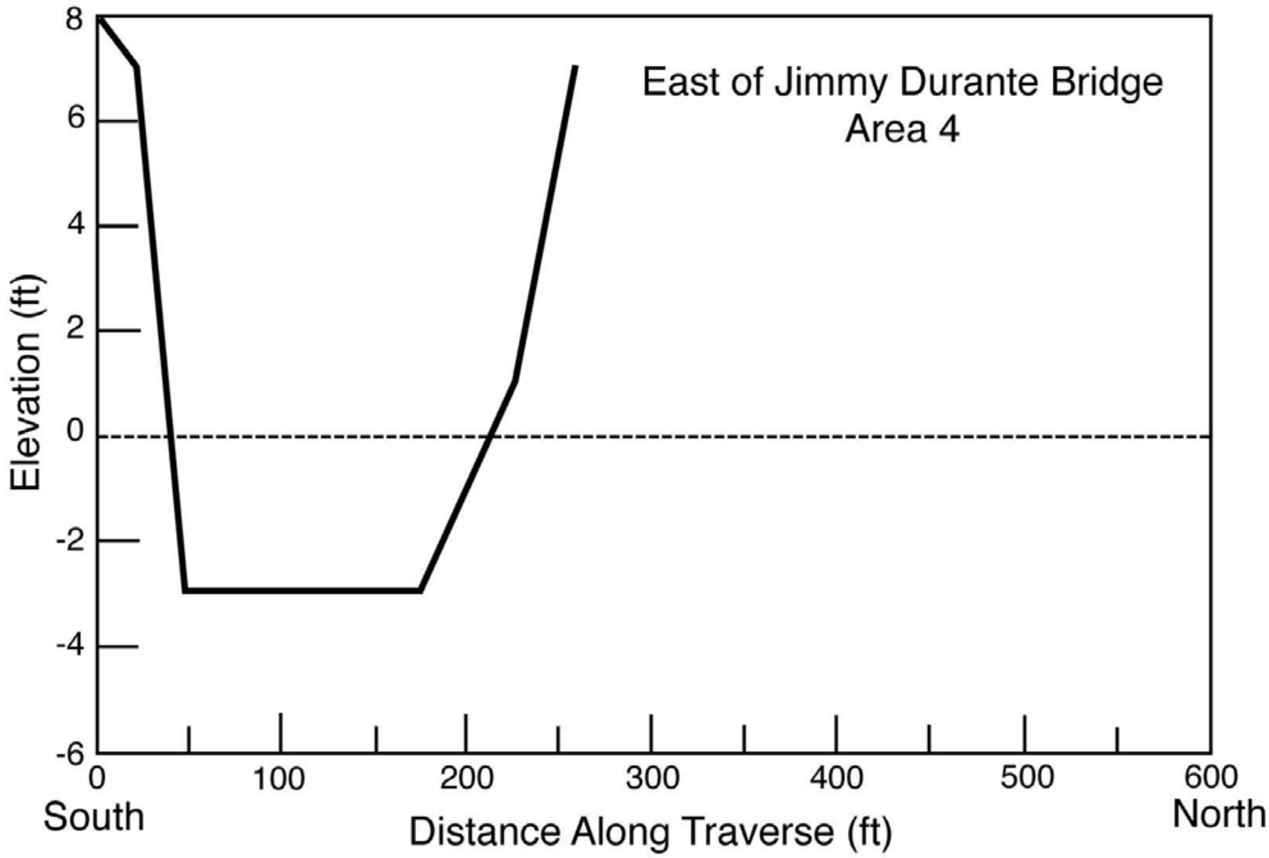


Figure 6-5. Proposed inlet channel cross-sections east of Jimmy Durante Bridge.

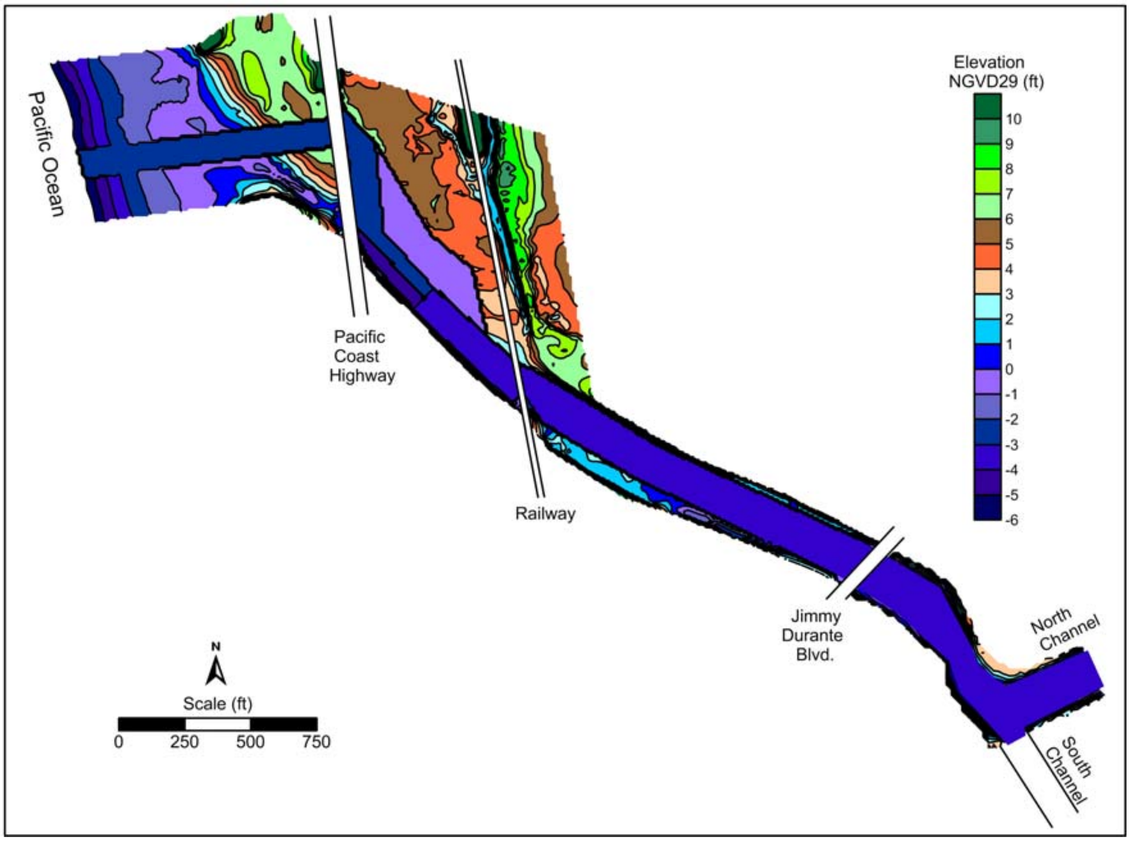


Figure 6-6. Inlet channel bathymetry after dredging.

North of the lagoon entrance in the City of Solana Beach, the beach overlies a wave-cut bedrock terrace and is backed by a steep sea cliff. Beach widths typically are narrower in this area, and sand depth varies from 5 feet to zero, where the sand cover is stripped and the bedrock is exposed. The berm height and beach face slope both depend on the sand grain size and wave climate. Berm heights in Del Mar are about 6 to 7 ft, NGVD, with foreshore slopes of 3 to 5 degrees (1:20 to 1:25). Heights and slopes are fairly uniform alongshore. The lack of a winter berm has been noticed at Del Mar Beach during the winter season. The subaerial beach width is defined as the distance from the cliff face (or seawall) to the intersection of the profile with the NGVD elevation plane.

Beach ranges SIO1, SIO2, and SIO5 (Figure 6-7) have been surveyed regularly since 1978 by Scripps Institution of Oceanography, the U.S. Army Corps of Engineers, and Coastal Environments. Figures 6-8a,b,c,d,e,f show beach profile surveys conducted after the winter and summer seasons from 2001 through 2009 for beach ranges SIO1, SIO2 and SIO5 respectively. These profiles represent typical winter and summer profiles at these ranges. Note that the profiles surveyed in April and May represent the generally narrower beach conditions following the winter season, while those surveyed in October and November represent the wider configuration that is characteristic after the summer season. The seasonal cycle at Del Mar Beach is defined by a difference in beach width between summer and winter profiles of about 100 to 150 ft. Beach profiles for ranges SIO1, SIO2,and SIO5 during 2009 are shown in Figure 6-9.

6.3.3 Sand Placement

Sand will be placed on the beach during the fall 2010 season. Figure 6-10 shows the beach fill design overlaid with the typical winter profile of the Del Mar Beach. The figure shows that about 150 yd3/yd will be placed on the beach between 7 ft, NGVD, and –2.56 ft, NGVD). The total length of the beach where the sand will be placed is about 1,600 ft (533 yds). The sand will be placed on the south and north sides of the lagoon inlet at DS40 (Figure 1-1). However, most of the sand will be placed on the south side of the lagoon and only a small volume of sand (4000-5000 yd^3) on the north beach. There will be a buffer of about 400-500 ft on both sides of the inlet where no sand will be placed to prevent the mobile sand from reentering the lagoon inlet.

Several factors will control sand placement to the south and north of the inlet, such as the predominant direction of the longshore current during inlet excavation and beach usage and condition. Sand transport direction during this time is predominantly to the south.

Prior to sand placement, especially from March through August, the beach area will be surveyed by a biologist to ensure that there are no impacts to grunion or any existing nesting sites on the beach or between the shoreline and Jimmy Durante Boulevard. The time and location of the placement of the sand will be determined in cooperation with the City of Del Mar and other interested agencies prior to deposition. Topographical and beach profile surveys will be conducted before and after excavation to document both conditions. A report will be prepared and sent to the City of Del Mar, California Coastal Commission, USACOE, and California State Lands after dredging.

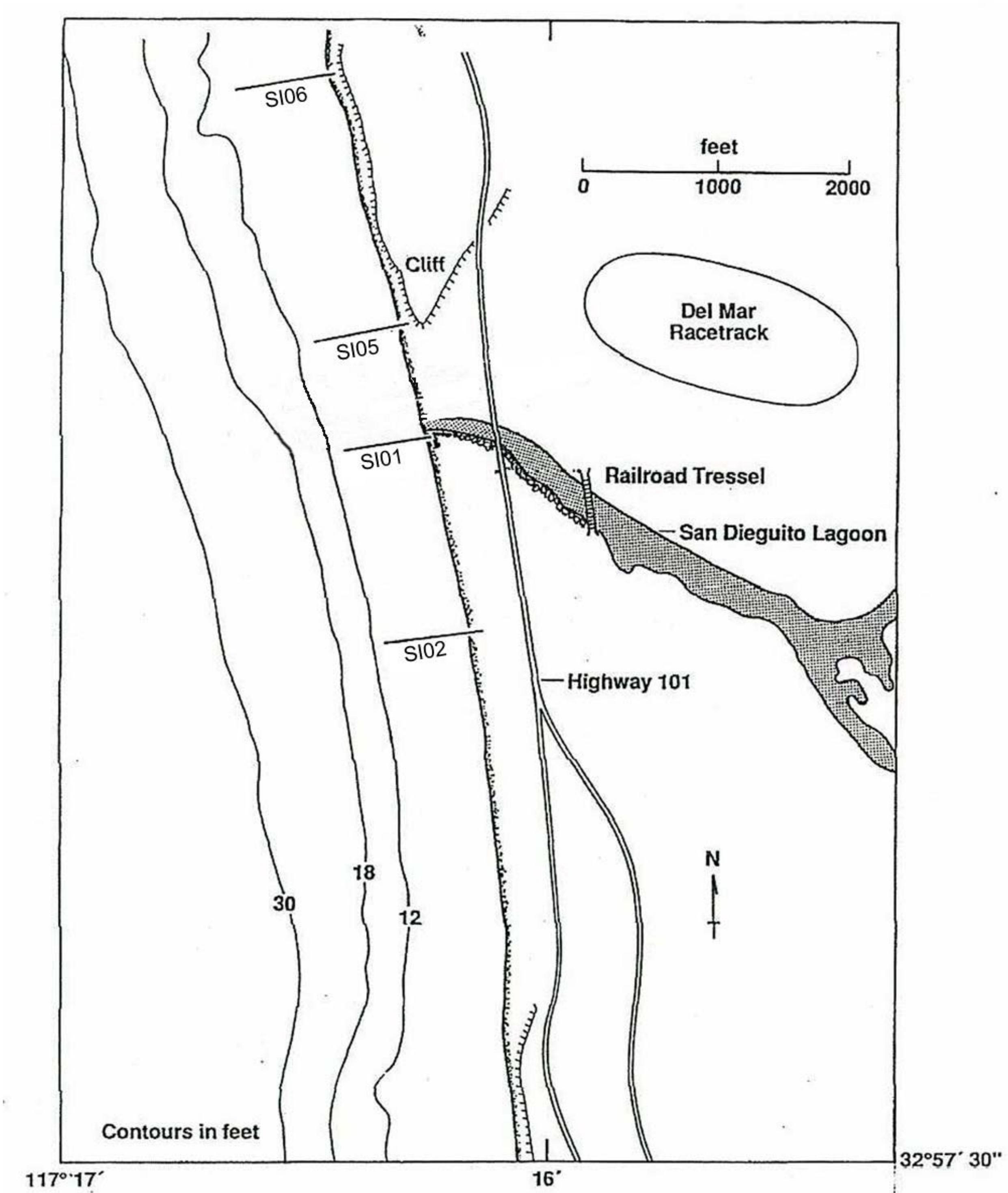


Figure 6-7. Map showing locations of beach profile ranges historically surveyed since 1978.

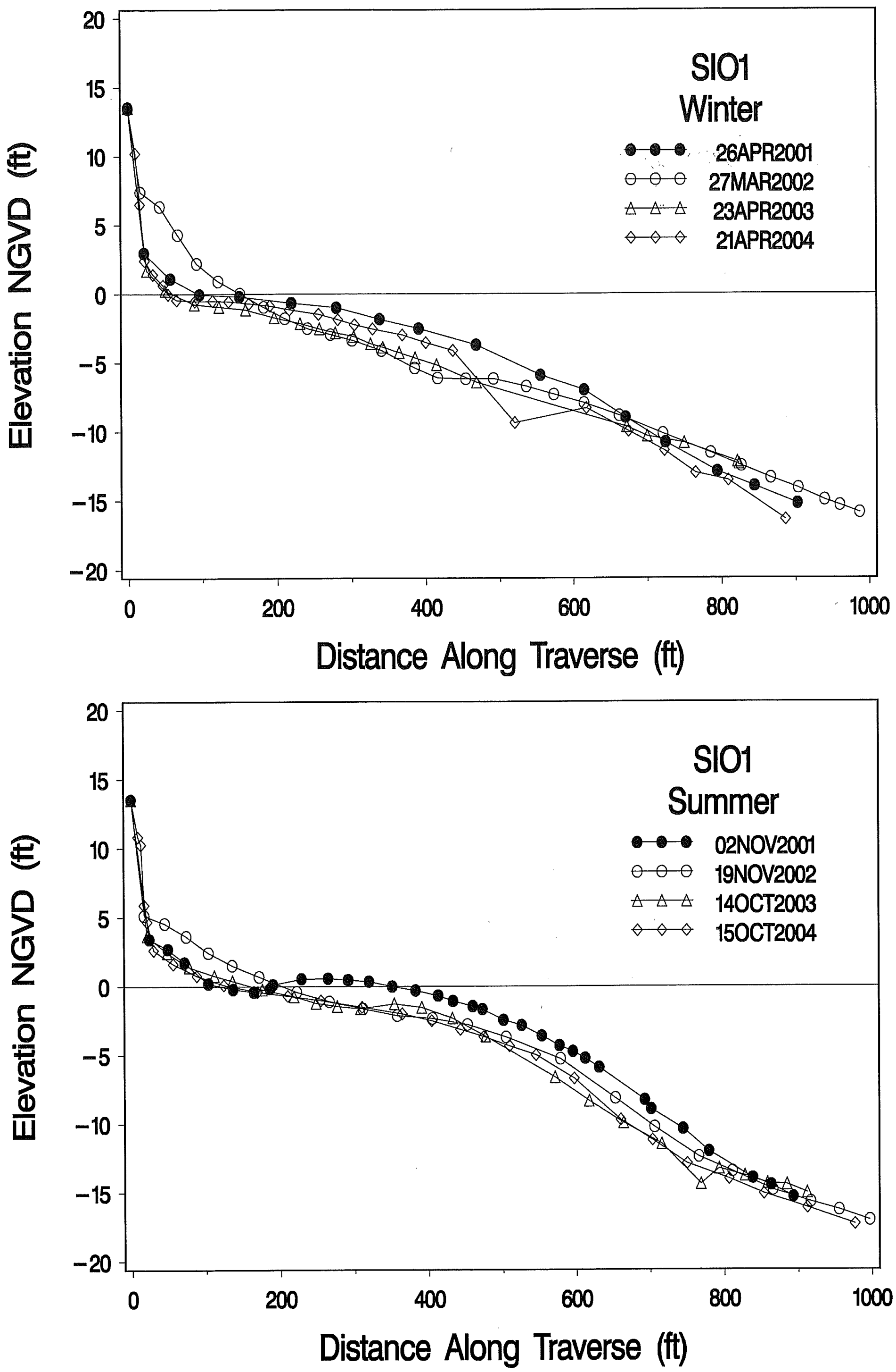
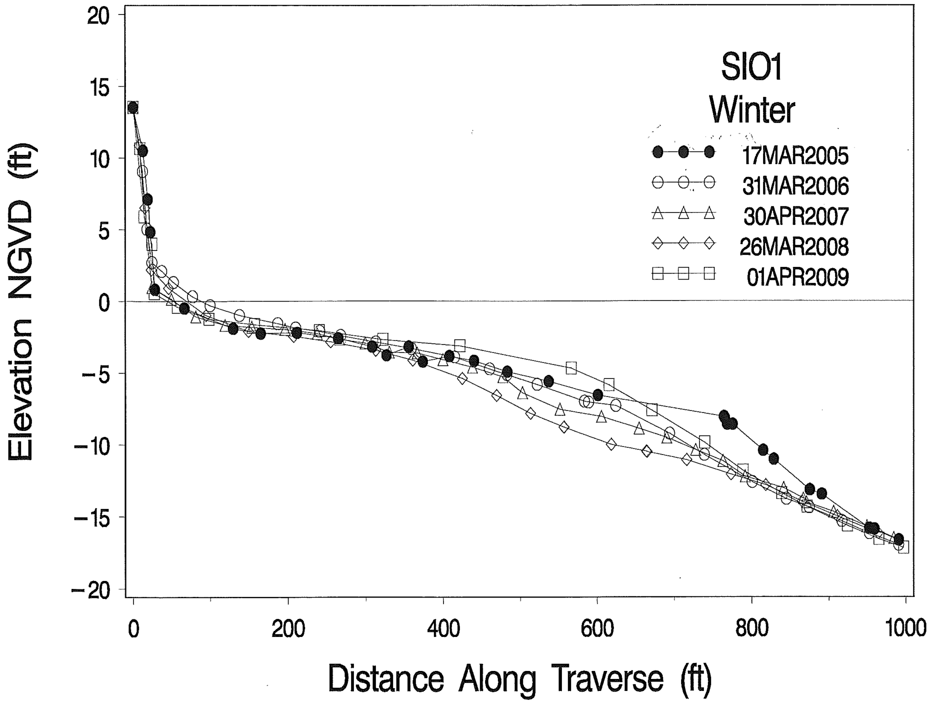


Figure 6-8a. Winter and summer beach profiles at SIO1 from2001 through 2004.



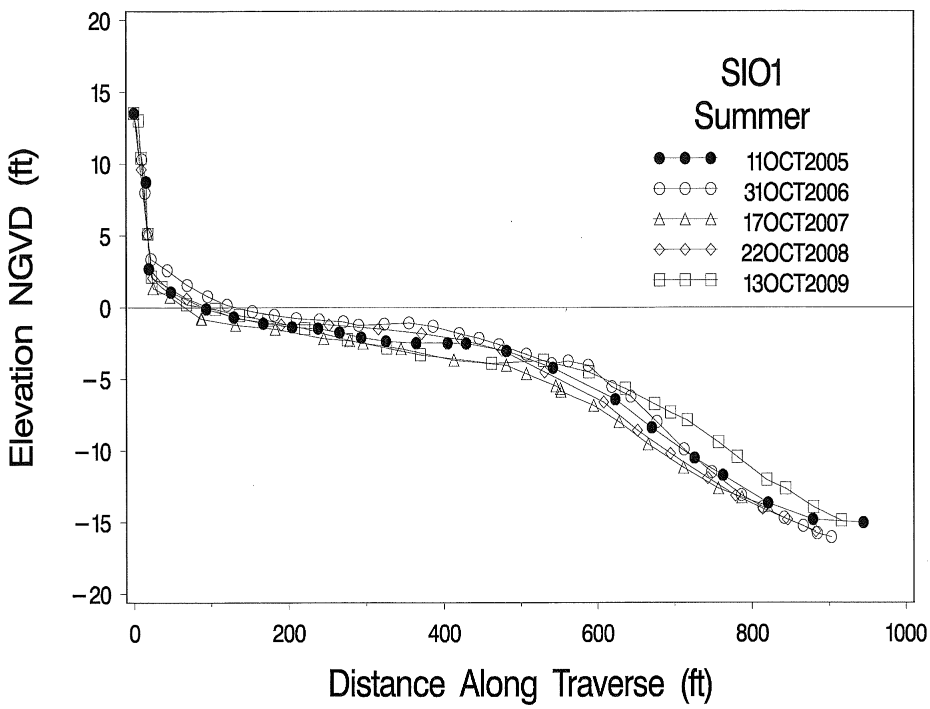
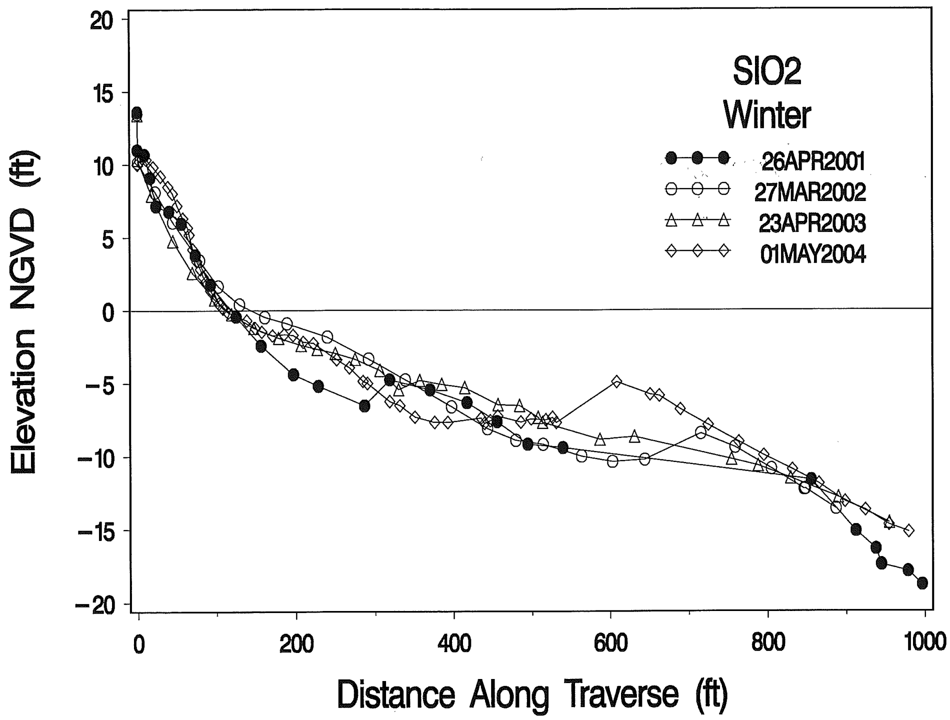


Figure 6-8b. Winter and summer beach profiles at SIO1 from2005 through 2009.



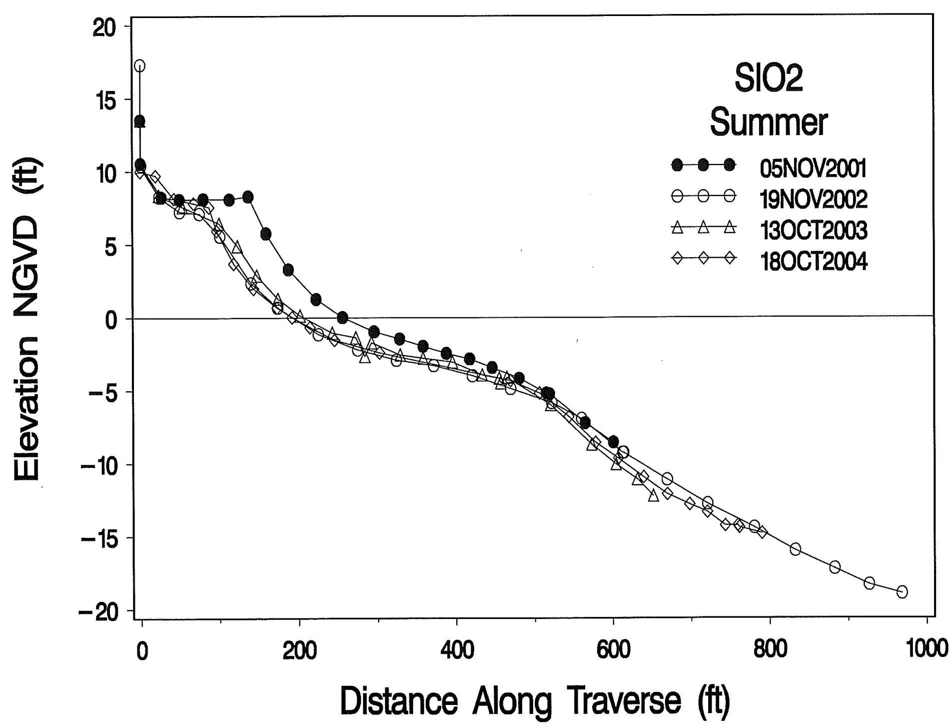


Figure 6-8c. Winter and summer beach profiles at SIO2 from2001 through 2004.

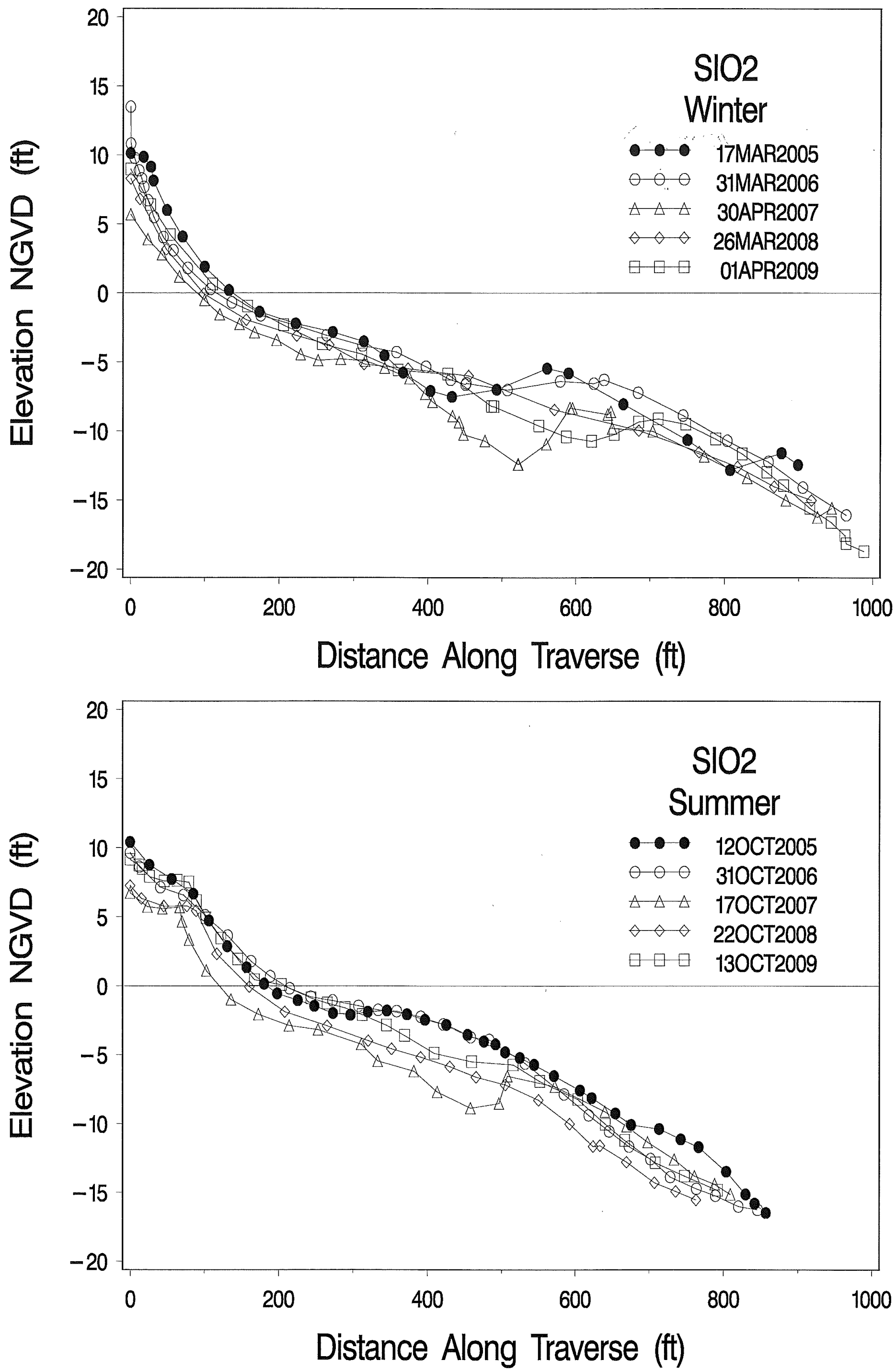


Figure 6-8d. Winter and summer beach profiles at SIO2 from 2005 through 2009.

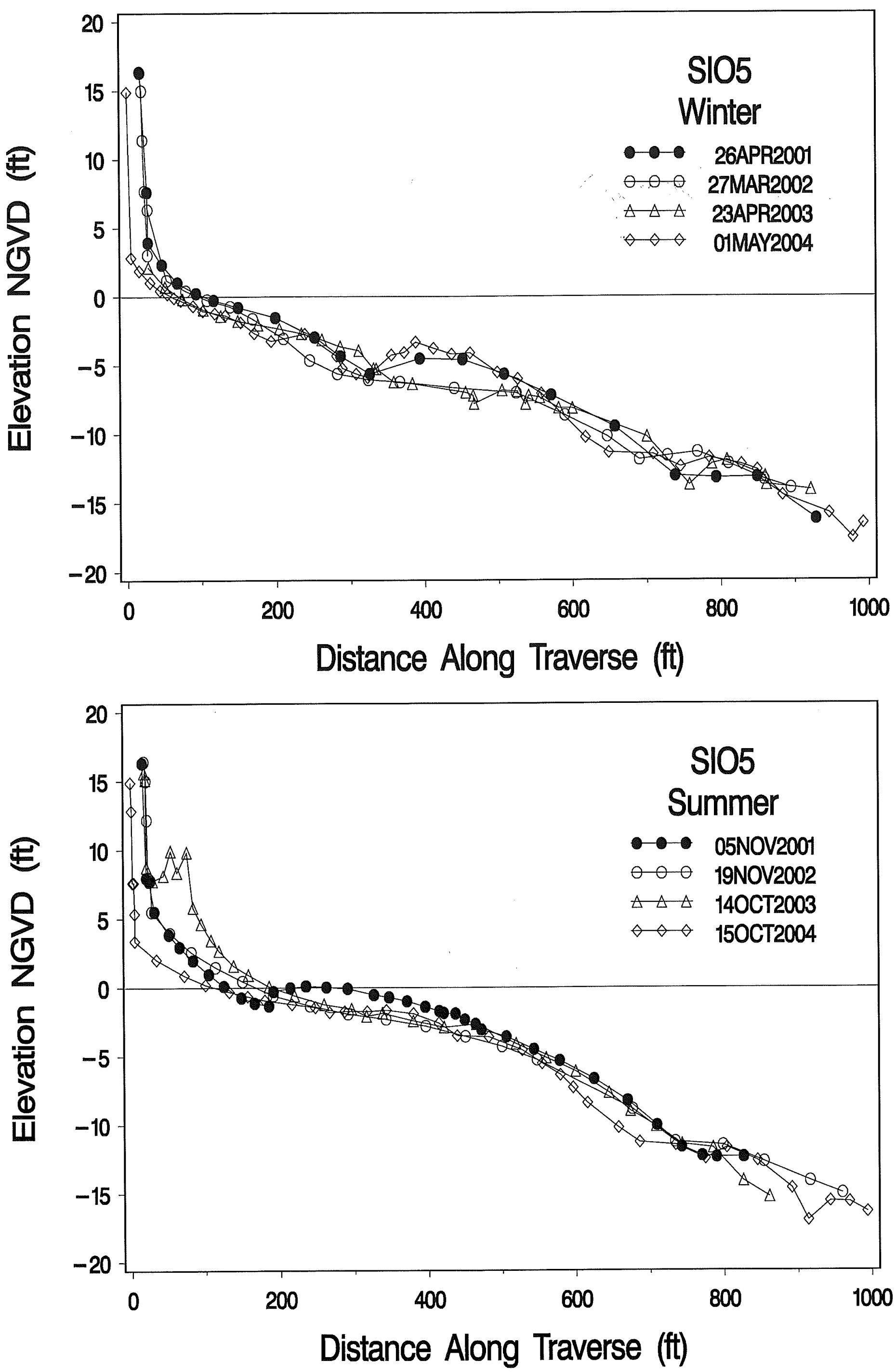


Figure 6-8e. Winter and summer beach profiles at SIO5 from 2001 through 2004

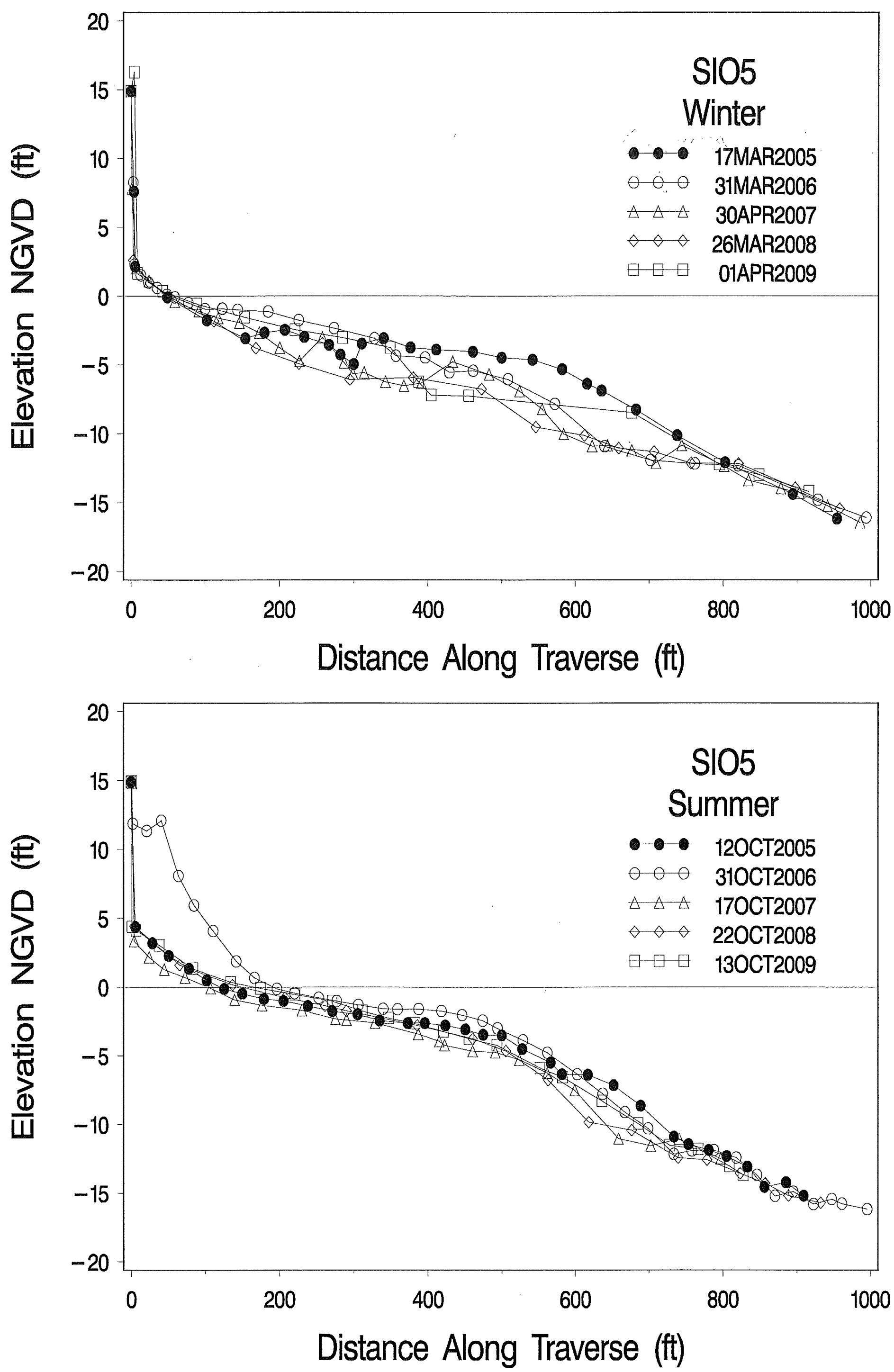


Figure 6-8f. Winter and summer beach profiles at SIO5 from 2005 through 2009

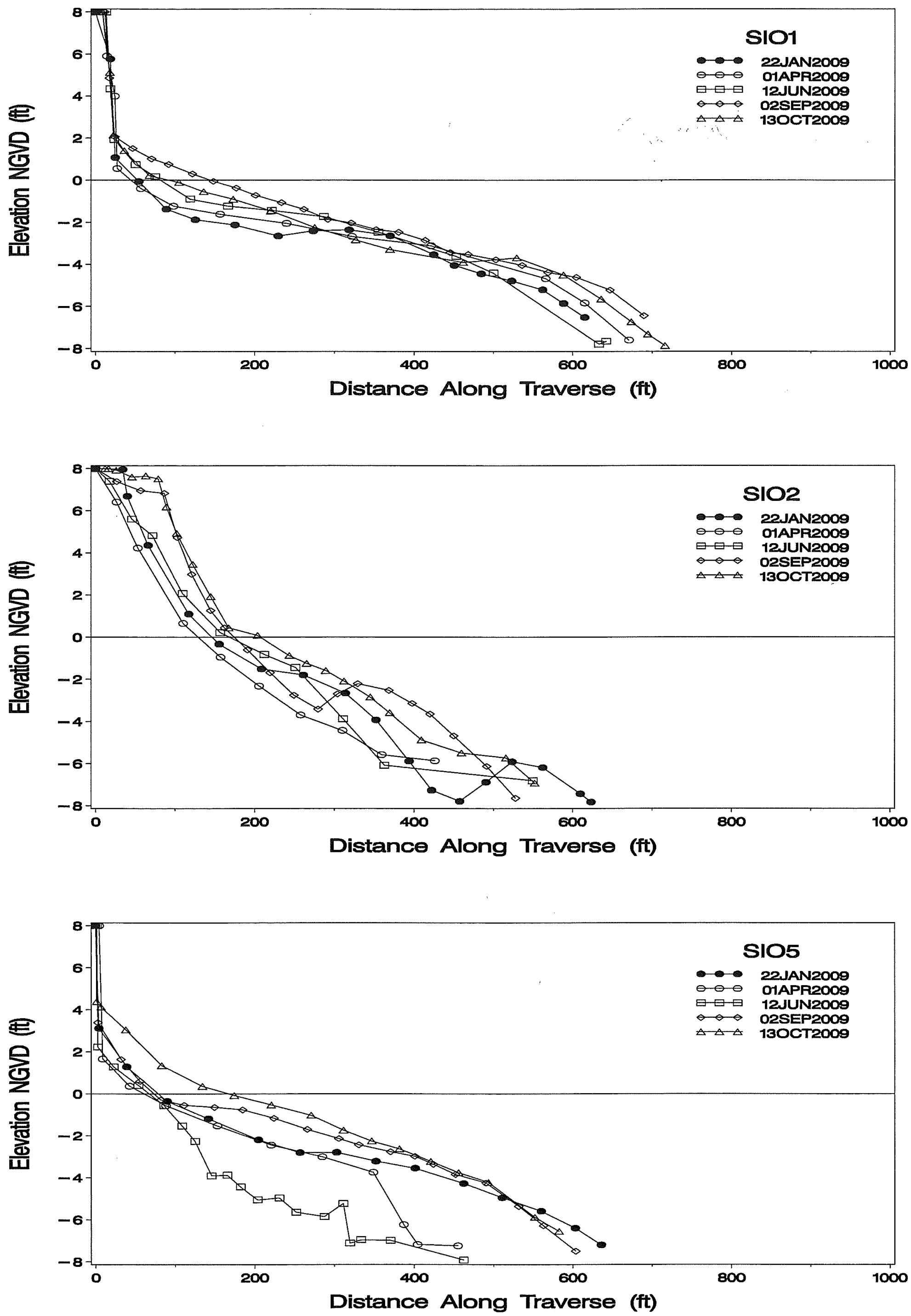


Figure 6-9. Beach profiles at SIO1, SIO2, and SIO5 during 2009.

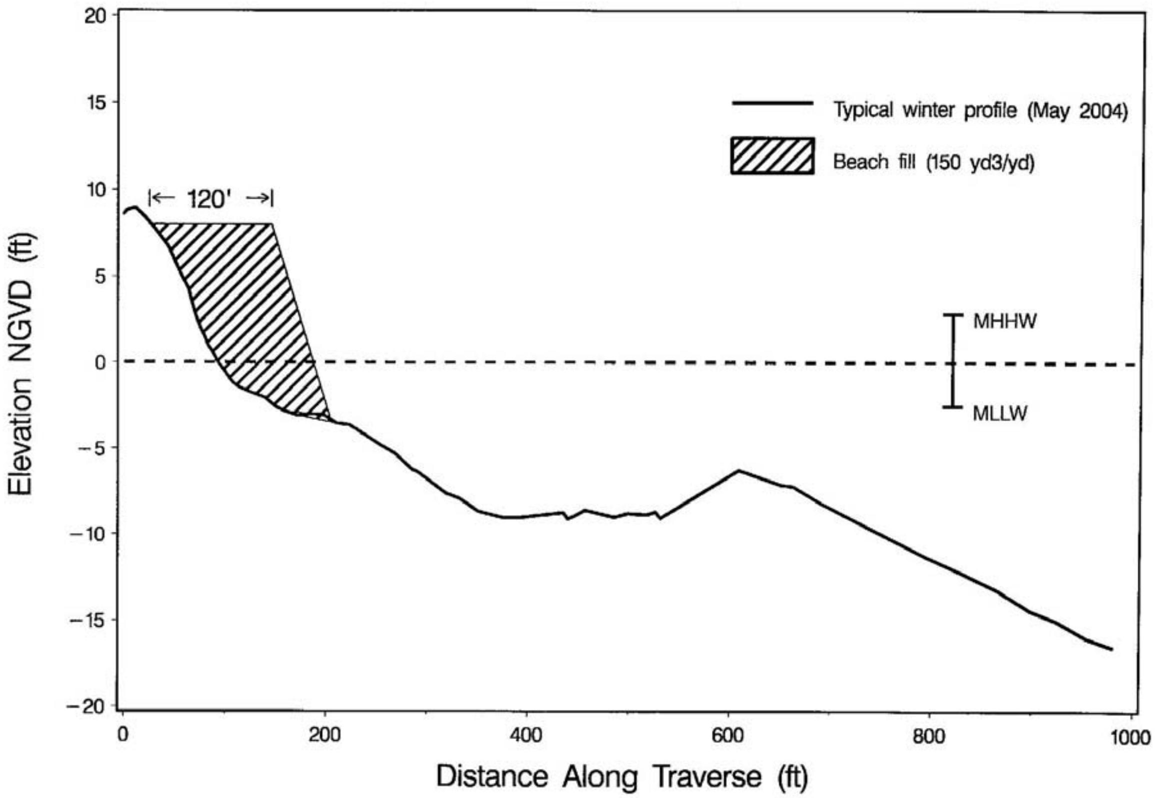


Figure 6-10. Beach fill design overlaid with typical winter profile for receiver site at Del Mar Beach.

6.4 DURATION OF INITIAL DREDGING PROCEDURE

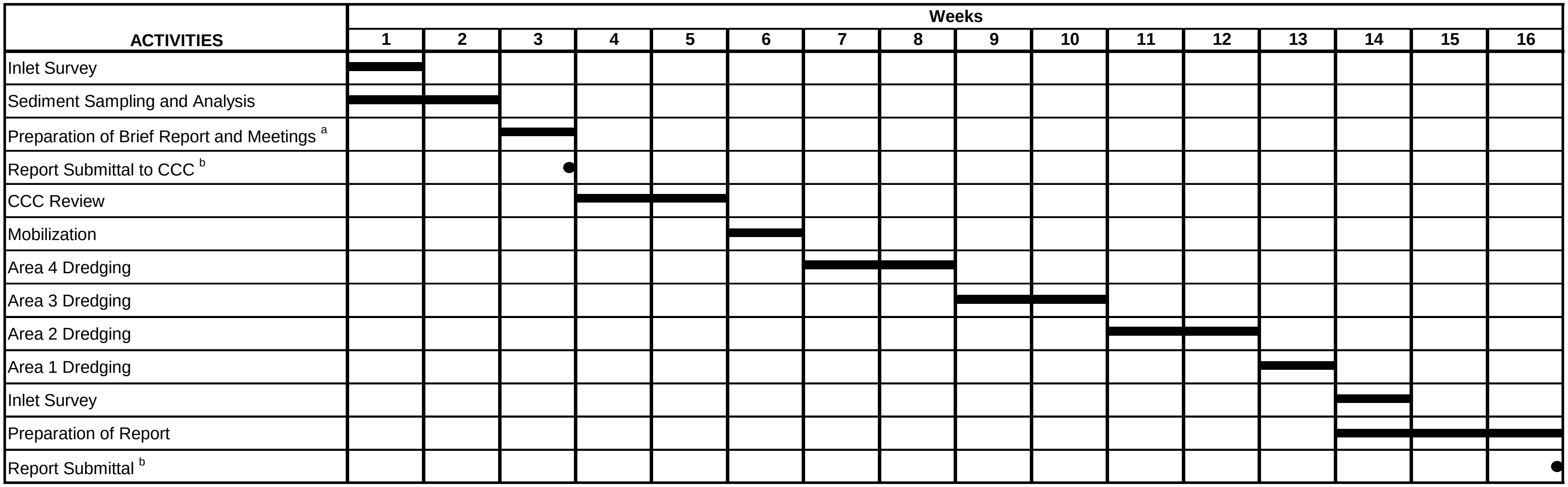
The estimated time periods required to dredge Areas 1, 2, 3, and 4 are 7 days, 14 days, 14 days, and 14 days, respectively. The total number of days required will be 49 working days (about 2.5 months). The estimated lengths of time are based on the volume of sand to be moved and the dredging capabilities of the excavation equipment (Table 6-1).

6.5 TIMELINE PLOT FOR INITIAL DREDGING

Figure 6-11 shows the timeline plot for the initial dredging of the San Dieguito Lagoon inlet channel.

Table 6-1. Estimated dredging capacities of excavation equipment.

Dredge Type	Dry Capacity (yd^3)	Wet Capacity (yd3)	Dredging Rate (yd^3/hr)
Front loader	7	5	40
Scraper	22	16	60
Backhoe excavator	3.5	3	250
Cutterhead dredger (10 inch)	–	–	Up to 100
Cutterhead dredger (12-14 inch)	–	–	Up to 150



[a] Meetings with California Coastal Commission and City of Del Mar staff, as necessary.
[b] Report submittal to California Coastal Commission and City of Del Mar and other agencies.

Figure 6-11. San Dieguito Lagoon initial dredging timeline.

7.0 PERIODIC MAINTENANCE DREDGING

The periodic dredging plan and its rationale have been discussed in detail by Elwany et al. (1994,1998a). In summary, the maintenance dredging program consists of dredging Areas 1 and 2 approximately every eight months and Area 3 only if needed. The eight-month schedule for Areas 1 and 2 is designed to reduce the rate of sand incursion east of the Railroad Bridge to an amount that will require only small, infrequent dredging in Area 3. The expected volumes to be periodically removed are 4,000 yd^3 per eight-month period from Area 1; 12,000 yd^3 per eight-month period from Area 2; and 5,000 yd^3 if needed from Area 3.

The locations and recommended elevations for the maintenance dredging are the same as those specified for the initial dredging (Figure 7-1), except at the inlet mouth (Area 1). The inlet channel under the Highway 101 Bridge and across the beach tends to meander and may shift considerably over the course of eight months. At each maintenance dredging, there will be a choice between enlarging the channel as configured at the time or straightening the channel. This choice will be best made on a case-by-case basis. The plan for all three areas is designed to maintain a sufficient cross-section of the inlet, but not necessarily to keep the channel across the beach in the same location. Figure 7-2 shows the recommended channel cross-sections when the lagoon is open.

7.1 SCHEDULING

The eight-month time interval specified in the plan may vary for practical reasons related to the dredging itself, in order to minimize environmental disturbances, or to accommodate other activities in the area. Since dredging can be complicated by waves and storm runoff, especially during the winter season, the initial dredging after the winter storm period in early April could be followed by the first maintenance dredging in November. The next dredging would then take place the following September.

SCE will provide the CCC and the City of Del Mar with all necessary information (as described in Special Condition #24) for each episode of periodic dredging at least 21 days prior to excavation.

There is no need for sediment testing for periodic dredging based on: 1) the initial sediment sampling; 2) the fact that the source of the sediment trapped in the inlet is from littoral drift; and 3) the fact that previous periodic inlet dredging from the lagoon inlet by the City of Del Mar showed compliance with USACOE and CCC requirements, and no complaints were raised from the public during these excavations. The 10 samples taken from the dredged areas and the 10 samples taken from the disposal areas, as described in the report in Section 8.3, will be stored for reference in the event a complaint is made.

This schedule would minimize disturbance during the peak months of public beach use and during the Del Mar Fair and horse-racing seasons at the Del Mar Fairgrounds. The maintenance dredging in Area 3 is to be carried out depending on the state of the channel in this reach and could be scheduled during either spring or autumn to avoid the storms of winter and the discharge of slurry on the beach during the summer.

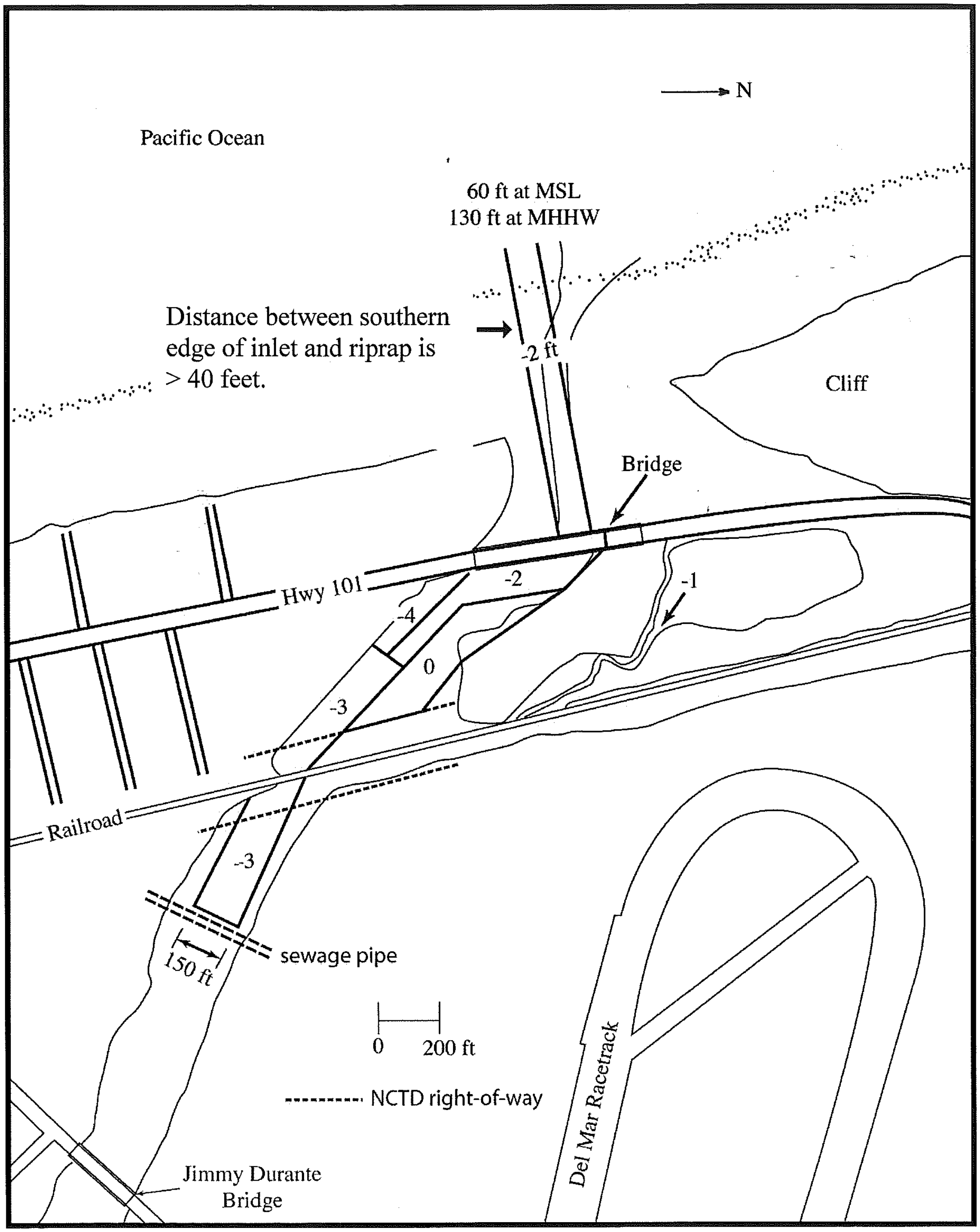


Figure 7-1. Map showing locations and elevations for recommended periodic maintenance dredging in San Dieguito Lagoon.

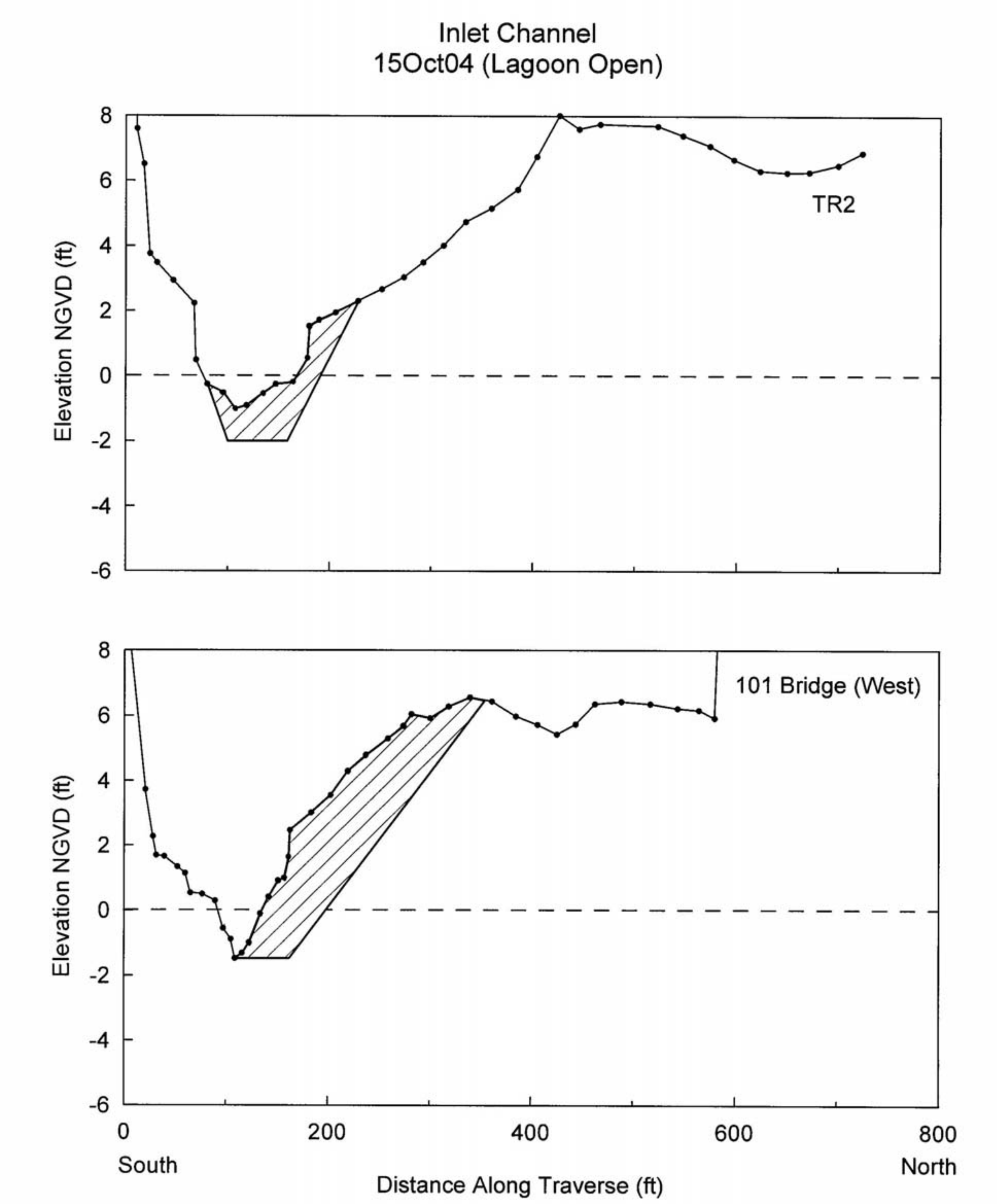


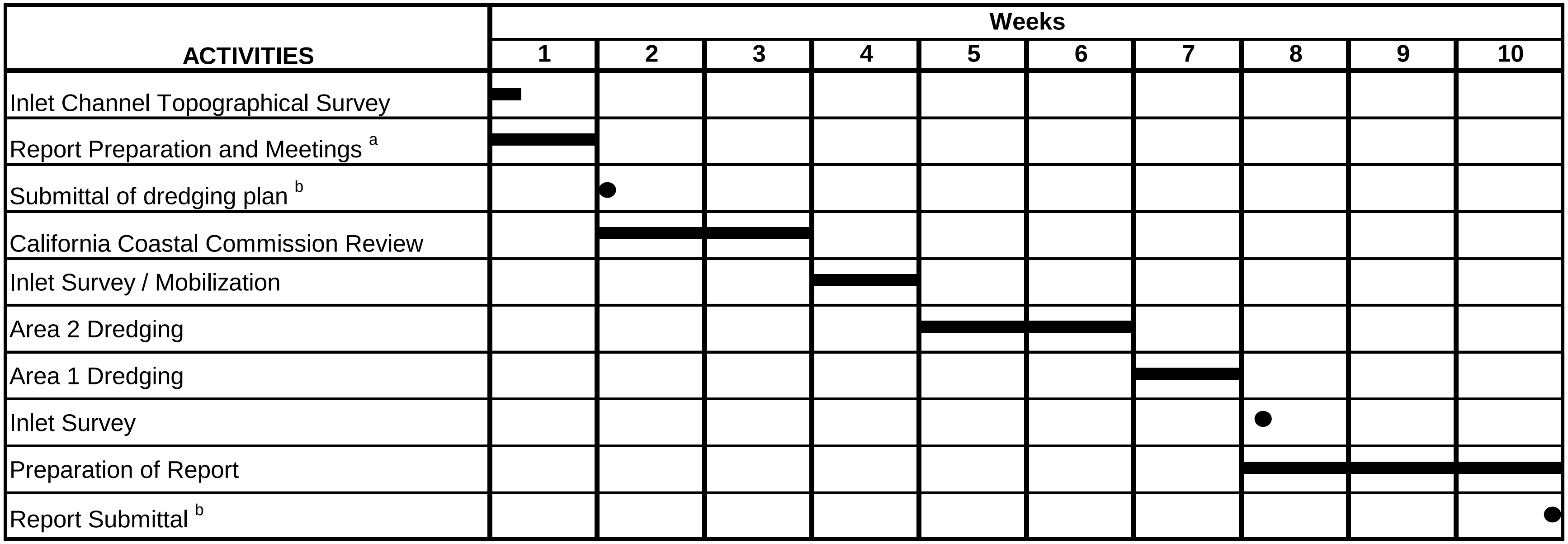
Figure 7-2. Proposed excavation of the inlet channel west of Highway 101 Bridge.

7.2 SEDIMENT DISPOSAL

The dredged channel sediments have the same characteristics as beach sand and are not known to contain any contaminants (Sections 3 and 4). Therefore, the sediments can be dredged and placed back on the beach as beach replenishment. The preferred dredge material disposal sites are located approximately 1,000 ft north and south of the river mouth on the open beach between MHHW (Mean Higher High Water) and MLLW (Mean Lower Low Water). The site will be specified according to the season in which the dredging will occur. Factors controlling site selection are longshore currents, need of sand, and beach usage. The SCE plan for sand disposal on the beach will also take into consideration beach conditions based on information gathered from the beach monitoring program as specified in Special Condition #25.

7.3 TIMELINE PLOT FOR PERIODIC MAINTENANCE DREDGING

Figure 7-3 shows the timeline plot for the periodic maintenance dredging of the inlet channel.



[a] Meetings with California Coastal Commission and City of Del Mar staff, as necessary.
[b] Report submittal to California Coastal Commission and City of Del Mar and other agencies.

Figure 7-3. San Dieguito Lagoon periodic dredging timeline.

8.0 IMPLEMENTATION

8.1 DREDGING METHODS

In this section, we present two proven dredging methods for carrying out the required sand removal, as follows:

1. Dredging with conventional excavation and earth-moving equipment, which can work in water depths of up to three feet; and
2. Dredging with a cutterhead suction dredger and slurry pipeline.

Based on cost and flexibility of scheduling and deployment, conventional excavation dredging is the best method for carrying out the specified programs of initial and maintenance dredging in Areas 1 and 2. For the initial dredging of Areas 3 and 4, the cutterhead suction dredger method will be used. The method is competitive with the use of conventional excavation equipment.

Areas 3 and 4 will be dredged using a cutterhead dredge. Due to operational constraints (power supply and narrow, shallow inlet channel), a diesel dredge will be used with a 10-inch cutterhead suction dredge. No electric dredge is available in Areas 3 and 4, nor is there an available power supply in or near these areas. For these reasons, a diesel dredge was selected. The City of Del Mar and Joint Powers Authority (JPA) have no objection to using the diesel engine dredge, which surpasses Tier 3 emissions standards for air quality (Figure 8-1). The width of the dredge is 20 feet, and the length is 100 feet. Areas 1 and 2 will be excavated using conventional earth-moving equipment, and Areas 3 and 4 will be dredged using a cutterhead suction dredge. The implementation of the dredging of Areas 1, 2, 3, and 4 is described below.

Southern California Edison (SCE) will notify the CCC, City of Del Mar, and other agencies of its desire to carry out the initial dredging three weeks in advance and will provide the following information: 1) a recent map of all dredging areas, 2) sample locations and testing results, and 3) an accurate schedule for the dredging.

8.1.1 Implementation with Conventional Earth-Moving Equipment (Areas 1 and 2)

8.1.1.1 Mobilization

Earth-moving equipment will be transported by conventional equipment haulers. These will require a small overnight storage and parking area (staging area) for the duration of the project. Two staging sites will be required, one each in Areas 1 and 3. Figures 8-2 and 8-3 show the staging sites at Areas 1 and 3. Easy access is available to both of these sites. Equipment fueling and maintenance will be conducted on-site, and special care will be taken to prevent any oil or fuel spills on the ground. Conventional earth-moving equipment is available on very short notice and can be mobilized on-site in one day.

San Dieguito River Valley
Regional Open Space Park
14103 Highland Valley Road
Escondido, CA 92025
(858) 674-2270 Fax (858) 674-2280
www.sdrp.org

December 22, 2009

Hany Elwany
Coastal Environments
2166 Avenida de la Playa, Suite E
La Jolla, CA 92037

Subject: Permission to Use Diesel Hydraulic Dredge

Dear Hany:

Per the noise information provided by Joe Ellis in a fax dated 11/13/09, the use of the specified diesel-powered hydraulic dredge (aka "Shrimp") for dredging the channel between W1 and the main channel (i.e., east of Jimmy Durante) is in compliance with the Final EIR for the Wetland Restoration project. According to the provided decibel readings the dredge would produce a noise level of approximately 68.2 dB at 400 feet south of the channel, the location of the closest residences. This is below the significance threshold of 75 dBA and is consistent with the Final EIR Findings.

Sincerely,

for

Dick Bobertz
Executive Director

Figure 8-1. JPA approval of the proposed dredger per the EIR and after consultation with the City of Del Mar.

Figure 8-2. Staging area west of Highway 101 Bridge.

Figure 8-3. Staging area east of Railroad Bridge on north side of inlet channel.

8.1.1.2 Operations

Areas 1 and 2 will be excavated with a combination of conventional earth-moving equipment (scrapers, backhoe, and front-end loader). The scrapers will transport dredged sediments directly to the disposal site by passing underneath the Highway 101 Bridge. A track backhoe excavator will be used to excavate sediments from along the channel in Area 2. Because the reach of the backhoe is limited to 35 ft, it may be necessary to construct a working berm of dredged sediments on the channel bed adjacent to the riverbank in order to excavate areas that are far from the channel banks. The working berm will subsequently be removed. The sediment removed from the inlet channel would temporarily be stored near the banks above Mean Higher High Water (MHHW). Areas 3 and 4 will be dredged using a small cutterhead dredge (Section 8.1).

After the dredging of Areas 1, 2, 3 and 4 has been completed, the berm that closes the inlet will be removed. The timing of the removal of the inlet berm will coincide with a low spring tide, so that the berm can be completely removed and the ebb channel flow to the ocean can help remove any residual sediments from the channel bed. The initial dredging effort for Areas 1 and 2 is estimated to require 7 days for Area 1 and 14 days for Area 2.

8.1.1.3 Demobilization

The equipment will be removed with conventional equipment haulers after the storage and parking site has been cleaned up, all residual dredged sediments have been removed, and the area has been returned to its original grade. Demobilization is a minor effort for this type of equipment and should require only one day.

8.1.2 Implementation with Cutterhead Suction Dredger

8.1.2.1 Mobilization

The equipment will be moved to the job site (staging area SA2; see Figure 8-4) by conventional haulers. The dredger will be launched at the North Channel, where it will be staged. A crane will be required to offload the dredger and launch it into the North Channel. The slurry pipeline would be assembled in the parking lot of the 22nd Agricultural District and laid out along the north side of the riverbank. The pipeline would be submerged under the Railroad Bridge and across the lagoon mouth to the disposal area south of the lagoon inlet.

Mobilization of this equipment will require several days to reconfigure the dredger, assemble the dredge, and launch the slurry pipeline.

8.1.2.2 Operations

During the dredging of Areas 3 and 4, a 2-ft berm will be built across the inlet to plug the inlet and maintain high water in the lagoon as necessary to operate the dredge. The berm will allow high tides greater than 2 ft, NGVD to flow into the lagoon. From time to time, the lagoon inlet will be allowed to drain maximally during ebb tide in order to maintain lagoon resources in good condition.

The West Channel will then be excavated, beginning with Areas 3 and 4, progressing toward the ocean inlet. Sediments dredged from Areas 3 and 4 will be pumped directly onto the beach. A four to five foot berm will be built on the beach face at 0, NGVD parallel to the shoreline. The pumped slurry will be placed behind the berm to control turbid water drainage to the ocean. The berm will be moved farther offshore when the back beach is filled with sand. At the end of dredging, the beach area will be graded. The disposal end of the slurry pipeline will be managed to facilitate de-watering of the discharged sediments As the dredger moves forward, adjustments will be made in the pipeline. The dredging of Areas 3 and 4 is expected to take 28 days.

Figure 8-2 shows the location of the sewer pipe in Area 3. The 22nd Agricultural District successfully replaced the old pipe with an underground pipe 20 feet below the bottom channel in the same location at the beginning of 2009.

8.1.2.3 Demobilization

Demobilization will involve breaking down the slurry pipeline and dismantling parts of the dredger for removal from the channel by crane and transportation by hauling. Demobilization will require several weeks to prepare the dredger for transport, disassemble the slurry pipeline, and clean up the storage site.

8.2 ADAPTATION OF DREDGING PLAN TO AN ENLARGED LAGOON

Both the rationale underlying this report and the resulting plan for channel maintenance apply to the present channel configuration and lagoon conditions. Therefore, this plan is subject to change after the restoration of the lagoon is completed.

The predicted sequence of the qualitative effects of increasing the tidal prism for the existing channel would be as follows:

1. Flow velocities in the channel would increase.
2. The increased velocity would tend to erode the channel, enlarging the cross-section and making velocities somewhat smaller. These processes would lead to a new short-term equilibrium in a few months, with both the velocities and the channel cross-section larger (or at least not smaller) than before enlargement.
3. Flow through the new short-term equilibrium channel may have more, less, or the same tidal asymmetry as before. This is not easy to predict, although it can be estimated from a well tuned, fixed-bed numerical model. Depending upon changes in

velocity and tidal asymmetry, the long-term incursion of sand to the channel and the required effort to maintain the new natural channel may be somewhat larger or smaller or may remain about the same.

This expected sequence of events would affect the channel maintenance plan as follows. First, the approach to a new equilibrium will tend to remove sand from the channel naturally, so that the amount of maintenance dredging required may become less. The recommended adaptation of the plan is to observe the approach to equilibrium, identify the new state of the channel in which sand deposition is at a minimum, and dredge to keep the channel slightly deeper in order to trap sand before it travels too far inland. In short, the same rationale can be applied to conditions after any enlargement.

8.3 CONSIDERATIONS FOR ONSITE IMPLEMENTATION

Before each dredging episode, SCE shall sample the area to be dredged and the possible placement sites. SCE will comply with California Coastal Commission, City of Del Mar, and USACOE permit conditions.

Prior to each dredging, SCE shall prepare a plan for dredging and disposal of dredge material that includes, at a minimum:

A) All sample results (initial dredge only),
B) A proposed placement plan,
C) Estimate of volume of material to be dredged and placed on the beach,
D) Schedule for dredging and placement, and
E) Map showing locations of all sediment samples and dredge and placement sites.

SCE shall provide the Dredging and Disposal Plan to the City of Del Mar, California Coastal Commission, U.S. Army Corps of Engineers, and State Lands Commission for review and written approval.

High-quality sand currently exists on the Del Mar beach. Therefore, sand used to replenish the beach shall consist of less than 5% clay or 10% silt and clay. Prior to the initial inlet dredging, ten samples will be taken from the channel excavation sites at locations approved by the City as part of the Dredging and Disposal Plan. Similarly, ten samples will be taken from the beach disposal sites after the beach sand has been deposited. These samples shall be properly stored and available for inspection by the City of Del Mar to demonstrate that the disposed beach sand is consistent with existing beach sand. In order to ensure that the sand located at the lower layer of excavation is similar to the sand at the upper layer, SCE shall take five (5) additional sediment samples for every two (2) feet of excavation to the depth of the design excavation as part of the sediment sampling that will be submitted in the Dredging and Disposal Plan.

SCE will select the locations of the 10 channel samples and 10 beach samples so that they cover the inlet channel and banks and are uniformly distributed to cover all of the dredged area. For the initial dredging, the samples will be analyzed for grain size to determine the percentage of fine material. The sediment sampling plan (as approved by USACOE and EPA) and its results are enclosed with this report as two separate reports. The approval of the sampling plan and its results were the basis for the USACOE permit.

Should public complaints arise regarding the odor and color of the sand during the inlet channel dredging phases, sand placement on the beach area would immediately stop, and the excavated sand would be temporarily stored near the dredging site until such odor subsided. The odorous sediment would be temporarily stockpiled near the area from which it was dredged in a suitable non-vegetated location until the odor subsided. There are no existing standards or regulations that regulate or quantify the strength of the smell; however, the contractor, as well as the onsite SCE engineer, will be the first to determine, based on their experience, whether the material has an offensive odor. Further, if public complaints arise due to placement on the beach of offensively pungent sediment odors, disposal will stop immediately until verbal approval of the City of Del Mar staff is obtained. During previous excavations at San Dieguito Lagoon in 2000, 2002, 2003, 2006 and 2008a, such complaints did not arise, suggesting that there will not be any odor problems during this project. This is also supported by our experience in dredging other lagoons, such as Los Peñasquitos Lagoon (dredged annually from 1986 to the present) and San Elijo Lagoon (from 1994 to the present). Since the location of any potentially odorous dredge material is not known at the present time, it is not possible to identify such location(s) in this amendment, but any occurrence of such sediments will be clearly reported in the after-dredging report. After the odor has subsided from any dredged material, the material will be placed on the beach by dump trucks using the routes indicated in Figure 8-4 (no public roads will be used).

To the maximum extent feasible and to the satisfaction of the City, dredged sand located between the Railroad Bridge extending eastward to the Jimmy Durante Bridge to be relocated and used as fill elsewhere within the channel or beaches shall be transported via pump or conveyor to minimize the potential impacts of heavy construction traffic on the surrounding community and existing infrastructure. Prior to backfilling and final approval of the project by the City, any conveyored sand dredged between the NCTD railroad trestle east to Jimmy Durante Boulevard shall be carefully inspected for foreign objects that could be harmful to the public.

On 15 December 2009 at low tide (–1 ft NGVD), CE and City of Del Mar representative Mr. Lauren Wasserman inspected the area between the Railroad Bridge and the Jimmy Durante Bridge carefully and excavated several locations from the surface to the dredging depth in the areas to be dredged. During this excavation and inspection, no stones, lumps, or other unsatisfactory material was encountered. Therefore, it is not necessary to sift the sand in this area. If any material unsuitable for beach disposal or objects that might be harmful to the public are found during dredging, the unsatisfactory material will be removed from the site in compliance with all applicable Federal, State, and local laws.

All suitable beach sand materials dredged west of the Jimmy Durante Bridge shall be placed in the pre-existing inlet channels and on the adjacent Del Mar beach during the initial inlet dredging, except if all applicable resource agencies determine that the sand is needed for least tern nesting site construction, or if the “airfield” sand volume is inadequate for the least tern

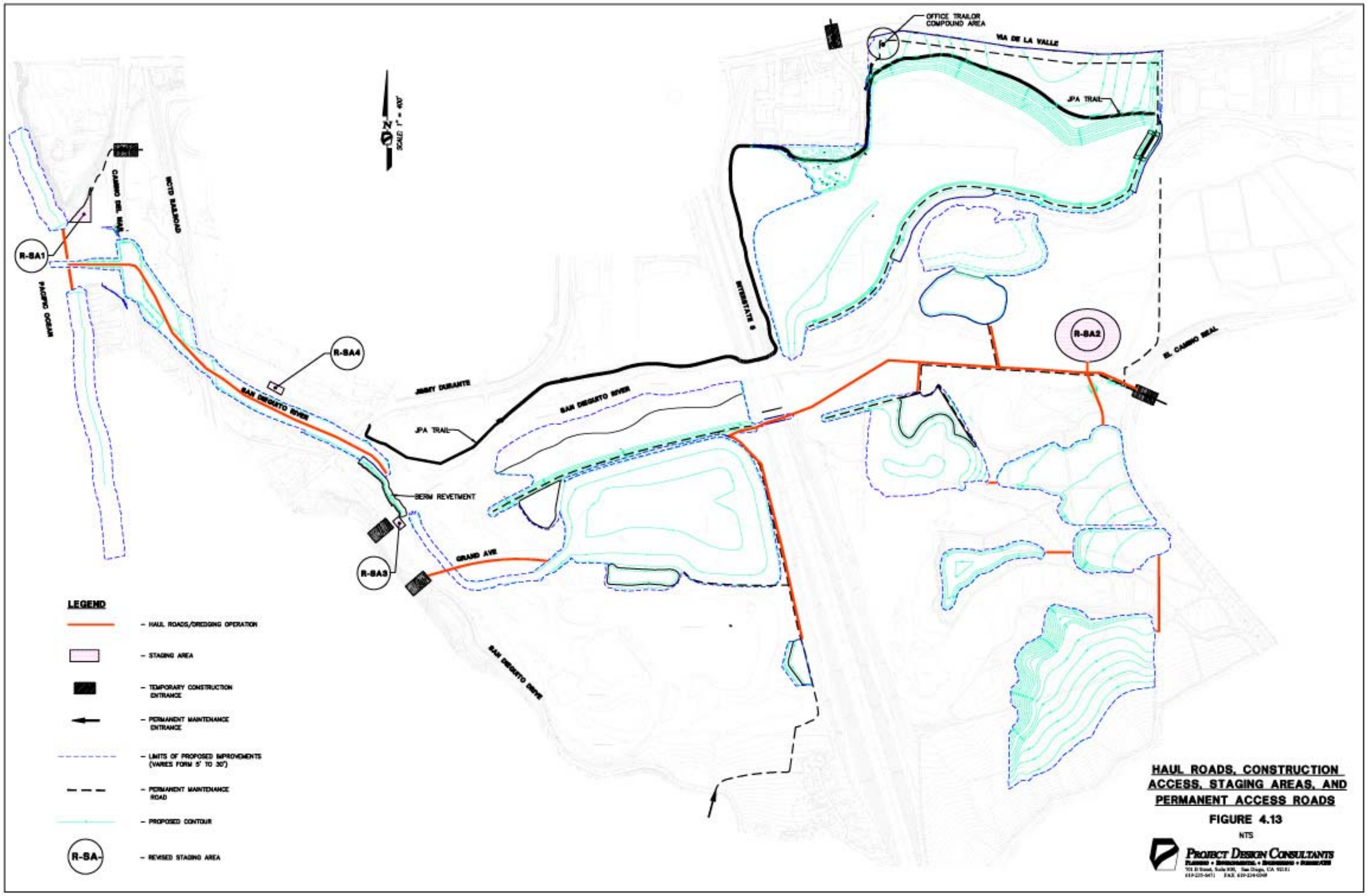


Figure 8-4. Map showing project staging areas (SA2 and SA3) and haul routes.

nesting sites. Then SCE may include in the Dredging and Disposal Plan the use of sand dredged from the area west of Jimmy Durante Boulevard to re-nourish the least tern nesting sites. Beach sand materials dredged from all subsequent inlet maintenance openings shall be placed directly on the Del Mar beach.

8.4 COMPLIANCE WITH CALIFORNIA COASTAL COMMISSION NOTICE OF INTENT TO ISSUE PERMIT (PERMIT APPLICATION NO. 6-04-088)

8.4.1 Condition 19: Timing of Construction/Seasonal and Habitat Restrictions

Regarding the permit required before any event involving disposal of inlet dredging materials on beach areas during the period of February through August, SCE will consult with the California Department of Fish and Game about the expected spawning and hatching period of the California grunion and provide monitors on the beach during the time of the predicted run. If no grunion are observed, disposal activities may take place until the next predicted run. If grunion are observed, there will be no activities until the next predicted run, at which time the monitoring will be repeated. Sand placement on the beach was discussed in Section 6.3.3. SCE will comply with these requirements. Lagoon dredging would start in fall 2010 and end in February 2011.

8.4.2 Condition 20: Staging Areas/Access Corridors

The staging areas for inlet channel dredging\excavation are defined in Section 8.1.1.1 (Figures 8-1 and 8-2) of this report. The North Beach staging area (Figure 8-1) will be used for dredging/excavating Area 1 (from the shoreline to the Railroad Bridge) and Area 2 (from Highway 101 to the Railroad Bridge). The staging area located east of the Railroad Bridge (Figure 8-2) and east of the Jimmy Durante Bridge (SA2 and SA3, Figure 8-3) will only be used during the dredging of Areas 3 and 4. There will be no use of public parking areas, including on-street parking, for interim storage of materials and equipment. The staging area on the beach will be minimal, as depicted in Figure 8-1. Each staging site will be restored immediately following completion of its portion of the overall operation.

8.4.3 Condition 21: Construction Materials

The plan presented in this study minimizes disturbance to sand and intertidal areas. The plan is based on a stable inlet channel configuration, which will minimize sand trapped in the inlet, and therefore reduce the volume of sand to be dredged from the inlet channel (Elwany et al., 1994). In addition, excavated beach sand as defined in the City of Del Mar and California Coastal Commission permits will be deposited on the beach. Local sand, cobbles, or shoreline rocks will not be used for back fill or construction materials. SCE will remove from the beach and inlet area any and all debris and any other material unacceptable for beach disposal that results from construction during this period. The removed material will be deposited offsite in accordance with State of California regulations.

Any material containing more than 10% silt and clay will not be used for beach nourishment, but will be disposed of offsite in a certified disposal site outside of the coastal zone.

It is anticipated that the volume of dredged material with concentrations of silt and clay this high will be very small and will require only 1 to 2 trucks to be moved off site. This is based on our studies, which show that the source of the sand filling the inlet channel is littoral sand. In case the amount of fine material is more than anticipated (requiring more than 2 trucks) and is concentrated in certain areas, these areas will not be dredged until a plan has been prepared estimating the volume of the material and recommending the best method of moving it to a disposal site. A large volume of fine material is not anticipated at this stage.

8.4.4 Condition 22: North Beach Staging Plan and Beach Access during Construction

Prior to use of the North Beach staging area or commencement of beach restoration activities, SCE will provide the Executive Director and the City of Del Mar with detailed plans for the staging of equipment in the area. This will include dates during which the North Beach area will be used, as well as a detailed outline of the proposed staging boundary. There will be no staging or equipment storage on North Beach from June 1 to September 30 without the prior approval of the City of Del Mar.

The staging plans will include all necessary measures, including barricades and security, to ensure public safety during and after construction hours. Staging areas will also avoid impacts to existing wetlands. The contractor will bear the responsibility for maintaining the security of the work site at all times during the construction phase.

A detailed list of the safety measures to be implemented during sand placement on the beach, including lifeguard access, pedestrian traffic, vehicular turnaround locations, flagging requirements, and hours of operation, will be submitted to the City of Del Mar for approval. Pedestrian and lifeguard beach access will be maintained during construction as required by the Community Services Department of the City of Del Mar.

8.4.5 Condition 23: Inlet Dredging Plan

A previous version of the inlet dredging plan (Coastal Environments, 2006a) was reviewed and approved by the City of Del Mar. The City's letter of approval is shown below in Figure 8-5. The inlet dredging plan includes the following:

1. Construction schedules for initial dredging (see Sections 6.2 and 6.3.3) and periodic dredging (Sections 6.3.3 and 7.1);
2. Numbers and types of trucks. Section 8.0 discusses implementation of dredging methods in detail. In general, for Areas 1 and 2 (Figure 2-2), conventional dredging using earth-moving equipment will be utilized. It is anticipated that there will be three scrapers, three front-loaders, four dump trucks, one pump, and two backhoes at the site. For the initial dredging of Areas 3 and 4, the hydraulic cutterhead suction dredger method will be used. For periodic maintenance, it is anticipated that Areas 1 and 2 will be excavated during each episode, and the equipment used will be two scrapers, three front loaders, three dump trucks, one pump, and one backhoe. If it is necessary to excavate Area 3 between events, earth-moving equipment will be used and sand will be transported under the Railroad Bridge using a conveyor;

City of Del Mar
Where the Turf meets the Surf
1050 Camino Del Mar · Del Mar, California 92014-2698

December 29, 2005

Mr. Samir Tanious
Southern California Edison
2244 Walnut Grove Avenue
G01 Quad 1A
Rosemead, CA 91770

SUBJECT: Inlet Dredging and Sand Monitoring for the San Dieguito Lagoon Restoration Project

Dear Mr. Tanious:

I have reviewed the submitted documents entitled, "Restored San Dieguito Lagoon Inlet Channel Initial and Periodic Dredging" (dated 10 December 2004) and "Beach Monitoring Program for San Dieguito Lagoon Restoration Project" (dated 9 December 2005) and found them to be in an acceptable form and content.

Sincerely,

Bob Scott, AICP
Senior Planner

Rjs

cc: Linda Niles, Planning and Community Development Director
Carmen Kasner, City Engineer, PBS&J
Tamara O'Neal, PBS&J
Gordon Lutes, Project Design Consultants
Chris Knopp, Project Design Consultants
Hany Elwany, Coastal Environments

Telephone: (858) 755-9313 · Fax: (858) 755-2794

Figure 8-5. City of Del Mar's letter of approval of the inlet dredging plan.

3. Material storage, if needed, will be near the dredged site until it is placed on the beach; and
4. Material will be hauled on the north banks of the lagoon under the Highway 101 Bridge. There will be no use of public roads or public parking areas for material storage except during the mobilization of equipment to the staging areas (see Figure 8-4 for haul routes).

The presented inlet dredging plan also complies with the following:

A. The initial dredging will be as shown on the approved drawings, and the inlet channel will be located a minimum of 50 feet from the riprap revetment to the south of the channel. At the time the inlet is dredged for the initial opening, any beach depressions from the pre-existing inlet channel will be filled to a level approximating adjacent undisturbed beach levels.

B. In the event that the inlet is closed at the time of any subsequent maintenance activities, reopening will occur such that the south edge of the inlet channel is located a minimum of 40 feet from the riprap, and the first priority for dredged sand will be to restore usable beach area.

C. In the event that the inlet is open at the time of any subsequent maintenance activities, dredging may occur in the inlet as it exists at the time, and any widening will occur on the channel side closest to the midpoint of the lagoon entrance (between the bluffs to the north and the revetment to the south).

Any proposed changes to the approved final plans will be reported to the Executive Director and only adopted after a Coastal Commission-approved amendment has been added to the coastal development permit pursuant to the Commission’s regulations, unless the Executive Director determines that the changes are minor and within the scope of the Commission’s permit approval and no amendment is required.

8.4.6 Condition 24: Beach Nourishment/Dredge Disposal Plans

During the initial inlet dredging, all beach quality sand dredged from west of the Jimmy Durante Bridge will be placed on the beach, except as noted below for potential use at the least tern nesting sites. For all subsequent inlet maintenance dredging, all beach quality sand will be placed directly on the beach adjacent to the San Dieguito River inlet. In addition, the lagoon inlet maintenance plan (initial and periodic) will comply with the following:

A. *Dredge Plan.* SCE will provide information to the City of Del Mar and California Coastal Commission for each dredging episode, which will include:

   1. A map of all dredging areas and sample locations;
   2. All testing results;
   3. A proposed placement plan;
   4. An estimate of the volume of beach quality material to be dredged;

5. An estimate of the volume of unacceptable beach material to be dredged and plans for disposal; and
6. A schedule for dredging, placement and disposal, if needed.

B. *Test Samples.* Prior to the initial restoration project, SCE will collect and test a minimum of ten samples from the channel excavation sites. All samples will be taken to a depth equal to or in excess of the design excavation depth. Prior sampling of the lagoon inlet channel sand indicates that the dredged sand is in accordance with the permit conditions of the City of Del Mar, California Coastal Commission, and U.S. Army Corps of Engineers (Section 4.1).

C. *Silt and Clay Limitations.* SCE will ensure that sand comprises at least 90% of the nourishment material and that the nourishment material contains less than 5% clay and less than 10% silt and clay combined, with sand, silt, and clay as defined by the United Soil Classification.

D. *Removal of Large Debris.* Prior to placement on the beach, SCE will make sure that all sand excavated from the lagoon area east of the NCTD Railroad Bridge is free of stones, organic debris, or lumps exceeding 1 inch in the greatest dimension. SCE will dispose of all unacceptable material offsite in compliance with all applicable Federal, State, and local laws.

E. *Sand Transport.* To the maximum extent feasible, all sand will be transported via pump or conveyor to minimize the potential impacts of heavy construction traffic on the surrounding community and infrastructure.

F. *Odor from Dredged Sand.* If there are public complaints about the odor of the beach quality sand, sand placement on the beach will stop and the remaining excavated or dredged sand will be stored near the dredge site until the odor subsides.

G. *Appearance.* To the maximum extent feasible, dredged sand will match the color of the existing beach sand to avoid public concerns about the safety or cleanliness of the sand placed on the beach.

H. *Tern Islands.* If it is determined by the project engineer in consultation with the USFWS that the volume of “airfield” (W1) sand is inadequate for least tern nesting site construction, SCE may use sand dredged from the area west of the Jimmy Durante Bridge to construct the least tern nesting sites and notify the Executive Director in writing of such determination prior to the use of such sand.

SCE will undertake beach nourishment and dredge disposal in accordance with the approved final plans. Any proposed changes to the approved final plans will not occur without a Coastal Commission-approved amendment to the coastal development permit, pursuant to the Commission’s regulations, unless the Executive Director determines that the changes are minor and within the scope of the Commission’s permit approval and no amendment is required.

9.0 MONITORING PLAN

A monitoring plan will be required to assess the condition of the lagoon throughout the year. The plan will include surveys and measurements that will provide adequate coverage of channel changes and guide modifications to the present inlet channel maintenance plan. The following surveys will be part of the monitoring plan.

9.1 INLET AND LAGOON CHANNEL TOPOGRAPHIC SURVEYS

Bimonthly topographic surveys of selected traverses in Areas 1, 2, 3, and 4 will be conducted. Traverses located east of the Jimmy Durante Bridge, at the South Channel, at the North Channel, and at the new constructed basins will be surveyed once a year.

For the inlet channel, a minimum of four transects will be surveyed per the City of Del Mar permit (Resolution No. PC-05-01). Transect locations are shown in Figure 9-1 (on the following page). The four transects will include two transects between the shoreline and the Highway 101 Bridge and two transects between the Highway 101 Bridge and the Railroad Bridge. These transects will be surveyed one month prior to any dredging and within one month after any inlet dredging. Reports on surveys before and after a dredge cycle will be submitted within 30 days of the last survey date.

9.2 WATER LEVEL MEASUREMENTS

Water level measurements will be taken at the new basins (west and east of I-5). These measurements will be taken continuously.

9.3 WATER QUALITY MEASUREMENTS

Water quality measurements will be taken at several stations. These will include temperature, salinity, dissolved oxygen, and pH. Water quality measurements will be taken once every two weeks. Water quality data is important for assessing the health of any lagoon.

9.4 LAGOON HEALTH MONITORING DURING CONSTRUCTION

Prior to the issuance of any permits, SCE shall provide the City of Del Mar with the details of a plan by which the temperature, salinity, dissolved oxygen (DO), pH, and microbiology (bacteria) of the lagoon will be monitored during the entire construction process. The plan shall include the means and frequency for reporting the results of the monitoring.

Monthly water quality data, including temperature, salinity, DO, pH, fecal coliforms, total coliforms, and *Enterococcus* counts, shall be taken from various locations (inlet area, West Channel area, North and South Channel area), in addition to continuous water level measurements at the eastern boundary of the lagoon. Data reports and data shall be submitted to the City of Del Mar for review on a quarterly basis, or upon request by the City. As necessary, turbidity assessments would be administered in the event that visible turbidity plumes arise.

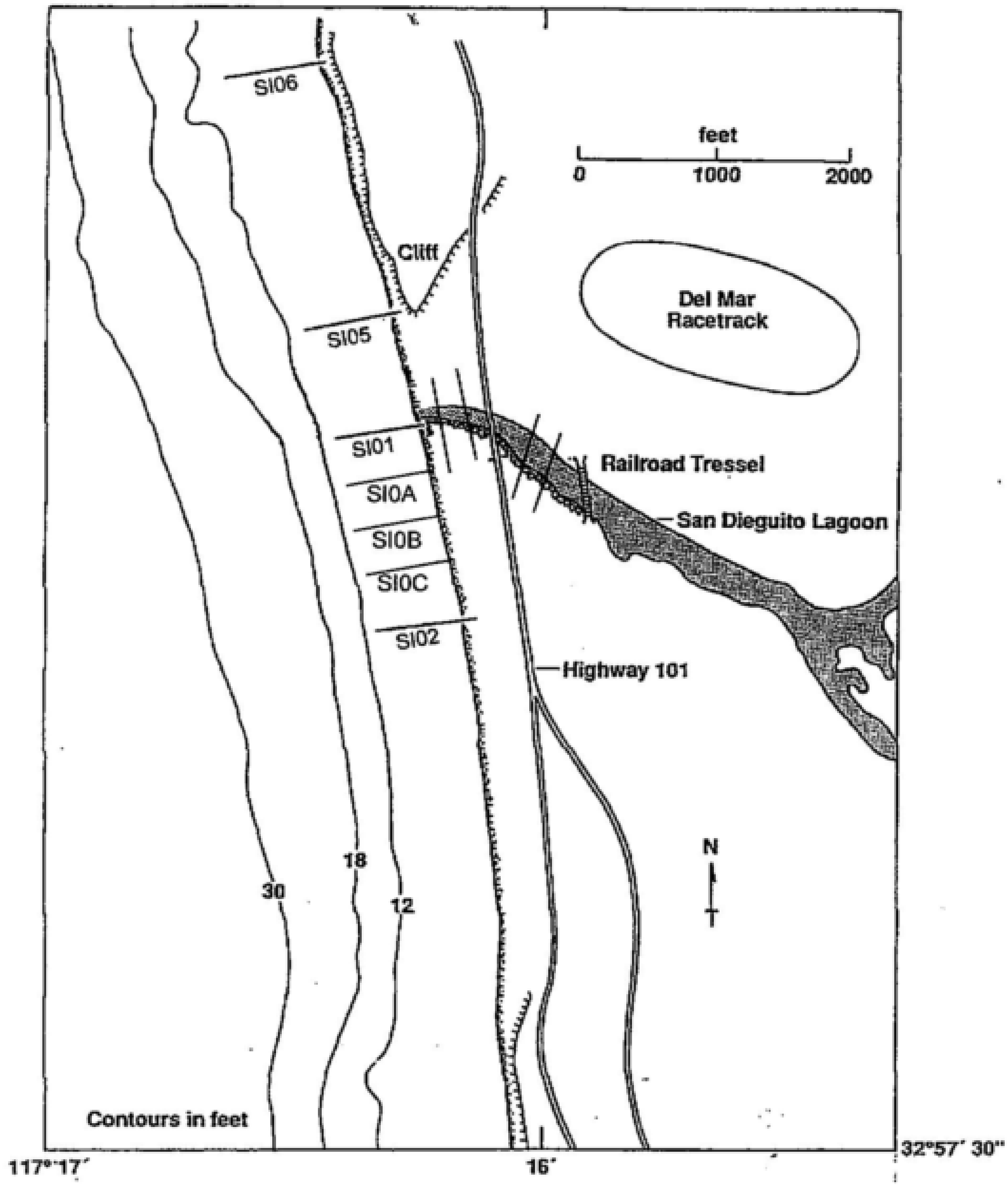


Figure 9-1. Locations of the four inlet cross-sections as approved by City of Del Mar.

If any one of the following unhealthy conditions is found, all construction operations that contributed to the condition will stop until the cause of the violation has been controlled, and the monitoring levels have returned to a healthy state:

A. Dissolved oxygen levels in the lagoon are less than two parts per million and remain at this level over a two-month time period; or

B. The pH level in the lagoon is more than 8.75 and remains at this level over a two-month time period; or

C. The salinity level in the lagoon is less than 15 parts per thousand and remains at this level over a two-month time period.

9.5 BEACH MONITORING PROGRAM

9.5.1 Log of Dredging Activities

A log will be maintained to record detailed project information during dredging operations. Observations will be made and recorded on every day that dredging or placement of sand is carried out. These observations will include the dates of placement, quantity of sand, locations from which the sand was dredged, methods of transportation and placement, locations of sand placement, weather conditions, river conditions, and any formal complaints regarding sand placement activities. An example of the log sheet is shown below.

Date	Description of Activities				
	Activities	Equipment Used	Volume Dredged	Placement Location	Remarks

9.5.2 Beach Profile Survey Locations

Beach surveys will be done at seven locations along the beach at the mouth of the San Dieguito Lagoon (Table 9-1 and Figure 9-1). Four profiles will be taken at historically surveyed locations, and three new profile locations will be established. Profiles will be referenced to the City of Del Mar's Shoreline Protection Area line (SPA line), or for sites that do not have an SPA line, to another fixed, identified feature. The exact locations of the new profiles (herein referred to as NEW PROFILE SIO A and NEW PROFILE SIO B) will be adjusted, such that they are in the approximate locations of the profiles identified by Dr. Stone as RE-13 and RE-18, respectively.

A sensible designation system for the beach profile names will be developed. The new profile names will be selected with the cooperation of the CCC staff. The new designation system will be presented in the first report submitted to the City of Del Mar and California Coastal Commission by SCE.

Table 9-1. Beach profile locations from north to south.

Profile Designation	Profile Designations As Shown in Figure 1	Description
SD-0600	SIO6	> 2,000 ft north of lagoon mouth
DM-SD0595	SIO5	North margin of lagoon mouth
DM-0590	SIO1	South margin of lagoon mouth
NEW PROFILE	SIO A	500 ft south of DM-0590
NEW PROFILE	SIO B	1,000 ft south of DM-0590
NEW PROFILE	SIO C	1,500 ft south of DM-0590
DM-0580	SIO2	≃2,000 ft south of lagoon mouth

9.5.3 Sampling Plan

Full profile beach surveys will be performed in the spring and fall for the four historic profile locations (DM-0590, DM-0580, DM-SD0595, and SD-0600) and for survey location SIOB, located approximately 1,000 feet south of DM-0590. These surveys will be done to the depth of closure (the depth beyond which there are no changes in bottom profile due to seasonal variations in wave conditions). In addition, wading depth surveys (to at least –6 ft NGVD) will be performed quarterly. Wading depth profiles will also be performed before and after artificial inlet maintenance and following large (greater than 12 ft wave height at 30 ft water depth) storms or floods (greater than a 25-year return period).

Surveys will be conducted using the methods in Elwany et al. (2003) or other professionally accepted methods.

9.5.4 Duration of Monitoring

Monitoring will be performed throughout the course of the restoration project and during maintenance dredging. It will continue for 15 years after the beginning of the project. If after this time, there is no evidence of any adverse project impact on the beach, the applicants may request a permit amendment to considerably reduce the monitoring frequency so that monitoring will only occur under the following circumstances: 1) pre- and post-excavation for inlet openings; 2) to provide wading depth profiles adjacent to the inlet; 3) to reduce reporting to an annual letter report or electronic notice; and 4) to dismiss the CPT panel.

9.5.5 Data Analysis

Following each survey, beach width, sand volume, and beach slope for each profile will be calculated. Time series data for beach width and volume will be plotted. In addition, plots will be made showing changes over time for beach width and sand volume between DM-0580 (SIO2) and all other profiles, and between DM-0590 (SIO1) and DM-SD0595 (SIO5).

The data analysis will be used to determine the fate and transport of any sand placed on the beach for nourishment or as a result of inlet dredging. Analysis results will also be used to make recommendations for placement locations for beach-compatible sand that will be excavated during upcoming dredging episodes. In addition, the analysis will determine whether the observed beach parameters (width, volume, or profile) are within the range of values measured during the historical monitoring period (from January 1978 until inlet maintenance begins), and in particular, whether these parameters meet or exceed any of the following "trigger" conditions.

1. Beach width at DM-0590 (SIO1) at or below 32.4 feet* (the lowest historically observed minimum);

2. Beach width at DM-0590 (SIO1) at or below 90 feet*, and a greater than 180-foot difference between beach widths measured at DM-0590 and DM-0580 (SIO1 and SIO2); or

3. Beach width at DM-SD0595 (SIO5) at or below 74 feet* (the lowest historically observed minimum).

10.0 CONCLUSIONS

This report presents the initial and maintenance dredging plans for the San Dieguito Lagoon for agency review before the start of initial dredging in early September 2010. Per the CCC's Coastal Development Permit (CDP) No. 6-04-88, SCE is requesting written approval of the attached plan.

The Inlet Channel Maintenance Plan presented here can be applied to the restored San Dieguito Lagoon with slight modifications. Improvements to the plan based upon the restored conditions can be implemented after reviewing the data collected during channel monitoring (Chapter 9). The plan presented here is conservative, which means that the quantity of sand dredged from the lagoon will likely be lower than estimated here, especially during wet time periods. Identification of the source of the sand fill, the inlet channel (Chapter 3), and analysis of the 20 sediment samples collected from the inlet channel (Section 4.1) indicate that the sand in the inlet channel has the same characteristics as the sand on the beach. Further, bacterial analysis of the water and sediment samples indicates that both are clean (Section 4.2). No significant impacts on marine resources were identified during the biological marine surveys conducted during September and October 2004 at low tide (Chapter 5).

The City of Del Mar, California, has adopted a plan similar to the periodic maintenance dredging plan presented in Chapter 7 to protect the San Dieguito Lagoon and prevent the loss of valuable biological resources on the following occasions with success: 23 September 2000, 5 October 2002, 5 September 2003, 22 September 2006, and 6 May 2008 (Coastal Environments, 2000, 2002, & 2003c, 2006c, 2008a). The public and the agencies were in full support of these efforts. There was minimal public inconvenience, with no complaints about the dredging operation, no problem with odors, and no fuel spills on the beach. Public access was allowed most of the time through a monitored construction corridor. High-quality sand was placed on the beach that was clear of debris.

Since the initial inlet dredging will start in early September 2010 and the inlet channel topography changes with time, SCE will submit to the City of Del Mar, CCC, and USACOE on 15 August 2010 any necessary changes to Figures 6-2 through 6-4 and grain size analysis of sediment samples taken from the area to be dredged as required by the permits.

11.0 REFERENCES

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APPENDIX A

GRAIN SIZE ANALYSIS FOR S10 AND S11

SIEVE and LASER PARTICLE SIZE SUMMARY

(METHODOLOGY: ASTM D422/D4464M)

Petroleum Services

Coastal Environments
San Dieguito Lagoon

Core Lab File No : 57111-410040EN
Date : 4/29/2010

Sample ID	Grain Size Description (Mean from Folk)	Median Grain Size, mm	Component Percentages								Silt & Clay
				Sand Size							
			Gravel	VCoarse	Coarse	Medium	Fine	VFine	Silt	Clay	
S10	mgr	0.31	0.00	10.25	17.44	34.78	25.24	8.49	3.06	0.74	3.8
S11	mgr	0.32	0.00	4.64	12.22	55.47	23.26	2.42	1.57	0.43	2.0

Company : Coastal Environments
Proj. Name : San Dieguito Lagoon

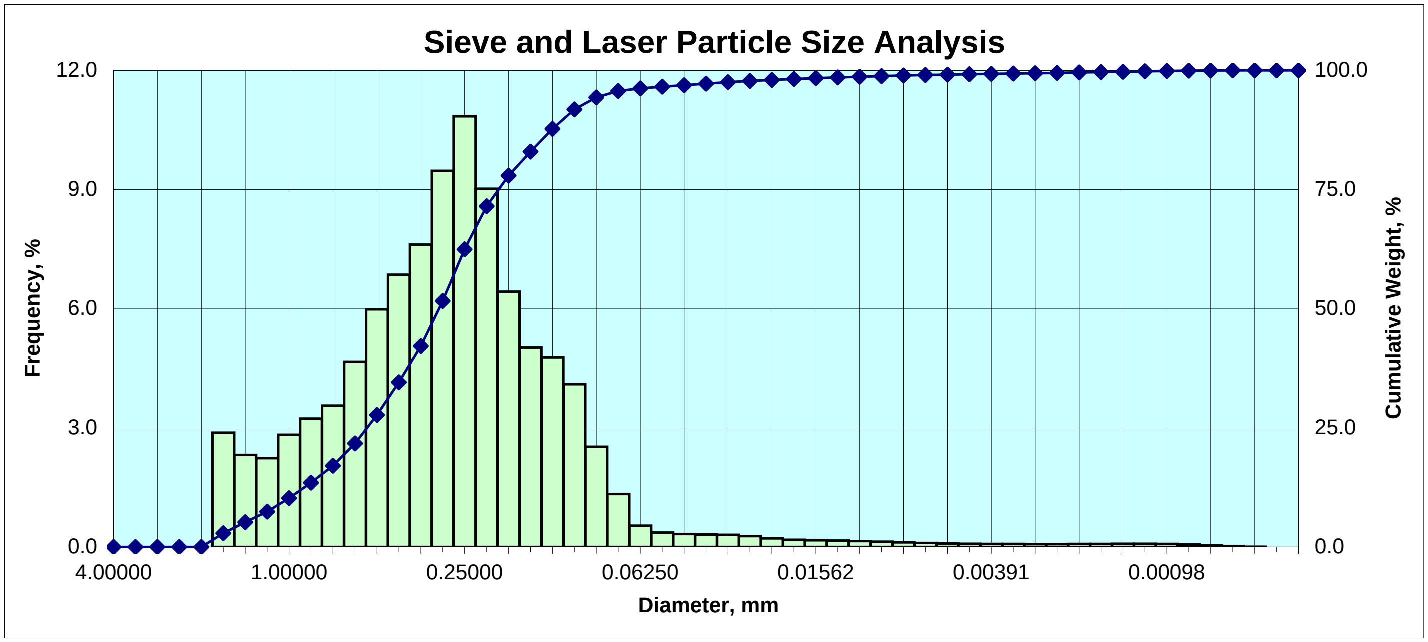
C.L. File No. : 57111-410040EN
Date : 4/29/2010

Sieve and Laser Particle Size Analysis (Metric)

Sample ID	Component Percentages								Percentiles										Sorting Statistics (Folk)				
	Gravel	Sand					Fines		Particle Diameter (mm)										Median	Mean	Sorting	Skew.	Kurt.
		vcgr	cgr	mgr	fgr	vfgr	silt	clay	5	10	16	25	40	50	75	84	90	95	mm	mm	ϕ		
S10	0.00	10.25	17.44	34.78	25.24	8.49	3.06	0.74	1.4364	1.0118	0.7424	0.5349	0.3698	0.3051	0.1932	0.1431	0.1143	0.0841	0.305	0.319	1.214	-0.086	1.142
									vcgr	vcgr	cgr	cgr	mgr	mgr	fgr	fgr	vfgr	vfgr	mgr	mgr	Poor	near sym	leptokurtic
S11	0.00	4.64	12.22	55.47	23.26	2.42	1.57	0.43	0.9481	0.6104	0.5053	0.4299	0.3561	0.3200	0.2417	0.2094	0.1799	0.1341	0.320	0.324	0.745	-0.074	1.392
									cgr	cgr	cgr	mgr	mgr	mgr	fgr	fgr	fgr	fgr	mgr	mgr	Mod.	near sym	leptokurtic

Company : Coastal Environments
Proj. Name : San Dieguito Lagoon

CL File No. : 57111-410040EN
Sample ID : S10



Particle Size Distribution

	Diameter				Weight %	
	[US Mesh]	[in.]	[mm]	[ϕ]	[Incl.]	[Cum.]
Granule	5	0.157480	4.00000	-2.00	0.000	0.00
	6	0.132425	3.36359	-1.75	0.000	0.00
	7	0.111355	2.82843	-1.50	0.000	0.00
	8	0.093638	2.37841	-1.25	0.000	0.00
	10	0.078740	2.00000	-1.00	0.000	0.00
V Crse Sand	12	0.066212	1.68179	-0.75	2.875	2.87
	14	0.055678	1.41421	-0.50	2.318	5.19
	16	0.046819	1.18921	-0.25	2.234	7.43
	18	0.039370	1.00000	0.00	2.824	10.25
Coarse Sand	20	0.033106	0.84090	0.25	3.232	13.48
	25	0.027839	0.70711	0.50	3.558	17.04
	30	0.023410	0.59460	0.75	4.662	21.70
	35	0.019685	0.50000	1.00	5.984	27.69
Medium Sand	40	0.016553	0.42045	1.25	6.854	34.54
	45	0.013919	0.35355	1.50	7.611	42.15
	50	0.011705	0.29730	1.75	9.730	51.62
	60	0.009843	0.25000	2.00	10.844	62.46
Fine Sand	70	0.008277	0.21022	2.25	9.021	71.49
	80	0.006960	0.17678	2.50	6.427	77.91
	100	0.005852	0.14865	2.75	5.024	82.94
	120	0.004921	0.12500	3.00	4.772	87.71
V. Fine Sand	140	0.004138	0.10511	3.25	4.098	91.81
	170	0.003480	0.08839	3.50	2.522	94.33
	200	0.002926	0.07433	3.75	1.335	95.66
Silt	230	0.002461	0.06250	4.00	0.535	96.20
	270	0.002069	0.05256	4.25	0.362	96.56
	325	0.001740	0.04419	4.50	0.327	96.89
	400	0.001463	0.03716	4.75	0.315	97.20
	450	0.001230	0.03125	5.00	0.306	97.51
	500	0.001035	0.02628	5.25	0.273	97.78
	635	0.000870	0.02210	5.50	0.218	98.00
		0.000732	0.01858	5.75	0.183	98.18
		0.000615	0.01562	6.00	0.169	98.35
		0.000517	0.01314	6.25	0.162	98.51
		0.000435	0.01105	6.50	0.150	98.66
		0.000366	0.00929	6.75	0.134	98.80
		0.000308	0.00781	7.00	0.115	98.91
		0.000259	0.00657	7.25	0.101	99.01
		0.000217	0.00552	7.50	0.089	99.10
		0.000183	0.00465	7.75	0.082	99.18
		0.000154	0.00391	8.00	0.077	99.26
Clay		0.000129	0.00328	8.25	0.075	99.33
		0.000109	0.00276	8.50	0.072	99.41
		0.000091	0.00232	8.75	0.073	99.48
		0.000077	0.00195	9.00	0.075	99.55
		0.000065	0.00164	9.25	0.077	99.63
		0.000054	0.00138	9.50	0.081	99.71
		0.000046	0.00116	9.75	0.079	99.79
		0.000038	0.00098	10.00	0.075	99.87
		0.000032	0.00082	10.25	0.064	99.93
		0.000027	0.00069	10.50	0.046	99.97
		0.000023	0.00058	10.75	0.022	100.00
		0.000019	0.00049	11.00	0.003	100.00
		0.000016	0.00041	11.25	0.000	100.00
		0.000015	0.00038	11.50	0.000	100.00

Sorting Statistics (Folk)

Parameter	Trask	Inman	Folk
Median	Medium sand sized		
(in)	0.0120	0.0120	0.0120
(mm)	0.3051	0.3051	0.3051
Mean	Medium sand sized		
(in)	0.0143	0.0128	0.0126
(mm)	0.3640	0.3260	0.3189
Sorting	Poor		
	1.664	0.439	1.214
Skewness	Near symmetrical		
	1.054	-0.158	-0.086
Kurtosis	Lepokurtic		
	0.190	0.724	1.142

Component Percentages

Gravel	Sand	Silt	Clay	Silt + Clay
0.00	96.20	3.06	0.74	3.80

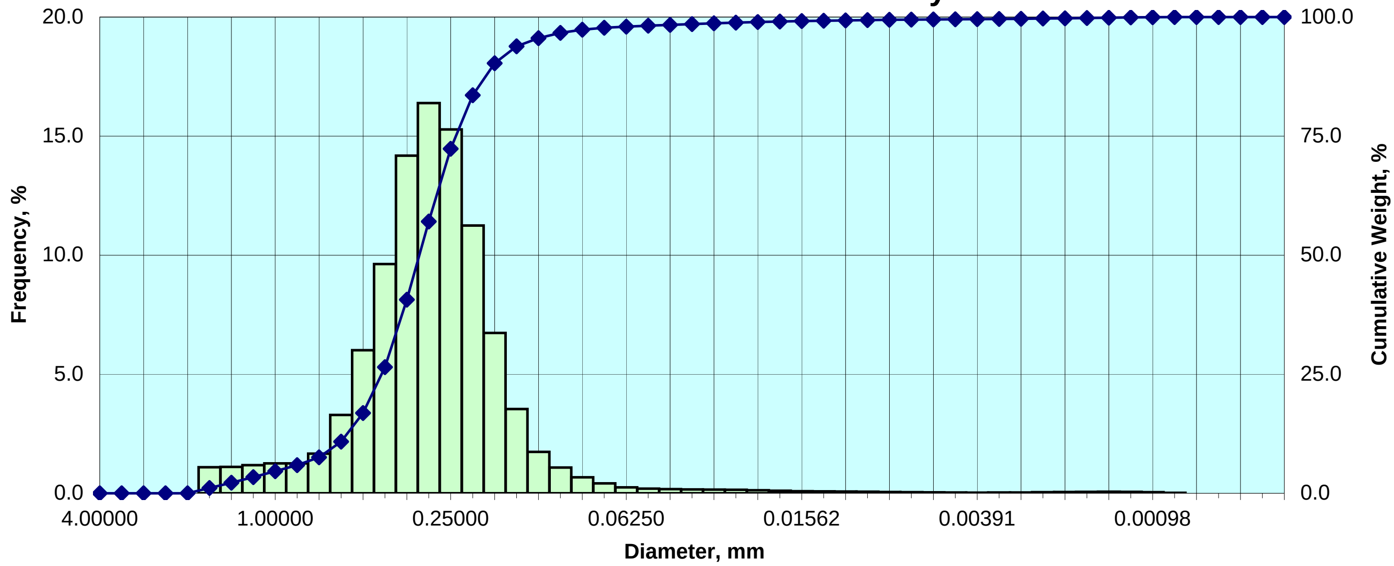
Percentile [Weight, %]	Particle Diameter [in.]	[mm]	[phi]
5	0.0566	1.4364	-0.5225
10	0.0398	1.0118	-0.0169
16	0.0292	0.7424	0.4297
25	0.0211	0.5349	0.9028
40	0.0146	0.3698	1.4352
50	0.0120	0.3051	1.7127
75	0.0076	0.1932	2.3722
84	0.0056	0.1431	2.8047
90	0.0045	0.1143	3.1295
95	0.0033	0.0841	3.5724

** Distribution pattern precludes calculation of these statistical parameters.

Company : Coastal Environments
Proj. Name : San Dieguito Lagoon

CL File No. : 57111-410040EN
Sample ID : S11

Sieve and Laser Particle Size Analysis



Particle Size Distribution

	Diameter				Weight %	
	[US Mesh]	[in.]	[mm]	[φ]	[Incl.]	[Cum.]
Granule	5	0.157480	4.00000	-2.00	0.000	0.00
	6	0.132425	3.36359	-1.75	0.000	0.00
	7	0.111355	2.82843	-1.50	0.000	0.00
	8	0.093638	2.37841	-1.25	0.000	0.00
	10	0.078740	2.00000	-1.00	0.000	0.00
V Crse Sand	12	0.066212	1.68179	-0.75	1.091	1.09
	14	0.055678	1.41421	-0.50	1.110	2.20
	16	0.046819	1.18921	-0.25	1.180	3.38
	18	0.039370	1.00000	0.00	1.254	4.64
Coarse Sand	20	0.033106	0.84090	0.25	1.258	5.89
	25	0.027839	0.70711	0.50	1.665	7.56
	30	0.023410	0.59460	0.75	3.289	10.85
	35	0.019685	0.50000	1.00	6.007	16.86
Medium Sand	40	0.016553	0.42045	1.25	9.628	26.48
	45	0.013919	0.35355	1.50	14.176	40.66
	50	0.011705	0.29730	1.75	16.390	57.05
	60	0.009843	0.25000	2.00	15.277	72.33
Fine Sand	70	0.008277	0.21022	2.25	11.247	83.57
	80	0.006960	0.17678	2.50	6.732	90.31
	100	0.005852	0.14865	2.75	3.541	93.85
	120	0.004921	0.12500	3.00	1.736	95.58
V. Fine Sand	140	0.004138	0.10511	3.25	1.081	96.66
	170	0.003480	0.08839	3.50	0.670	97.33
	200	0.002926	0.07433	3.75	0.419	97.75
Silt	230	0.002461	0.06250	4.00	0.249	98.00
	270	0.002069	0.05256	4.25	0.196	98.20
	325	0.001740	0.04419	4.50	0.173	98.37
	400	0.001463	0.03716	4.75	0.160	98.53
	450	0.001230	0.03125	5.00	0.154	98.68
	500	0.001035	0.02628	5.25	0.145	98.83
	635	0.000870	0.02210	5.50	0.125	98.95
		0.000732	0.01858	5.75	0.105	99.06
		0.000615	0.01562	6.00	0.091	99.15
		0.000517	0.01314	6.25	0.081	99.23
		0.000435	0.01105	6.50	0.072	99.30
		0.000366	0.00929	6.75	0.065	99.37
		0.000308	0.00781	7.00	0.056	99.42
		0.000259	0.00657	7.25	0.047	99.47
		0.000217	0.00552	7.50	0.039	99.51
		0.000183	0.00465	7.75	0.033	99.54
		0.000154	0.00391	8.00	0.030	99.57
Clay		0.000129	0.00328	8.25	0.032	99.60
		0.000109	0.00276	8.50	0.036	99.64
		0.000091	0.00232	8.75	0.045	99.69
		0.000077	0.00195	9.00	0.055	99.74
		0.000065	0.00164	9.25	0.063	99.80
		0.000054	0.00138	9.50	0.067	99.87
		0.000046	0.00116	9.75	0.061	99.93
		0.000038	0.00098	10.00	0.045	99.98
		0.000032	0.00082	10.25	0.022	100.00
		0.000027	0.00069	10.50	0.002	100.00
		0.000023	0.00058	10.75	0.000	100.00
		0.000019	0.00049	11.00	0.000	100.00
		0.000016	0.00041	11.25	0.000	100.00
		0.000015	0.00038	11.50	0.000	100.00

Sorting Statistics (Folk)

Parameter	Trask	Inman	Folk
Median	Medium sand sized		
(in)	0.0126	0.0126	0.0126
(mm)	0.3200	0.3200	0.3200
Mean	Medium sand sized		
(in)	0.0132	0.0128	0.0127
(mm)	0.3358	0.3253	0.3235
Sorting	Mod.		
	1.334	0.644	0.745
Skewness	Near symmetrical		
	1.007	-0.245	-0.074
Kurtosis	Lepokurtic		
	0.219	1.220	1.392

Component Percentages

Gravel	Sand	Silt	Clay	Silt + Clay
0.00	98.00	1.57	0.43	2.00

Percentile [Weight, %]	Particle Diameter [in.]	[mm]	[phi]
5	0.0373	0.9481	0.0769
10	0.0240	0.6104	0.7122
16	0.0199	0.5053	0.9847
25	0.0169	0.4299	1.2180
40	0.0140	0.3561	1.4894
50	0.0126	0.3200	1.6437
75	0.0095	0.2417	2.0489
84	0.0082	0.2094	2.2555
90	0.0071	0.1799	2.4746
95	0.0053	0.1341	2.8986

** Distribution pattern precludes calculation of these statistical parameters.

APPENDIX B

CHEMICAL ANALYSIS FOR S10 (SDL1) AND S11 (SDL2)

17 May 2010

Coastal Environments
Attn: Dr. Hany Elwany
2166 Avenida de la Playa, Suite E
La Jolla, CA 92037

EMA Log #: 10D0542

Project Name: San Dieguito Lagoon

Enclosed are the results of analyses for samples received by the laboratory on 04/20/10 14:38. Samples were analyzed pursuant to client request utilizing EPA or other ELAP approved methodologies. I certify that this data is in compliance both technically and for completeness.

Dan Verdon
Laboratory Director

CA ELAP Certification #: 2564

Client Name: Coastal Environments Project Name: San Dieguito Lagoon	**EMA Log #: 10D0542**

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
SDL 1	10D0542-01	Sediment	04/20/10 10:30	04/20/10 14:38
SDL 2	10D0542-02	Sediment	04/20/10 11:00	04/20/10 14:38

NOTE: The TTLC Mercury analyses were performed by a sub-contract laboratory, results to follow in a separate report.

Client Name: Coastal Environments	EMA Log #: 10D0542
Project Name: San Dieguito Lagoon	

Total Metals by EPA 6000/7000 Series Methods

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
SDL 1 (10D0542-01) Sediment	**Sampled: 04/20/10 10:30**		**Received: 04/20/10 14:38**							
Arsenic	**0.928**	0.679	0.679	mg/kg dry	1	0042822	04/28/10	04/28/10	EPA 6020	
Cadmium	ND	0.136	0.136	"	"	"	"	"	"	
Chromium	**6.43**	0.814	1.36	"	"	"	"	"	"	
Copper	**2.95**	0.679	0.679	"	"	"	"	"	"	
Lead	**1.28**	0.679	0.679	"	"	"	"	"	"	
Nickel	**3.29**	0.814	1.36	"	"	"	"	"	"	
Selenium	ND	0.271	1.36	"	"	"	"	"	"	
Silver	ND	0.136	0.136	"	"	"	"	"	"	
Zinc	**53.7**	1.36	6.79	"	"	"	"	"	"	
SDL 2 (10D0542-02) Sediment	**Sampled: 04/20/10 11:00**		**Received: 04/20/10 14:38**							
Cadmium	ND	0.129	0.129	mg/kg dry	1	0042822	04/28/10	04/28/10	EPA 6020	
Arsenic	**0.736**	0.645	0.645	"	"	"	"	"	"	
Chromium	**5.01**	0.775	1.29	"	"	"	"	"	"	
Copper	**2.44**	0.645	0.645	"	"	"	"	"	"	
Lead	**0.917**	0.645	0.645	"	"	"	"	"	"	
Nickel	**2.44**	0.775	1.29	"	"	"	"	"	"	
Selenium	ND	0.258	1.29	"	"	"	"	"	"	
Silver	ND	0.129	0.129	"	"	"	"	"	"	
Zinc	**12.8**	1.29	6.45	"	"	"	"	"	"	

Client Name: Coastal Environments	EMA Log #: 10D0542
Project Name: San Dieguito Lagoon	

Organochlorine Pesticides by EPA Method 8081B

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
SDL 1 (10D0542-01) Sediment	**Sampled: 04/20/10 10:30**		**Received: 04/20/10 14:38**							
Aldrin	ND	0.35	1.36	ug/kg dry	1	0042901	04/29/10	05/14/10	EPA 8081	
alpha-BHC	ND	0.18	1.36	"	"	"	"	"	"	
beta-BHC	ND	0.29	1.36	"	"	"	"	"	"	
gamma-BHC (Lindane)	ND	0.24	1.36	"	"	"	"	"	"	
delta-BHC	ND	0.28	1.36	"	"	"	"	"	"	
Total BHCs	ND	0.18	1.36	"	"	"	"	"	"	
Chlordane (Total)	ND	3.23	3.46	"	"	"	"	"	"	
2,4´-DDD	ND	0.83	1.36	"	"	"	"	"	"	
4,4´-DDD	ND	0.33	1.36	"	"	"	"	"	"	
2,4´-DDE	ND	0.73	1.36	"	"	"	"	"	"	
4,4´-DDE	**1.18**	0.32	1.36	"	"	"	"	"	"	J
2,4´-DDT	ND	1.36	1.36	"	"	"	"	"	"	
4,4´-DDT	ND	0.22	1.36	"	"	"	"	"	"	
Total DDT	**1.18**	0.22	1.36	"	"	"	"	"	"	J
Dieldrin	ND	0.32	1.36	"	"	"	"	"	"	
Endosulfan I	ND	0.29	1.36	"	"	"	"	"	"	
Endosulfan II	ND	0.52	1.36	"	"	"	"	"	"	
Endosulfan sulfate	**0.58**	0.33	1.36	"	"	"	"	"	"	J
Endrin	ND	0.33	1.36	"	"	"	"	"	"	
Endrin aldehyde	ND	0.20	1.36	"	"	"	"	"	"	
Heptachlor	ND	0.48	1.36	"	"	"	"	"	"	
Heptachlor epoxide	ND	0.48	1.36	"	"	"	"	"	"	
Methoxychlor	ND	0.50	2.71	"	"	"	"	"	"	
Toxaphene	ND	11.9	16.8	"	"	"	"	"	"	
Surrogate: TCMX		*85 %*	*26-146*			"	"	"	"	

Client Name: Coastal Environments
Project Name: San Dieguito Lagoon

EMA Log #: 10D0542

Organochlorine Pesticides by EPA Method 8081B

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
SDL 2 (10D0542-02) Sediment	**Sampled: 04/20/10 11:00**		**Received: 04/20/10 14:38**							
Aldrin	**2.20**	0.33	1.29	ug/kg dry	1	0042901	04/29/10	05/14/10	EPA 8081	
alpha-BHC	ND	0.17	1.29	"	"	"	"	"	"	
beta-BHC	ND	0.28	1.29	"	"	"	"	"	"	
gamma-BHC (Lindane)	ND	0.23	1.29	"	"	"	"	"	"	
delta-BHC	ND	0.26	1.29	"	"	"	"	"	"	
Total BHCs	ND	0.17	1.29	"	"	"	"	"	"	
Chlordane (Total)	ND	3.07	3.29	"	"	"	"	"	"	
2,4´-DDD	ND	0.79	1.29	"	"	"	"	"	"	
4,4´-DDD	ND	0.32	1.29	"	"	"	"	"	"	
2,4´-DDE	ND	0.70	1.29	"	"	"	"	"	"	
4,4´-DDE	**0.68**	0.30	1.29	"	"	"	"	"	"	J
2,4´-DDT	ND	1.29	1.29	"	"	"	"	"	"	
4,4´-DDT	ND	0.21	1.29	"	"	"	"	"	"	
Total DDT	**0.68**	0.21	1.29	"	"	"	"	"	"	J
Dieldrin	ND	0.30	1.29	"	"	"	"	"	"	
Endosulfan I	ND	0.27	1.29	"	"	"	"	"	"	
Endosulfan II	ND	0.49	1.29	"	"	"	"	"	"	
Endosulfan sulfate	ND	0.31	1.29	"	"	"	"	"	"	
Endrin	ND	0.32	1.29	"	"	"	"	"	"	
Endrin aldehyde	ND	0.19	1.29	"	"	"	"	"	"	
Heptachlor	ND	0.46	1.29	"	"	"	"	"	"	
Heptachlor epoxide	ND	0.45	1.29	"	"	"	"	"	"	
Methoxychlor	ND	0.48	2.58	"	"	"	"	"	"	
Toxaphene	ND	11.4	16.0	"	"	"	"	"	"	
Surrogate: TCMX		*86 %*	*26-146*			"	"	"	"	

Client Name: Coastal Environments
Project Name: San Dieguito Lagoon

EMA Log #: 10D0542

Polychlorinated Biphenyls by EPA Method 8082

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
SDL 1 (10D0542-01) Sediment	**Sampled: 04/20/10 10:30**		**Received: 04/20/10 14:38**							
Aroclor 1016	ND	3.18	13.6	ug/kg dry	1	0042901	04/29/10	05/14/10	EPA 8082	
Aroclor 1221	ND	3.18	13.6	"	"	"	"	"	"	
Aroclor 1232	ND	3.18	13.6	"	"	"	"	"	"	
Aroclor 1242	ND	3.18	13.6	"	"	"	"	"	"	
Aroclor 1248	ND	3.18	13.6	"	"	"	"	"	"	
Aroclor 1254	ND	3.18	13.6	"	"	"	"	"	"	
Aroclor 1260	ND	3.18	13.6	"	"	"	"	"	"	
Total Aroclors	ND	3.18	13.6	"	"	"	"	"	"	
Surrogate: TCMX		*85 %*	*26-146*			*"*	*"*	*"*	*"*	
SDL 2 (10D0542-02) Sediment	**Sampled: 04/20/10 11:00**		**Received: 04/20/10 14:38**							
Aroclor 1016	ND	3.02	12.9	ug/kg dry	1	0042901	04/29/10	05/14/10	EPA 8082	
Aroclor 1221	ND	3.02	12.9	"	"	"	"	"	"	
Aroclor 1232	ND	3.02	12.9	"	"	"	"	"	"	
Aroclor 1242	ND	3.02	12.9	"	"	"	"	"	"	
Aroclor 1248	ND	3.02	12.9	"	"	"	"	"	"	
Aroclor 1254	ND	3.02	12.9	"	"	"	"	"	"	
Aroclor 1260	ND	3.02	12.9	"	"	"	"	"	"	
Total Aroclors	ND	3.02	12.9	"	"	"	"	"	"	
Surrogate: TCMX		*86 %*	*26-146*			*"*	*"*	*"*	*"*	

Client Name: Coastal Environments
Project Name: San Dieguito Lagoon

EMA Log #: 10D0542

Conventional Chemistry Parameters by Standard/EPA Methods

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
SDL 1 (10D0542-01) Sediment	**Sampled: 04/20/10 10:30**		**Received: 04/20/10 14:38**							
% Solids	**73.7**	0.1	0.1	%	1	0042824	04/28/10	04/29/10	SM 2540 G	
SDL 2 (10D0542-02) Sediment	**Sampled: 04/20/10 11:00**		**Received: 04/20/10 14:38**							
% Solids	**77.5**	0.1	0.1	%	1	0042824	04/28/10	04/29/10	SM 2540 G	

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Client Name: Coastal Environments
Project Name: San Dieguito Lagoon

EMA Log #: 10D0542

TPH by EPA 8015C

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
SDL 1 (10D0542-01) Sediment	**Sampled: 04/20/10 10:30**		**Received: 04/20/10 14:38**							
Gasoline (C6-C10)	ND	5.4	13.6	mg/kg dry	1	0042602	04/26/10	04/26/10	EPA 8015C	
Diesel (C10-C28)	ND	5.4	13.6	"	"	"	"	"	"	
Extended Range HC (C28-C40)	ND	13.6	13.6	"	"	"	"	"	"	
Surrogate: 4-Bromofluorobenzene		*104 %*	*75-129*			*"*	*"*	*"*	*"*	
SDL 2 (10D0542-02) Sediment	**Sampled: 04/20/10 11:00**		**Received: 04/20/10 14:38**							
Gasoline (C6-C10)	ND	5.2	12.9	mg/kg dry	1	0042602	04/26/10	04/26/10	EPA 8015C	
Diesel (C10-C28)	ND	5.2	12.9	"	"	"	"	"	"	
Extended Range HC (C28-C40)	ND	12.9	12.9	"	"	"	"	"	"	
Surrogate: 4-Bromofluorobenzene		*101 %*	*75-129*			*"*	*"*	*"*	*"*	

Client Name: Coastal Environments
Project Name: San Dieguito Lagoon

EMA Log #: 10D0542

Total Metals by EPA 6000/7000 Series Methods - Quality Control

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 0042822											
Blank (0042822-BLK1)					Prepared & Analyzed: 04/28/10						
Zinc	ND	1.00	5.00	mg/kg wet							
Arsenic	ND	0.500	0.500	"							
Cadmium	ND	0.100	0.100	"							
Chromium	ND	0.600	1.00	"							
Copper	ND	0.500	0.500	"							
Lead	ND	0.500	0.500	"							
Nickel	ND	0.600	1.00	"							
Selenium	ND	0.200	1.00	"							
Silver	ND	0.100	0.100	"							
LCS (0042822-BS1)					Prepared & Analyzed: 04/28/10						
Selenium	7.12	0.200	1.00	mg/kg wet	10.0		71	75-125			QL-10
Arsenic	8.05	0.500	0.500	"	10.0		80	75-125			
Cadmium	8.26	0.100	0.100	"	10.0		83	75-125			
Chromium	9.05	0.600	1.00	"	10.0		90	75-125			
Silver	8.81	0.100	0.100	"	10.0		88	75-125			
Zinc	7.99	1.00	5.00	"	10.0		80	75-125			
Copper	8.92	0.500	0.500	"	10.0		89	75-125			
Lead	9.41	0.500	0.500	"	10.0		94	75-125			
Nickel	9.03	0.600	1.00	"	10.0		90	75-125			
LCS Dup (0042822-BSD1)					Prepared & Analyzed: 04/28/10						
Selenium	7.93	0.200	1.00	mg/kg wet	10.0		79	75-125	11	20	
Lead	9.90	0.500	0.500	"	10.0		99	75-125	5	20	
Copper	9.28	0.500	0.500	"	10.0		93	75-125	4	20	
Chromium	9.42	0.600	1.00	"	10.0		94	75-125	4	20	
Nickel	9.41	0.600	1.00	"	10.0		94	75-125	4	20	
Silver	9.16	0.100	0.100	"	10.0		92	75-125	4	20	
Cadmium	8.64	0.100	0.100	"	10.0		86	75-125	4	20	
Arsenic	8.41	0.500	0.500	"	10.0		84	75-125	4	20	
Zinc	8.45	1.00	5.00	"	10.0		85	75-125	6	20	

Client Name: Coastal Environments

Project Name: San Dieguito Lagoon

EMA Log #: 10D0542

Total Metals by EPA 6000/7000 Series Methods - Quality Control

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 0042822											
Duplicate (0042822-DUP1)			**Source: 10D0542-01**	Prepared & Analyzed: 04/28/10							
Selenium	ND	0.271	1.36	mg/kg dry		ND				20	
Arsenic	1.01	0.679	0.679	"		0.928			8	20	
Cadmium	ND	0.136	0.136	"		ND				20	
Chromium	6.59	0.814	1.36	"		6.43			3	20	
Silver	ND	0.136	0.136	"		ND				20	
Nickel	3.82	0.814	1.36	"		3.29			15	20	
Lead	1.42	0.679	0.679	"		1.28			11	20	
Copper	3.10	0.679	0.679	"		2.95			5	20	
Zinc	15.4	1.36	6.79	"		53.7			111	20	QR-02
Matrix Spike (0042822-MS1)			**Source: 10D0542-01**	Prepared & Analyzed: 04/28/10							
Copper	14.7	0.679	0.679	mg/kg dry	13.6	2.95	87	75-125			
Lead	15.2	0.679	0.679	"	13.6	1.28	103	75-125			
Nickel	15.4	0.814	1.36	"	13.6	3.29	89	75-125			
Selenium	10.7	0.271	1.36	"	13.6	ND	79	75-125			
Zinc	25.2	1.36	6.79	"	13.6	53.7	NR	75-125			QM-06
Silver	11.7	0.136	0.136	"	13.6	ND	86	75-125			
Chromium	17.0	0.814	1.36	"	13.6	6.43	78	75-125			
Cadmium	11.5	0.136	0.136	"	13.6	ND	85	75-125			
Arsenic	12.4	0.679	0.679	"	13.6	0.928	84	75-125			
Matrix Spike Dup (0042822-MSD1)			**Source: 10D0542-01**	Prepared & Analyzed: 04/28/10							
Cadmium	11.9	0.136	0.136	mg/kg dry	12.1	ND	98	75-125	4	20	
Chromium	17.9	0.814	1.36	"	12.1	6.43	94	75-125	5	20	
Copper	14.9	0.679	0.679	"	12.1	2.95	99	75-125	1	20	
Lead	13.9	0.679	0.679	"	12.1	1.28	104	75-125	9	20	
Nickel	15.8	0.814	1.36	"	12.1	3.29	103	75-125	3	20	
Arsenic	12.6	0.679	0.679	"	12.1	0.928	97	75-125	2	20	
Zinc	29.2	1.36	6.79	"	12.1	53.7	NR	75-125	15	20	QM-06
Silver	10.9	0.136	0.136	"	12.1	ND	90	75-125	7	20	
Selenium	9.90	0.271	1.36	"	12.1	ND	82	75-125	8	20	

Client Name: Coastal Environments
Project Name: San Dieguito Lagoon

EMA Log #: 10D0542

Organochlorine Pesticides by EPA Method 8081B - Quality Control

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 0042901											
Blank (0042901-BLK1)					Prepared: 04/29/10 Analyzed: 05/13/10						
Aldrin	ND	0.26	1.00	ug/kg wet							
alpha-BHC	ND	0.14	1.00	"							
beta-BHC	ND	0.22	1.00	"							
gamma-BHC (Lindane)	ND	0.18	1.00	"							
delta-BHC	ND	0.20	1.00	"							
Total BHCs	ND	0.14	1.00	"							
Chlordane (Total)	ND	2.38	2.55	"							
2,4´-DDD	ND	0.61	1.00	"							
4,4´-DDD	ND	0.24	1.00	"							
2,4´-DDE	ND	0.54	1.00	"							
4,4´-DDE	ND	0.24	1.00	"							
2,4´-DDT	ND	1.00	1.00	"							
4,4´-DDT	ND	0.16	1.00	"							
Total DDT	ND	0.16	1.00	"							
Dieldrin	ND	0.24	1.00	"							
Endosulfan I	ND	0.21	1.00	"							
Endosulfan II	ND	0.38	1.00	"							
Endosulfan sulfate	ND	0.24	1.00	"							
Endrin	ND	0.24	1.00	"							
Endrin aldehyde	ND	0.15	1.00	"							
Heptachlor	ND	0.36	1.00	"							
Heptachlor epoxide	ND	0.35	1.00	"							
Methoxychlor	ND	0.37	2.00	"							
Toxaphene	ND	8.80	12.4	"							
Surrogate: TCMX	*14.4*			*"*	*16.7*		*86*	*26-146*			
LCS (0042901-BS1)					Prepared: 04/29/10 Analyzed: 05/13/10						
Aldrin	14.2	0.26	1.00	ug/kg wet	16.7		85	42-122			
gamma-BHC (Lindane)	14.5	0.18	1.00	"	16.7		87	32-127			
4,4´-DDT	14.9	0.16	1.00	"	16.7		89	25-160			
Dieldrin	13.9	0.24	1.00	"	16.7		83	36-146			
Endrin	14.8	0.24	1.00	"	16.7		89	30-147			
Heptachlor	14.4	0.36	1.00	"	16.7		86	34-111			
Surrogate: TCMX	*13.6*			*"*	*16.7*		*81*	*26-146*			

Client Name: Coastal Environments
Project Name: San Dieguito Lagoon

EMA Log #: 10D0542

Organochlorine Pesticides by EPA Method 8081B - Quality Control

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 0042901											
LCS Dup (0042901-BSD1)					Prepared: 04/29/10	Analyzed: 05/13/10					
Aldrin	15.6	0.26	1.00	ug/kg wet	16.7		93	42-122	9	30	
gamma-BHC (Lindane)	15.8	0.18	1.00	"	16.7		95	32-127	9	30	
4,4´-DDT	16.4	0.16	1.00	"	16.7		99	25-160	10	30	
Dieldrin	15.9	0.24	1.00	"	16.7		95	36-146	13	30	
Endrin	16.3	0.24	1.00	"	16.7		98	30-147	10	30	
Heptachlor	15.8	0.36	1.00	"	16.7		95	34-111	9	30	
Surrogate: TCMX	*14.2*			*"*	*16.7*		*85*	*26-146*			
Duplicate (0042901-DUP1)			**Source: 10D0542-01**		Prepared: 04/29/10	Analyzed: 05/14/10					
Aldrin	ND	0.35	1.36	ug/kg dry		ND				30	
alpha-BHC	ND	0.18	1.36	"		ND				30	
beta-BHC	ND	0.29	1.36	"		ND				30	
gamma-BHC (Lindane)	ND	0.24	1.36	"		ND				30	
delta-BHC	ND	0.28	1.36	"		ND				30	
Total BHCs	ND	0.18	1.36	"		ND				30	
Chlordane (Total)	ND	3.23	3.46	"		ND				30	
2,4´-DDD	ND	0.83	1.36	"		ND				30	
4,4´-DDD	ND	0.33	1.36	"		ND				30	
2,4´-DDE	ND	0.73	1.36	"		ND				30	
4,4´-DDE	0.87	0.32	1.36	"		1.18			30	30	J
2,4´-DDT	ND	1.36	1.36	"		ND				30	
4,4´-DDT	ND	0.22	1.36	"		ND				30	
Total DDT	0.87	0.22	1.36	"		1.18			30	30	J
Dieldrin	ND	0.32	1.36	"		ND				30	
Endosulfan I	ND	0.29	1.36	"		ND				30	
Endosulfan II	ND	0.52	1.36	"		ND				30	
Endosulfan sulfate	0.53	0.33	1.36	"		0.58			8	30	J
Endrin	ND	0.33	1.36	"		ND				30	
Endrin aldehyde	ND	0.20	1.36	"		ND				30	
Heptachlor	ND	0.48	1.36	"		ND				30	
Heptachlor epoxide	ND	0.48	1.36	"		ND				30	
Methoxychlor	ND	0.50	2.71	"		ND				30	
Toxaphene	ND	11.9	16.8	"		ND				30	
Surrogate: TCMX	*16.6*			*"*	*22.6*		*73*	*26-146*			

Organochlorine Pesticides by EPA Method 8081B - Quality Control

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 0042901											
Matrix Spike (0042901-MS1)			**Source: 10D0542-01**		Prepared: 04/29/10		Analyzed: 05/14/10				
Aldrin	14.1	1.73	6.79	ug/kg dry	22.6	ND	62	42-122			
gamma-BHC (Lindane)	14.6	1.19	6.79	"	22.6	ND	65	32-127			
4,4´-DDT	14.4	1.09	6.79	"	22.6	ND	63	25-160			
Dieldrin	14.0	1.59	6.79	"	22.6	ND	62	36-146			
Endrin	14.2	1.66	6.79	"	22.6	ND	63	30-147			
Heptachlor	13.7	2.41	6.79	"	22.6	ND	61	34-111			
Surrogate: TCMX	*17.4*			*"*	*22.6*		*77*	*26-146*			
Matrix Spike Dup (0042901-MSD1)			**Source: 10D0542-01**		Prepared: 04/29/10		Analyzed: 05/14/10				
Aldrin	15.6	1.73	6.79	ug/kg dry	22.6	ND	69	42-122	11	30	
gamma-BHC (Lindane)	17.5	1.19	6.79	"	22.6	ND	77	32-127	18	30	
4,4´-DDT	16.3	1.09	6.79	"	22.6	ND	72	25-160	13	30	
Dieldrin	16.1	1.59	6.79	"	22.6	ND	71	36-146	14	30	
Endrin	16.6	1.66	6.79	"	22.6	ND	73	30-147	16	30	
Heptachlor	16.8	2.41	6.79	"	22.6	ND	74	34-111	20	30	
Surrogate: TCMX	*17.9*			*"*	*22.6*		*79*	*26-146*			

Client Name: Coastal Environments **EMA Log #: 10D0542**
Project Name: San Dieguito Lagoon

Polychlorinated Biphenyls by EPA Method 8082 - Quality Control

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 0042901											
Blank (0042901-BLK1)					Prepared: 04/29/10 Analyzed: 05/13/10						
Aroclor 1016	ND	2.34	10.0	ug/kg wet							
Aroclor 1221	ND	2.34	10.0	"							
Aroclor 1232	ND	2.34	10.0	"							
Aroclor 1242	ND	2.34	10.0	"							
Aroclor 1248	ND	2.34	10.0	"							
Aroclor 1254	ND	2.34	10.0	"							
Aroclor 1260	ND	2.34	10.0	"							
Total Aroclors	ND	2.34	10.0	"							
Surrogate: TCMX	*14.4*			*"*	*16.7*		*86*	*26-146*			
LCS (0042901-BS2)					Prepared: 04/29/10 Analyzed: 05/14/10						
Aroclor 1260	156	2.34	10.0	ug/kg wet	167		93	8-127			
Surrogate: TCMX	*11.9*			*"*	*16.7*		*71*	*26-146*			
LCS Dup (0042901-BSD2)					Prepared: 04/29/10 Analyzed: 05/14/10						
Aroclor 1260	159	2.34	10.0	ug/kg wet	167		95	8-127	2	30	
Surrogate: TCMX	*12.0*			*"*	*16.7*		*72*	*26-146*			
Duplicate (0042901-DUP1)			**Source: 10D0542-01**		Prepared: 04/29/10 Analyzed: 05/14/10						
Aroclor 1016	ND	3.18	13.6	ug/kg dry		ND				30	
Aroclor 1221	ND	3.18	13.6	"		ND				30	
Aroclor 1232	ND	3.18	13.6	"		ND				30	
Aroclor 1242	ND	3.18	13.6	"		ND				30	
Aroclor 1248	ND	3.18	13.6	"		ND				30	
Aroclor 1254	ND	3.18	13.6	"		ND				30	
Aroclor 1260	ND	3.18	13.6	"		ND				30	
Total Aroclors	ND	3.18	13.6	"		ND				30	
Surrogate: TCMX	*16.6*			*"*	*22.6*		*73*	*26-146*			

Client Name: Coastal Environments
Project Name: San Dieguito Lagoon

EMA Log #: 10D0542

Polychlorinated Biphenyls by EPA Method 8082 - Quality Control

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 0042901											
Matrix Spike (0042901-MS2)			**Source: 10D0542-02**		Prepared: 04/29/10		Analyzed: 05/14/10				
Aroclor 1260	219	15.1	64.5	ug/kg dry	215	ND	102	8-127			
Surrogate: TCMX	*16.9*			*"*	*21.5*		*79*	*26-146*			
Matrix Spike Dup (0042901-MSD2)			**Source: 10D0542-02**		Prepared: 04/29/10		Analyzed: 05/14/10				
Aroclor 1260	230	15.1	64.5	ug/kg dry	215	ND	107	8-127	5	30	
Surrogate: TCMX	*18.3*			*"*	*21.5*		*85*	*26-146*			

Client Name: Coastal Environments
Project Name: San Dieguito Lagoon

EMA Log #: 10D0542

Conventional Chemistry Parameters by Standard/EPA Methods - Quality Control

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 0042824											
Duplicate (0042824-DUP1)			**Source: 10D0542-01**		Prepared: 04/28/10	Analyzed: 04/29/10					
% Solids	75.3	0.1	0.1	%		73.7			2	20	

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Client Name: Coastal Environments
Project Name: San Dieguito Lagoon

EMA Log #: 10D0542

TPH by EPA 8015C - Quality Control

Analyte	Result	MDL	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 0042602											
Blank (0042602-BLK1)					Prepared & Analyzed: 04/26/10						
Gasoline (C6-C10)	ND	4.0	10.0	mg/kg wet							
Diesel (C10-C28)	ND	4.0	10.0	"							
Extended Range HC (C28-C40)	ND	10.0	10.0	"							
Surrogate: 4-Bromofluorobenzene	*51.3*			*"*	*50.0*		*103*	*75-129*			
LCS (0042602-BS1)					Prepared & Analyzed: 04/26/10						
Gasoline (C6-C10)	205	4.0	10.0	mg/kg wet	200		103	75-125			
Diesel (C10-C28)	516	4.0	10.0	"	500		103	75-125			
Surrogate: 4-Bromofluorobenzene	*53.8*			*"*	*50.0*		*108*	*75-129*			
LCS Dup (0042602-BSD1)					Prepared & Analyzed: 04/26/10						
Gasoline (C6-C10)	176	4.0	10.0	mg/kg wet	200		88	75-125	15	30	
Diesel (C10-C28)	482	4.0	10.0	"	500		96	75-125	7	30	
Surrogate: 4-Bromofluorobenzene	*50.9*			*"*	*50.0*		*102*	*75-129*			
Duplicate (0042602-DUP1)		**Source: 10D0542-01**			Prepared & Analyzed: 04/26/10						
Gasoline (C6-C10)	ND	5.4	13.6	mg/kg dry		ND				30	
Diesel (C10-C28)	ND	5.4	13.6	"		ND				30	
Extended Range HC (C28-C40)	ND	13.6	13.6	"		ND				30	
Surrogate: 4-Bromofluorobenzene	*69.6*			*"*	*67.9*		*103*	*75-129*			
Matrix Spike (0042602-MS1)		**Source: 10D0542-01**			Prepared & Analyzed: 04/26/10						
Gasoline (C6-C10)	235	5.4	13.6	mg/kg dry	271	ND	87	75-125			
Diesel (C10-C28)	643	5.4	13.6	"	678	ND	95	75-125			
Surrogate: 4-Bromofluorobenzene	*69.9*			*"*	*67.9*		*103*	*75-129*			
Matrix Spike Dup (0042602-MSD1)		**Source: 10D0542-01**			Prepared & Analyzed: 04/26/10						
Gasoline (C6-C10)	292	5.4	13.6	mg/kg dry	271	ND	108	75-125	22	30	
Diesel (C10-C28)	643	5.4	13.6	"	678	ND	95	75-125	0.05	30	
Surrogate: 4-Bromofluorobenzene	*67.5*			*"*	*67.9*		*99*	*75-129*			

Client Name: Coastal Environments Project Name: San Dieguito Lagoon	**EMA Log #: 10D0542**

Notes and Definitions

QR-02	The RPD result exceeded the QC limits due to non-homogeneity of sample.
QM-06	Due to noted non-homogeneity of the QC sample matrix, the MS/MSD did not provide reliable results for accuracy and precision. Sample results for the QC batch were accepted based on LCS/LCSD percent recoveries and RPD values.
QL-10	Due to a digestion/spiking error the LCS percent recovery was outside of the control limit. The LCSD had acceptable recovery showing that the method is in control and the analytes are reportable. Data released without further qualification.
J	Detected but below the Reporting Limit; therefore, result is an estimated concentration (CLP J-Flag).
ND	Analyte NOT DETECTED at or above the reporting limit (or method detection limit when specified)
NR	Not Reported
dry	Sample results reported on a dry weight basis (if indicated in units column)
RPD	Relative Percent Difference
MDL	Method detection limit (indicated per client's request)

EnviroMatrix Analytical, Inc.

27 April 2010

Coastal Environments
Attn: Dr. Hani Elwany
2166 Avenida de la Playa
La Jolla, California 92037

EMA Log #: 10D0542

Project Name: San Dieguito Lagoon

Enclosed with this letter are the test results performed by subcontract laboratory for the following analyses:

- Hg Total EPA - 7470

The samples were received by EnviroMatrix Analytical, Inc. intact and with chain-of-custody documentation. The test results and pertinent quality assurance/quality control data are listed on the attached tables.

I certify that this data report is in compliance both technically and for completeness. Release of the data contained in this hard copy data report has been authorized by the following signature.

Dan Verdon
Laboratory Director

SIERRA ANALYTICAL

26 April 2010

Jennifer Beyer
EnviroMatrix Analytical, Inc.
4340 Viewridge Ave Suite A
San Diego, CA 92123

RE:NA

Work Order No.: 1004317

Attached are the results of the analyses for samples received by the laboratory on 04/21/10 13:59.

The samples were received by Sierra Analytical Labs, Inc. with a chain of custody record attached or completed at the submittal of the samples.

The analyses were performed according to the prescribed method as outlined by EPA, Standard Methods, and A.S.T.M.

The remaining portions of the samples will be disposed of within 30 days from the date of this report.
If you require any additional retaining time, please advise us.

Sincerely,

Richard K. Forsyth

Laboratory Director

Sierra Analytical Labs, Inc. is certified by the California Department of Health Services (DOHS), Environmental Laboratory Accredidation Program (ELAP) No. 2320.

SIERRA ANALYTICAL

EnviroMatrix Analytical. Inc. 4340 Viewridge Ave Suite A San Diego CA, 92123	Project: NA Project Number: 10D0542 Project Manager: Jennifer Beyer	Reported: 04/26/10 14:18

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
10D0542-01 / SDL 1	1004317-01	Sediment	04/20/10 10:30	04/21/10 13:59
10D0542-02 / SDL 2	1004317-02	Sediment	04/20/10 11:00	04/21/10 13:59

CASE NARRATIVE

SAMPLE RECEIPT:	Samples were received intact, at 4°C, and accompanied by chain of custody documentation.
PRESERVATION:	Samples requiring preservation were verified prior to sample preparation and analysis.
HOLDING TIMES:	All holding times were met, unless otherwises noted in the report with data qualifiers.
QA/QC CRITERIA:	All quality objective criteria were met, except as noted in the report with data qualifiers.

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

26052 Merit Circle Suite 105, Laguna Hills, California 92653
Telephone: (949) 348-9389 Fax: (949) 348-9115
E-Mail: sierralabs @ sierralabs.net

SIERRA ANALYTICAL

EnviroMatrix Analytical, Inc. 4340 Viewridge Ave Suite A San Diego CA, 92123	Project: NA Project Number: 10D0542 Project Manager: Jennifer Beyer	**Reported:** 04/26/10 14:18

Metals by EPA 6000/7000 Series Methods

Sierra Analytical Labs, Inc.

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
10D0542-01 / SDL 1 (1004317-01) Sediment	**Sampled: 04/20/10 10:30**		**Received: 04/21/10 13:59**						
Mercury	ND	0.18	mg/kg	1	B0D2304	04/23/10	04/23/10 10:27	EPA 7471A	
10D0542-02 / SDL 2 (1004317-02) Sediment	**Sampled: 04/20/10 11:00**		**Received: 04/21/10 13:59**						
Mercury	ND	0.18	mg/kg	1	B0D2304	04/23/10	04/23/10 10:29	EPA 7471A	

26052 Merit Circle Suite 105, Laguna Hills, California 92653
Telephone: (949) 348-9389 Fax: (949) 348-9115
E-Mail: sierralabs @ sierralabs.net

EnviroMatrix Analytical, Inc. 4340 Viewridge Ave Suite A San Diego CA, 92123	Project: NA Project Number: 10D0542 Project Manager: Jennifer Beyer	Reported: 04/26/10 14:18

Metals by EPA 6000/7000 Series Methods - Quality Control

Sierra Analytical Labs, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B0D2304 - EPA 7471A										
Blank (B0D2304-BLK1)				Prepared & Analyzed: 04/23/10						
Mercury	ND	0.18	mg/kg							
LCS (B0D2304-BS1)				Prepared & Analyzed: 04/23/10						
Mercury	0.17	0.18	mg/kg	0.167		102	70-130			
Matrix Spike (B0D2304-MS1)	**Source: 1004260-13**			Prepared & Analyzed: 04/23/10						
Mercury	0.18	0.18	mg/kg	0.153	0.02	105	70-130			
Matrix Spike Dup (B0D2304-MSD1)	**Source: 1004260-13**			Prepared & Analyzed: 04/23/10						
Mercury	0.18	0.18	mg/kg	0.153	0.02	105	70-130	0.00	30	

26052 Merit Circle Suite 105, Laguna Hills, California 92653
Telephone: (949) 348-9389 Fax: (949) 348-9115
E-Mail: sierralabs @ sierralabs.net

EnviroMatrix Analytical, Inc. 4340 Viewridge Ave Suite A San Diego CA, 92123	Project: NA Project Number: 10D0542 Project Manager: Jennifer Beyer	**Reported:** 04/26/10 14:18

Notes and Definitions

DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit
NR	Not Reported
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference

26052 MERIT CIRCLE SUITE 105, LAGUNA HILLS, CALIFORNIA 92653
TELEPHONE: (949) 348-9389 FAX: (949) 348-9115
E-MAIL: SIERRALABS @ SIERRALABS.NET

SUBCONTRACT ORDER

EnviroMatrix Analytical, Inc.

10D0542

1004317

SENDING LABORATORY:	**RECEIVING LABORATORY:**
EnviroMatrix Analytical, Inc.	Sierra Analytical Labs, Inc. [S]
4340 Viewridge Ave., Ste. A	26052 Merit Circle, Suite 105
San Diego, CA 92123	Laguna Hills, CA 92653
Phone: (858) 560-7717	Phone :(949) 348-9389
Fax: (858) 560-7763	Fax: (949) 348-9115
Project Manager: Jennifer Beyer	

STD TAT

Please use comments as sample ID on report

	Analysis	**Due**	**Expires**	**Laboratory ID**	**Comments**
1	**Sample ID: 10D0542-01**	**Sediment**	**Sampled:04/20/10 10:30**	[redacted]	
	Hg Total - Sed/Tiss.	04/29/10 16:00	05/18/10 10:30		SDL 1
	Containers Supplied: 4 oz. jar (B)				
2	**Sample ID: 10D0542-02**	**Sediment**	**Sampled:04/20/10 11:00**	[redacted]	
	Hg Total - Sed/Tiss.	04/29/10 16:00	05/18/10 11:00		SDL 2
	Containers Supplied: 4 oz. jar (B)				

Send report to jbeyer@enviromatrixinc.com, llvick@enviromatrixinc.com, reports@enviromatrixinc.com

B-45

Released By	Date	Received By	Date
[illegible]	4/21/10 1359	[illegible]	4.21.10 / 13:59

Page___ of ___

CHAIN-OF-CUSTODY RECORD

– EnviroMatrix (EMA) Analytical, Inc. —

4340 Viewridge Ave., Ste. A - San Diego, CA 92123 - Phone (858) 560-7717 - Fax (858) 560-7763

APR 20 '10 14:54

EMA LOG #: 1000542

Client: Coastal Environments

Attn: Dr. Hany Elwany

Samplers(s): Mike Tilka

Address: 2166 Avenida de la Playa, La Jolla CA 92037

Phone: 858 459-0008 Fax:

Email:

Billing Address:

Project ID: San Dieguito Lagoon

Project #: PO #:

Requested Analysis

ID #	Client Sample ID	Sample Date	Sample Time	Sample Matrix	Container # / Type	Oil & Grease □413.1 □413.2 □1664	8015B (TPH) □Gas □Diesel □Ext	624/8260 (VOC) Full BTXE MTBE Oxy Nap	625 / 8270 (SVOC) □PAH only	608 / 8081 (Organochlorine Pesticides)	608 / 8082 (Polychlorinated Biphenyls)	8141 (Organophosphorus Pesticides)	TBT (Organotin Compounds)	□pH □EC □TSS □TDS	□Nitrate □Nitrite □TKN □NH3	CAC Title 22/CAM17 Metals □TTLC □STLC	TCLP (RCRA) □Metals □Organics	Cd Cr Cu Pb Ni Ag Zn □Dissolved	Coliform. □Total (MTF) □Fecal (MTF)	Colilert, T+E.Coli □P/A □Enumeration	Enterococcus. □MTF □Enterolert	Heterotrophic Plate Count (HPC)	□BOD □COD □Cyanide	see attached fax
1	SDL 1	4/20	1030	sed																				X
2	SDL 2	4/20	1100	sed																				X
3																								
4																								
5																								
6																								
7																								
8																								
9																								
10																								

Matrix Codes: A = Air, DW = Drinking Water, GW = Groundwater, SW = Storm Water
WW = Wastewater, S = Soil, SED = Sediment, SD = Solid, T = Tissue, O – Oil, L = Liquid

Shipped By: □Courier □UPS □FedEx □USPS □Client Drop Off □Other

[1]**Turn-Around-Time:** □Same Day □24 hr □48 hr □3 day □4 day □5 day □STD (7 day)

[1]**Reporting Requirements:** □Fax □PDF □Excel □Geotracker/EDF □Hard Copy □EDT

[1]**Sample Disposal:** □By Laboratory □[2]Return to Client: P/U or Delivery □Archive

Sample Integrity

Correct Containers: Yes No N/A	Containers Properly Preserved: Yes No N/A
Custody Seals Intact: Yes No N/A	Temp at Receipt:
COC-Labels Agree: Yes No N/A	Sampled By: Client EMA Autosampler

RELINQUISHED BY	DATE/TIME	RECEIVED BY
Signature: Mike Tilka	4/20/10	Signature: [signature]
Print: Mike Tilka	1430	Print: Matt Cu[illegible]
Company: CE		Company: EMA
Signature		Signature
Print		Print
Company:		Company:
Signature		Signature
Print		Print
Company:		Company:

Project/Sample Comments:

12 c̄ blue ice

[1]Additional costs may apply, consult a project manager for details.

[2]EMA reserves the right to return any samples that do not match our waste profile.

NOTE: By relinquishing samples to EMA, Inc., client agrees to pay for the services requested on this COC form and any additional analyses performed on this project. Payment for services is due within 30 days from date of invoice. Samples will be disposed of 7 days after report has been finalized unless otherwise noted. All work is subject to EMA's terms and conditions.

SUBCONTRACT ORDER

EnviroMatrix Analytical, Inc.

10D0542

SENDING LABORATORY:	**RECEIVING LABORATORY:**
EnviroMatrix Analytical, Inc.	Sierra Analytical Labs, Inc. [S]
4340 Viewridge Ave., Ste. A	26052 Merit Circle, Suite 105
San Diego, CA 92123	Laguna Hills, CA 92653
Phone: (858) 560-7717	Phone :(949) 348-9389
Fax: (858) 560-7763	Fax: (949) 348-9115
Project Manager: Jennifer Beyer	

STD TAT

Please use comments as sample ID on report

Analysis	Due	Expires	Laboratory ID	Comments
Sample ID: 10D0542-01	**Sediment**	**Sampled:04/20/10 10:30**		
Hg Total - Sed/Tiss.	04/29/10 16:00	05/18/10 10:30		SDL 1
Containers Supplied:				
4 oz. jar (B)				
Sample ID: 10D0542-02	**Sediment**	**Sampled:04/20/10 11:00**		
Hg Total - Sed/Tiss.	04/29/10 16:00	05/18/10 11:00		SDL 2
Containers Supplied:				
4 oz. jar (B)				

Send report to jbeyer@enviromatrixinc.com, lluick@enviromatrixinc.com, reports@enviromatrixinc.com

Released By	Date	Received By	Date
[signature]	4/21/10 1359	[signature]	4.21.10 / 13:59

Coastal Environments
Oceanographic and Coastal Services

20 April 2010

EnviroMatrix Analytical, Inc.
4340 Viewridge Avenue, Suite A
San Diego, CA 92123
Tel: (858) 560-7717
Fax: (858) 560-7763

RE: Chemical Bulk Sediment Analysis from Cores Taken on April 20, 2010 from the San Dieguito Lagoon Inlet Channel

Dear Dan/ Louis and Dan:

Project Name: Dredging/Excavation of San Dieguito Lagoon Inlet Channel

Mr. Mike Jilka left two samples bottles at your lab they are labled SDL1 and SDL2. Please rename the samples as SDL1= S10 and SDL2=S11.

Please analyze each sample for all the parameters shown in the table below. For your information, these tests are for USACOE permits to place excavated sediment from the San Dieguito Lagoon inlet channel on adjacent beaches.

Matrix	Parameter	Method
Sediment	10 Sed/Total Metals Concentrations (EPA 6020 & EPA 7471)	Varies
Sediment	Pesticides by EPA 8081A PN101	EPA 8081A
Sediment	TPH Extended Range by EPA 8015B	EPA 8015 B

Dan please let know if we need to analyze for PCB's.

If you have any questions, please call me at 858-459-0008. Thank you.

Sincerely,

Hany Elwany, Ph.D.
President

CHAIN-OF-CUSTODY RECORD

– EnviroMatrix (EMA) Analytical, Inc. ——
4340 Viewridge Ave., Ste. A - San Diego, CA 92123 - Phone (858) 560-7717 - Fax (858) 560-7763

APR 20 '10 14:54

EMA LOG #: 1000542

Client: Coastal Environments
Attn: Dr. Hany Elwany
Samplers(s): Mike Tilka
Address: 2166 Avenida de la Playa
La Jolla CA 92037
Phone: 858 459-0008 Fax:
Email:
Billing Address:

Project ID: San Dieguito Lagoon
Project #: PO #:

Requested Analysis

ID #	Client Sample ID	Sample Date	Sample Time	Sample Matrix	Container # / Type	Oil & Grease □ 413.1 □ 413.2 □ 1664	8015B (TPH) □ Gas □ Diesel □ Ext	624/8260 (VOC) Full BTXE MTBE Oxy Nap	625 / 8270 (SVOC) □ PAH only	608 / 8081 (Organochlorine Pesticides)	608 / 8082 (Polychlorinated Biphenyls)	8141 (Organophosphorus Pesticides)	TBT (Organotin Compounds)	□ pH □ EC □ TSS □ TDS	□ Nitrate □ Nitrite □ TKN □ NH3	CAC Title 22/CAM17 Metals □ TTLC □ STLC	TCLP (RCRA) □ Metals □ Organics	Cd Cr Cu Pb Ni Ag Zn □ Dissolved	Coliform. □ Total (MTF) □ Fecal (MTF)	Colilert, T+E.Coli □ P/A □ Enumeration	Enterococcus, □ MTF □ Enterolert	Heterotrophic Plate Count (HPC)	□ BOD □ COD □ Cyanide	See attached fax				
1	SDL 1	4/20	1030	sed																				X				
2	SDL 2	4/20	1100	sed																				X				
3																												
4																												
5																												
6																												
7																												
8																												
9																												
10																												

Matrix Codes: A = Air, DW = Drinking Water, GW = Groundwater, SW = Storm Water
WW = Wastewater, S = Soil, SED = Sediment, SD = Solid, T = Tissue, O = Oil, L = Liquid
Shipped By: □ Courier □ UPS □ FedEx □ USPS □ Client Drop Off □ Other
[1]Turn-Around-Time: □ Same Day □ 24 hr □ 48 hr □ 3 day □ 4 day □ 5 day □ STD (7 day)
[1]Reporting Requirements: □ Fax □ PDF □ Excel □ Geotracker/EDF □ Hard Copy □ EDT
[1]Sample Disposal: □ By Laboratory □ [2]Return to Client: P/U or Delivery □ Archive

Sample Integrity

Correct Containers: Yes No N/A	Containers Properly Presevved: Yes No N/A
Custody Seals Intact: Yes No N/A	Temp @ Receipt: ________
COC/Labels Agree: Yes No N/A	Sampled By: Client EMA Autosampler

RELINQUISHED BY	DATE/TIME	RECEIVED BY
Signature [signature]	4/20/10	Signature [signature]
Print Mike Tilka	1430	Print Matt Cinders
Company: CE		Company: EMA
Signature		Signature
Print		Print
Company:		Company:
Signature		Signature
Print		Print
Company:		Company:

Project/Sample Comments:

12 c̄ blue ice

[1]Additional costs may apply, consult a project manager for details.

[2]EMA reserves the right to return any samples that do not match our waste profile.

NOTE: By relinquishing samples to EMA, Inc., client agrees to pay for the services requested on this COC form and any additional analyses performed on this project. Payment for services is due within 30 days from date of invoice. Samples will be disposed of 7 days after report has been finalized unless otherwise noted. All work is subject to EMA's terms and conditions.