



Cerritos Bahia Marina Maintenance Dredging Project

INITIAL STUDY

Prepared by:

City of Long Beach
Department of Development Services
Planning Bureau

INITIAL STUDY

Project Title:

Cerritos Bahia Marina Maintenance Dredging Project

Lead agency name and address:

City of Long Beach, Department of Development Services
333 W. Ocean Boulevard, 5th Floor
Long Beach, CA 90802

Contact person and phone number:

Craig Chalfant
(562) 570-6368

Project location:

6289 East Pacific Coast Highway, City of Long Beach, County of Los Angeles, CA

Project Sponsor's name and contact information:

Rafael Holcombe
Project Engineer
Tetra Tech
401 E. Ocean Blvd., Suite 420
Long Beach, CA 90802
(562) 495-0495

General Plan:

Land Use Designation No. 7 Mixed Use District

Zoning:

Planned Development District 1 (PD-1), Sub-area 15

Project Description:

The proposed project involves maintenance dredging for the Cerritos Bahia Marina to maintain sufficient water depth for marina operations. The proposed dredge depth for the project is -6 feet mean lower low water (mllw) with an allowable over dredge of +2 feet. The volume of material to be removed is 26,867 cubic yards (cy). A volume of 11,086 cy is available to -6 feet (mllw) and 15,781 cy is available in the +2 foot over dredge volume.

Dredging is required throughout the marina, in particular under the docks and in Docks C-E and E-F. The dredging will be conducted in phases. The intent is to phase the project, removing boats and dredging around two or three docks at a time to reduce impacts to marina operations and occupancy. Phase I will involve Docks A, B and C; Docks E and F for Phase II; Docks G and H for Phase III; and Dock I for Phase IV. Dredging will be conducted using a 10-inch Barracuda hydraulic suction dredge manufactured by Dredging Supply Company. Dredged material will be pumped via a

10-inch pipeline to the Material Processing Area for dewatering and loading into trucks for disposal. Dredging activities will be limited to eight hours per day.

The dredged materials will be stored in piles within the designated Material Processing Area in the Cerritos Bahia Marina parking lot for a time period of less than one week for each Phase. The project will occupy approximately 34 parking spaces for the Material Processing Area and approximately 86 spaces for the entire dewatering process. Dredging will be continuous for eight hour shifts and the dewatering equipment will continue to run when the dredge is in operation. An estimated 250 total truck trips will occur throughout the entire project for delivery of dredged materials to the disposal locations (Chiquita Canyon Sanitary Landfill, Sunshine Landfill, Alpha Olinda Landfill, or Puente Hills) for re-use as daily cover.

The total duration of this project would be approximately 66 days. No project dredging and disposal activities would occur between the period of March 15 through September 1, since this is considered the foraging season for the California least tern and California brown pelican. Project implementation is expected to commence in the mid to late fall months of 2009 and end by February 2010, which are the months of lowest boater activity.

The project would result in a temporary loss of eelgrass within the Marina. The project has been designed to minimize impacts to eelgrass and the applicant has developed an eelgrass mitigation plan.

Surrounding land uses and settings:

The project site is bounded on the north by residential uses, on the east by residential uses; on the west by commercial uses along Pacific Coast Highway, and on the south by the Los Cerritos Channel.

Public agencies whose approval is required:

City of Long Beach Planning Commission (Adopt Negative Declaration 08-09 and approve Local Coastal Development Permit)

ENVIRONMENTAL FACTORS POTENTIALLY AFFECTED:

The environmental factors checked below would be potentially affected by this project involving at least one impact that is a “Less Than Significant with Mitigation Incorporation” or “Potentially Significant Impact” as indicated by the checklist on the following pages:

Negative Declaration ND 08-09
Cerritos Bahia Marina Maintenance Dredging Project

<input type="checkbox"/> Aesthetics	<input type="checkbox"/> Hazards & Hazardous Materials	<input type="checkbox"/> Population & Housing
<input type="checkbox"/> Agricultural Resources	<input type="checkbox"/> Hydrology & Water Quality	<input type="checkbox"/> Public Services
<input type="checkbox"/> Air Quality	<input type="checkbox"/> Land Use & Planning	<input type="checkbox"/> Recreation
<input checked="" type="checkbox"/> Biological Resources	<input type="checkbox"/> Mineral Resources	<input type="checkbox"/> Transportation & Traffic
<input type="checkbox"/> Cultural Resources	<input type="checkbox"/> National Pollution Discharge Elimination System	<input type="checkbox"/> Utilities & Service Systems
<input type="checkbox"/> Geology & Soils	<input type="checkbox"/> Noise	<input type="checkbox"/> Mandatory Findings of Significance

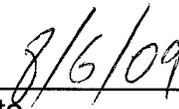
DETERMINATION:

On the basis of this initial evaluation:

- I find that the proposed project COULD NOT have a significant effect on the environment and a NEGATIVE DECLARATION will be prepared.
- I find that although the proposed project could have a significant effect on the environment, there will not be a significant effect in this case because revisions in the project have been made by or agreed to by the project proponent. A MITIGATED NEGATIVE DECLARATION will be prepared.
- I find that the proposed project MAY have a significant effect on the environment and an ENVIRONMENTAL IMPACT REPORT is required.
- I find that the proposed project MAY have a "potentially significant impact" or "potentially significant unless mitigated" impact on the environment, but at least one effect 1) has been adequately analyzed in an earlier document pursuant to applicable legal standards, and 2) has been addressed by mitigation measures based on the earlier analysis, as described on attached sheets. An ENVIRONMENTAL IMPACT REPORT is required, but it must analyze only the effects that remain to be addressed.
- I find that although the proposed project could have a significant effect on the environment, because all potentially significant effects (a) have been analyzed adequately in an earlier EIR or NEGATIVE DECLARATION pursuant to applicable standards, and (b) have been avoided or mitigated pursuant to that earlier EIR or NEGATIVE DECLARATION, including revisions or mitigation measures that are imposed upon the proposed project, nothing further is required.



Craig Chalfant
Planner



Date

EVALUATION OF ENVIRONMENTAL IMPACTS

- 1) A brief explanation is required for all answers except “No Impact” answers that are supported adequately by the information sources a lead agency cites in the parenthesis following each question. A “No Impact” answer is adequately supported if the referenced information sources show that the impact simply does not apply to projects like the one involved (e.g. the project falls outside a fault rupture zone). A “No Impact” answer should be explained where it is based on project-specific factors as well as general standards (e.g. the project will not expose sensitive receptors to pollutants, based on a project specific screening analysis).
- 2) All answers must take account of the whole action involved, including off-site as well as on-site, cumulative as well as project-level, indirect as well as direct, and construction as well as operational impacts.
- 3) Once the lead agency has determined that a particular physical impact may occur, then the checklist answers must indicate whether the impact is potentially significant, less than significant with mitigation, or less than significant. “Potentially Significant Impact” is appropriate if there is substantial evidence that an effect may be significant. If there are one or more “Potentially Significant Impact” entries when the determination is made, an EIR is required.
- 4) “Negative Declaration; Less Than Significant With Mitigation Incorporation” applies where the incorporation of mitigation measures has reduced an effect from “Potentially Significant Impact” to a “Less Than Significant Impact.” The lead agency must describe the mitigation measures, and briefly explain how they reduce the effect to a less than significant level (mitigation measures from “Earlier Analysis,” as described in (5) below, may be cross-referenced).
- 5) Earlier analyses may be used where, pursuant to the tiering, program EIR, or other CEQA process, an effect has been adequately analyzed in an earlier EIR or Negative Declaration (per Section 15063(c)(3)(D)). In this case, a brief discussion should identify the following:
 - a) Earlier Analysis Used. Identify and state where they are available for review.
 - b) Impacts Adequately Addressed. Identify which effects from the above checklist were within the scope of and adequately analyzed in an earlier document pursuant to applicable legal standards, and state whether such effect were addressed by mitigation measures based on the earlier analysis.
 - c) Mitigation Measures. For effects that are “Less than Significant with Mitigation Measures Incorporated,” describe the mitigation measures which were incorporated or refined from the earlier document and the extent to which they address site-specific conditions for the project.

- 6) Lead agencies are encouraged to incorporate into the check list references to information sources for potential impacts (e.g. general plans, zoning ordinances). Reference to a previously prepared or outside document should, where appropriate, include a reference to the page or pages where the statement is substantiated.
- 7) Supporting information Sources: A source list should be attached, and other sources used or individuals contacted should be cited in the discussion.
- 8) The explanation of each issue should identify:
 - a) The significance criteria or threshold. If any, used to evaluate each question; and
 - b) The mitigation measure identified, if any, to reduce the impact to less than significance.

I. AESTHETICS

a. Would the project have a substantial adverse effect on a scenic vista?

- Potentially Significant Impact Less Than Significant with Mitigation Incorporation Less Than Significant Impact No Impact

The project site is located at the Los Cerritos Channel east of Pacific Coast Highway. While the surrounding area south of the project site provides views of waterways and wetland areas, the project would not alter the visual character of these natural areas. Views of these natural areas from the north would not be significantly obscured by the temporary storage of covered dredged materials (less than one week for each of the five project Phases) and dredging equipment in the Marina parking lot. No other areas in the project vicinity would be considered scenic vistas. Project maintenance dredging activities would not have a substantial adverse effect on any scenic vistas and therefore no further analysis of this environmental issue is required.

b. Would the project substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?

- Potentially Significant Impact Less Than Significant with Mitigation Incorporation Less Than Significant Impact No Impact

There are no State designated scenic highways located within the City (the portion of Pacific Coast Highway east of the Traffic Circle is identified in the State's Scenic Highway Program as an "eligible" scenic highway). No scenic resources, trees or rock outcroppings would be damaged as a result of dredging the Cerritos Bahia Marina. There would therefore be no impact to any natural scenic resource and no further analysis is required.

c. Would the project substantially degrade the existing visual character or quality of the site and its surroundings?

- Potentially Significant Impact Less Than Significant with Mitigation Incorporation Less Than Significant Impact No Impact

The City topography is relatively flat, with scenic vistas of the ocean to the south and the Palos Verdes peninsula to the west. The nearest scenic hills are located in the City of Signal Hill, which is completely surrounded by the City of Long Beach. In addition, distant views of the San Gabriel and San Bernardino

Mountains to the north as well as the Santa Ana Mountains to the east are occasionally available to the public on days of clear visibility (primarily during the winter months).

The proposed project involves maintenance dredging for the Cerritos Bahia Marina to maintain sufficient water depth for marina operations. The proposed dredge depth for the project is -6 feet mean lower low water (mllw) with an allowable over dredge of +2 feet. The volume of material to be removed is 26,867 cubic yards (cy). The project site is bounded on the north by residential uses and mixed uses; on the east by residential uses; on the west by the Pacific Coast Highway and commercial uses; and on the south by wetlands. The nearest "eligible" scenic highway is the Pacific Coast Highway, which is adjacent to the proposed project. The project improvements at the Cerritos Bahia Marina can be viewed from public areas including adjacent streets and residential uses.

The project would not involve the construction or reconstruction of any structures that could potentially alter the visual character of the area surrounding the project. The dredging equipment and covered dredged materials stored on-site would temporarily alter but not degrade the visual character of the surrounding area. No further environmental analysis is necessary.

d. Would the project create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?

- Potentially Significant Impact Less Than Significant with Mitigation Incorporation Less Than Significant Impact No Impact

There are not high levels of lighting or glare emanating from the project area. On-site lighting would continue to be limited to security lighting and interior lighting from Marina buildings. Off-site lighting currently emanates from adjacent residential and commercial uses located to the north, east, and west of the project site, as well as adjacent street lighting. Maintenance dredging of the Marina would not add any new sources of light or glare since all dredging activities would be conducted during daytime hours and no new structures or lighting facilities would be constructed as part of project implementation. No further environmental analysis is necessary.

II. AGRICULTURE RESOURCES

In determining whether impacts to agricultural resources are significant environmental effects, lead agencies may refer to the California Agricultural Land Evaluation and Site Assessment Model (1997) prepared by the California Department of Conservation as an optional model to use in assessing impacts on agriculture and farmland. Would the project:

a. Would the project convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?

- Potentially Significant Impact Less Than Significant with Mitigation Incorporation Less Than Significant Impact No Impact

b. Would the project conflict with existing zoning for agricultural use, or a Williamson Act contract?

- Potentially Significant Impact Less Than Significant with Mitigation Incorporation Less Than Significant Impact No Impact

c. Would the project involve other changes in the existing environment that, due to their location or nature, could result in conversion of Farmland to non-agricultural use?

- Potentially Significant Impact Less Than Significant with Mitigation Incorporation Less Than Significant Impact No Impact

For Sections II. (a), (b) and (c) -There are no agricultural zones within the City of Long Beach, which is a fully urbanized community that has been built upon for over half a century. The proposed maintenance dredging of the Cerritos Bahia Marina would have no effect upon agricultural resources within the City of Long Beach or any other neighboring city or county.

III. AIR QUALITY

The South Coast Air Basin is subject to some of the worst air pollution in the nation, attributable to its topography, climate, meteorological conditions, large population base, and dispersed urban land use patterns.

Air quality conditions are affected by the rate and location of pollutant emissions and by climatic conditions that influence the movement and dispersion of pollutants. Atmospheric forces such as wind speed, wind direction, and air temperature gradients, along with local and regional topography, determine how air pollutant emissions affect air quality.

The South Coast Air Basin has a limited capability to disperse air contaminants because of its low wind speeds and persistent temperature inversions. In the Long Beach area, predominantly daily winds consist of morning onshore airflow from the southwest at a mean speed of 7.3 miles per hour and afternoon and evening offshore airflow from the northwest at 0.2 to 4.7 miles per hour with little variability between seasons. Summer wind speeds average slightly higher than winter wind speeds. The prevailing winds carry air contaminants northward and then eastward over Whittier, Covina, Pomona and Riverside.

The majority of pollutants found in the Los Angeles County atmosphere originate from automobile exhausts as unburned hydrocarbons, carbon monoxide, oxides of nitrogen and other materials. Of the five major pollutant types (carbon monoxide, nitrogen oxides, reactive organic gases, sulfur oxides, and particulates), only sulfur oxide emissions are produced mostly by sources other than automobile exhaust.

a. Would the project conflict with or obstruct implementation of the applicable Air Quality Attainment Plan?

- Potentially Significant Impact Less Than Significant with Mitigation Incorporation Less Than Significant Impact No Impact

The project site is located in the South Coast Air Basin (SCAB), which is within the jurisdiction of the South Coast Air Quality Management District (SCAQMD). According to the SCAQMD Guidelines, to be consistent with the Air Quality Management Plan (AQMP), a project must conform to the local General Plan and must not result in or contribute to an exceedance of the City's projected population growth forecast.

Project dredging and dewatering procedures would not generate population growth, as the project does not involve residential development or development that would facilitate population growth. Therefore, the project would not contribute to an exceedance of the City's projected population growth forecast. Furthermore, the project does not conflict with the City's General Plan and essentially consists of maintenance of an existing recreational resource. As a result, no impacts associated with conflicts to the adopted air quality management plan would occur.

b. Would the project violate any air quality standard or contribute substantially to an existing or projected air quality violation?

- Potentially Significant Impact Less Than Significant with Mitigation Incorporation Less Than Significant Impact No Impact

The SCAB is in non-attainment for the federal 8-hour ozone standard, the State 1-hour ozone standard, the federal 24-hour PM₁₀ standard, and the State 24-hour and annual PM₁₀ standards. The SCAB is designated as in attainment or unclassified for all other federal and State ambient air quality standards. The ozone precursors VOC and NO_x, in addition to fine particulate matter (PM_{2.5} and PM₁₀), are the pollutants of primary concern for projects located in the SCAQMD. Based on SCAQMD thresholds, a project would have a significant adverse impact on regional air quality if it generates emissions exceeding SCAQMD adopted thresholds (See Table 1). It should be noted that operational thresholds are not included since the project would only result in temporary emissions associated with dredging and dewatering activities, and would not generate any long-term or permanent operational emissions such as those that would result from additional traffic trips or permanent emission-generating equipment.

As indicated above, the project would emit temporary construction emissions during implementation. Dredging, dewatering, and truck trips would all create emissions that would contribute to the existing air quality conditions in the region. Emissions associated with dredging activities come from engine emissions as opposed to dust; the dewatering phase has a low potential for particulate matter (PM) dust emissions and wind erosion due to the self contained equipment being used and to the wet (submerged) nature of the soils that would be disturbed. Truck trips hauling dewatered soils to area landfills are also potential sources for temporary PM emissions. It should be noted that truck trips would occur on an existing paved parking lot and as such would not result in significant dust entrainment. Dredging activities will be limited to eight hours per day.

Temporary construction emissions were estimated using two models and sources due to the type of project. The dredging emission factors were supplied from the California Air Resource Board (CARB) off-road 2007 emissions factors software. A 750 horsepower (hp) dredge diesel engine was modeled, even though the one used for the project will likely be smaller, to provide a conservative approach. Dewatering emissions factors for the 25 hp gas generator proposed to be used for the project were taken from the SCAQMD *Off-Road Mobile Source Emission Factors (2007)*. Emissions factors (lbs/hr) for both dredging and dewatering activities were then multiplied by the eight-hour working day for the proposed project. Truck and loading activities for the proposed project were estimated using ARB's URBEMIS 2007 v.9.2.4 computer model (See Appendix A for air quality data). The total dredged volume of 26,867 cubic yards was used for haul volume. The model also includes worker trip emissions.

Table 1 shows the maximum daily construction emissions that would result from the proposed project in comparison to SCAQMD construction emission thresholds. As indicated in Table 1, emissions generated by the implementation of the proposed project would be below SCAQMD regional thresholds. Therefore, impacts would be less than significant and no further environmental analysis is necessary.

Table 1
Maximum Daily Construction Emissions (pounds per day)

Emission Source	ROG	NO _x	CO	PM	SO _x
Dredging	2.49	27.27	8.74	0.97	0.03
Dewatering	0.18	1.10	0.59	0.05	0.01
Truck Trips and Loading	1.83	19.69	8.86	0.99	0.02
Total Emissions	4.50	48.06	17.66	2.01	0.06
SCAQMD Thresholds (peak day)	75	100	550	150	150
Exceed SCAQMD Thresholds?	No	No	No	No	No

Note: The dredging and dewatering phases occur during the same period of time

Source: URBEMIS 2007 v9.2.4 (See Appendix A for model results); SCAQMD CEQA Air Quality Handbook, 1993; CARB Off-Road 2007; SCAQMD Off-road Mobile Source Emission Factors, 2007.

c. Would the project result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors)?

- Potentially Significant Impact
 Less Than Significant with Mitigation Incorporation
 Less Than Significant Impact
 No Impact

Please see Sections III. (a) and (b) above for discussion.

d. Would the project expose sensitive receptors to substantial pollutant concentrations?

- Potentially Significant Impact
 Less Than Significant with Mitigation Incorporation
 Less Than Significant Impact
 No Impact

Certain population groups are considered particularly sensitive to air pollution. Sensitive receptors consist of land uses that are more likely to be used by these population groups. Sensitive receptors include health care facilities, retirement homes, school and playground facilities, and residential areas. The nearest sensitive receptors to the project activities are the hotel located adjacent to the project north of Dock E and the mobile home park located to the northwest of Dock I. The hotel and the mobile homes are located approximately 150 feet and 170 feet away from the closest potential locations of dredging operations, respectively. As indicated above, construction emissions would not exceed SCAQMD thresholds, and would therefore not subject sensitive receptors to significant pollutant concentrations. Impacts related to exposure of sensitive

receptors to substantial pollutant concentrations would be less than significant and no further environmental analysis is necessary.

e. Would the project create objectionable odors affecting a substantial number of people?

- Potentially Significant Impact Less Than Significant with Mitigation Incorporation Less Than Significant Impact No Impact

Odors associated with implementation of the proposed project would be generated by the operation of heavy-duty equipment during the dredging and dewatering phases. Odors associated with the operation of the machinery would be similar to those of diesel machinery which includes the smells of oil or diesel fuels. These odors would be limited to the time that construction equipment is operating. In addition, due to the distance of the nearby receptors, odors would likely disperse and would be less than significant.

Odors typically associated with dredging or dewatering occur when decaying organic material comes in contact with air. Dredging activities are not likely to expose material to air because the dredged material would be transported to the dewatering system through a closed tube. Because the dewatering equipment proposed for project use is capable of instantaneously dewatering dredged materials, the potential for decaying organic matter to result in odor issuance is significantly reduced. Furthermore, haul trucks are proposed to be staged so as to quickly remove the dewatered material from the project site. Therefore, impacts associated with odors would be less than significant and no further environmental analysis is necessary.

f. Would the project generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment, based on any applicable threshold of significance?

- Potentially Significant Impact Less Than Significant with Mitigation Incorporation Less Than Significant Impact No Impact

The project will generate some emissions of greenhouse gases, primarily through dredging vehicle and equipment exhaust emissions, throughout the dredging activities. At present, there are no federal, State or local emissions thresholds established for greenhouse gases such as carbon dioxide. However, the project would not create any long-term on-site stationary sources and would not establish any new growth-inducing land uses. The proposed project involves maintenance dredging for the Cerritos Bahia Marina to maintain sufficient water depth for marina operations. The project's contribution to global climate change in the form of greenhouse gas emissions is therefore limited to

dredging/construction vehicle and equipment emissions. The project would not result in any new, ongoing sources of greenhouse gas emissions. Therefore, the project's contribution to greenhouse gas emissions of global climate change is less than significant.

g. Would the project conflict with any applicable plan, policy or regulation of an agency adopted for the purpose of reducing the emissions of greenhouse gases?

- Potentially Significant Impact Less Than Significant with Mitigation Incorporation Less Than Significant Impact No Impact

See Section III. (f) above for discussion. The project would not establish any new plans, policies or regulations that would conflict with any federal, State or local plans, policies or regulations intended to reduce greenhouse gas emissions.

Sources

California Air Resources Board. Off-road 2007 software. 2007.

California Air Resources Board. URBEMIS 2007 v.9.2.4 software. 2007.

Southern California Air Quality Management District. *Off-road Mobile Source Emission Factors*. 2007.

Southern California Air Quality Management District. *CEQA Air Quality Handbook*. 1993

IV. BIOLOGICAL RESOURCES

The following discussion is primarily derived from the *Eelgrass Survey and Draft Mitigation Plan, Cerritos Bahia Marina Maintenance Dredging Project* prepared by Tetra Tech, November 2008 (See Appendix B).

The project area consists of 7.9 acres of vegetated and non-vegetated shallows, of which 3.9 acres below the existing Bahia Marina docks and in the fairways between the docks would be subject to dredging. Of this 3.9 acres, 1.2 acres is currently vegetated as eelgrass beds, with the remainder comprised of unvegetated, unconsolidated soft bottom with an approximate 50/50 mix of sand and mud. Eelgrass (*Zostera marina*) is a prolific primary producer (i.e., converts sunlight to energy) that supports diverse and distinct groups of species, provides critical nourishment to herbivores and detritivores (animals that eat partly decomposed organic material), and affects chemical and physical processes in coastal waters. Eelgrass grows in a range of environmental conditions, with hydrodynamic factors (such as tidal current speed, water depth, and

exposure to waves) determining the character of eelgrass habitat. Waves and currents in high-energy, shallow waters move seafloor sediments, and eelgrass grows and migrates with the moving sand, forming linear bands. Sheltered, low-energy embayments, such as the project site, can be completely covered by a contiguous eelgrass bed. Light penetration in the water column is also important to eelgrass growth, with eelgrass generally growing denser and deeper in clear water. Bed size and density may influence ecological functions of eelgrass, but whether in a dense meadow or sporadic individual stands, eelgrass is an essential part of coastal ecosystems and its presence indicates the overall environmental quality of coastal waters. (Wilbur 2009.)

Eelgrass forms a complex underwater landscape, with long, narrow leaves floating and swaying in the water column, tangled roots anchoring the plant to the seafloor, and rhizomes connecting one plant to the next. The bright green leaves of eelgrass are frequently covered by an assemblage of algae and invertebrates whose habitat needs are satisfied by an individual leaf. Eelgrass leaves naturally break away from the root system every autumn, which accumulate on the shore and provide important ecological services. Piles of eelgrass beach wrack shelters abundant insect and amphipod communities that are critical prey for shorebirds. Not only is wrack important foraging habitat, it captures and holds sand and other sediment, helping to reduce beach erosion. Most detached leaves, however, do not reach the shore. They sink to the seafloor creating a detritus soup that is fundamental to the ocean's ecosystem and is used by deposit feeders and exported to other biological communities. Eelgrass also contributes to chemical and physical processes of coastal waters. Eelgrass produces oxygen, absorbs nutrients and pollutants, and improves water quality. Leaves slow water movement and roots stabilize sediments, promoting sediment deposition and minimizing shoreline erosion. (Wilbur 2009.)

The upland portion of the project site where dewatering and spoils management would occur is located within the parking lot of the Marina, which is fully paved and lacks any landscaping. Dredge and return water pipes would cross through a barren dirt area between the Marina and the parking lot.

a. Would the project have a substantial adverse impact, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?

- Potentially Significant Impact Less Than Significant with Mitigation Incorporation Less Than Significant Impact No Impact

The Los Alamitos, Seal Beach, and Long Beach USGS 7.5-minute quadrangles were queried using California Department of Fish and Game's (CDFG's) California Natural Diversity Data Base (CNDDB) (CDFG 2009 [updated May 30,

2009]) to indicate the nearest location of any potential special-status species, plant communities, and critical habitat in relation to the project site, which lies more or less in the center of these three quadrangles. This database search was conducted to determine the likelihood for special-status species tracked by CDFG to occur at the project site. The potential for special-status species to occur on-site is based on the proximity of the site to tracked occurrences, known geographic ranges, surrounding land uses, and on-site habitat suitability. The literature review included a search of CDFG's *Special Animals List* (CDFG 2008).

Eighteen (18) special-status plant species are tracked within the three quads; however, the special-status plant species tracked in the vicinity primarily require upland and habitats such as marshes, swamps, coastal salt marshes, coastal dunes, and coastal bluff scrub and have a very low potential of occurring within the subtidal habitat on-site. Therefore, no impacts are expected to occur to any special-status plant species as a result of the proposed project.

Twenty-eight (28) special-status wildlife species are also tracked within the three quadrangles. Thirteen (13) of the 28 special-status wildlife species tracked in the vicinity primarily require habitats such as freshwater aquatic habitats, riparian forest, grassland, and coastal sage scrub. The remaining 15 special-status wildlife species with potential of occurring at the project site are listed below in Table 2.

Table 2
Special-Status Wildlife Species with Potential of Occurring Onsite

Scientific Name	Common Name	Global Rank	State Rank	Federal Listing	State Listing	CDFG	Required Habitat	Potential Onsite
<i>Invertebrates</i>								
<i>Cicindela gabbii</i>	Western tidal-flat tiger beetle	G4	S1	-	-	-	Estuaries and mudflats along coast of southern California. Found on dark-colored mud in the lower zone; occasionally found on dry saline flats of estuaries.	Unlikely, but possible along fringe of Marina
<i>Cicindela hirticollis gravida</i>	Sandy beach tiger beetle	G5T2	S1	-	-	-	Areas adjacent to non-brackish water along coast of California. Clean, dry, light-colored sand in upper zone. Subterranean larvae prefer moist sand not affected by wave action.	Unlikely, but possible along fringe of Marina
<i>Cicindela latesignata latesignata</i>	Western beach tiger beetle	G4T1T2	S1	-	-	-	Mudflats and beaches in coastal southern California.	Unlikely, but possible along fringe of Marina
<i>Cicindela senilis frosti</i>	Senile tiger beetle	G4T1	S1	-	-	-	Inhabits marine shoreline, from central California coast south to salt	Unlikely, but possible along fringe of Marina

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Scientific Name	Common Name	Global Rank	State Rank	Federal Listing	State Listing	CDFG	Required Habitat	Potential Onsite
							marshes of San Diego. Dark-colored mud in lower zone & dried salt pans in the upper zone.	
<i>Panoquina errans</i>	Wandering skipper	G4G5	S1	-	-	-	Southern California coastal salt marshes. Requires moist saltgrass for larval development.	Unlikely; no saltgrass at site
<i>Rynchops niger</i>	Black skimmer	G5	S1S3	-	-	Special Concern	Nests on gravel bars, low islets, and beaches, in unvegetated sites.	May forage along the channel adjacent to the dredge area
<i>Trigonoscuta dorothea dorothea</i>	Dorothy's El Segundo Dune weevil	G1T1	S1	-	-	-	Coastal sand dunes in Los Angeles County.	Unlikely; no suitable habitat
<i>Tryonia imitator</i>	Mimic tryonia	G2G3	S2S3	-	-	-	Inhabits coastal lagoons, estuaries and salt marshes, from Sonoma County south to San Diego County. Found only in permanently submerged areas with herbaceous vegetation in variety of sediment types.	More typically found in less saline environments, but could potentially occur within site.
Birds								
<i>Charadrius alexandrinus nivosus</i>	Western snowy plover	G4T3	S2	Threatened	-	Special Concern	Sandy beaches, salt pond shores of large alkali lakes. Friable soils for nesting.	Unlikely; may forage along edge
<i>Passerculus sandwichensis beldingi</i>	Belding's savannah sparrow	G5T3	S3	-	Endangered	-	Coastal salt marshes, from Santa Barbara south through San Diego County. Nests in <i>Salicornia</i> on and about margins of tidal flats.	No suitable nesting habitat; may occasionally forage along rocks at edge of Marina
<i>Pelecanus occidentalis californicus</i>	California brown pelican	G4T3	S1S2	Endangered	Endangered	-	Colonial nester on coastal islands just outside surfline. Nests on small coastal islands affording immunity from attack by ground-dwelling predators.	Frequently seen roosting within marinas and on docks, forage in main channel
<i>Rallus longirostris levipes</i>	Light-footed clapper rail	G5T1T2	S1	Endangered	Endangered	-	Found in salt marshes traversed by tidal sloughs, where cordgrass and pickleweed are dominant vegetation. Requires dense growth for nesting and cover; feeds on molluscs and crustaceans.	Unlikely, no suitable habitat
<i>Sternula antillarum browni</i>	California least tern	G4T2T3Q	S2S3	Endangered	Endangered	-	Nests along the coast from San Francisco Bay south to northern Baja California.	Moderate potential to forage in project area

Scientific Name	Common Name	Global Rank	State Rank	Federal Listing	State Listing	CDFG	Required Habitat	Potential Onsite
							Colonial breeder on sand beaches, alkali flats, land fills, or paved areas.	
Mammals								
<i>Microtus californicus stephensi</i>	South coast marsh vole	G5T1T2	S1S2	-	-	Special Concern	Tidal marshes in Los Angeles, Orange and Southern Ventura Counties.	Unlikely, no suitable habitat
<i>Sorex ornatus salicornicus</i>	Southern California saltmarsh shrew	G5T1?	S1	-	-	Special Concern	Coastal marshes in Los Angeles, Orange and Ventura Counties. Requires dense vegetation and woody debris for cover.	Unlikely, no suitable habitat

California brown pelican and California least tern have a moderate to high potential of occurring on-site as pelicans can be frequently found loafing and bathing in marina waters and roosting on docks, while least tern frequently forage in the open channels of marinas. However, no suitable nesting habitat is present on-site for the California brown pelican or California least tern. Given that the project site lacks the habitat typically associated with most special-status wildlife species tracked in the vicinity of the project site, the remaining soils surrounding the project site are disturbed to some degree by human influences, and there is significant development in the site vicinity, it is unlikely that any special-status wildlife species, or any state or federally listed species, would be significantly impacted by the proposed project. In addition, implementation of the proposed project is not expected to affect any nesting birds protected by CDFG Code 3513, which provides protection to almost all native bird species listed under the Migratory Bird Treaty Act (MBTA). Furthermore, to avoid coinciding with the California brown pelican and California least tern foraging season from March 15 through September 1, the applicant has agreed not to undertake any project dredging or disposal activities during this foraging season time period. The potential impacts to special-status wildlife species and nesting birds would therefore be less than significant and no further environmental analysis is necessary.

b. Would the project have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?

- Potentially Significant Impact
 Less Than Significant with Mitigation Incorporation
 Less Than Significant Impact
 No Impact

No riparian habitat and no federally-designated critical habitat exists on-site; however, the November 2008 Eelgrass Survey (Tetra Tech, Inc. 2008) indicate

that patches and beds of eelgrass occur throughout the marina, largely within the fairways. Eelgrass bed habitat has been identified as a sensitive marine resource by the California Department of Fish and Game, the National Marine Fisheries Service, and the U.S. Fish and Wildlife Service. Eelgrass beds serve as refuges, foraging areas, and nursery habitats for various coastal and bay invertebrates, fishes, and birds.

The total area of eelgrass found within the Marina survey area was 4,928 m² (1.2 ac). Eelgrass was found at depths between -2 ft mean lower low water (mllw) and -8 ft mllw. Eelgrass predominantly occurred at -6 ft mllw (84% of eelgrass in the study area) and shallower. Because most of the eelgrass is located within the fairways in shallow water that impedes boat access to the docks, the proposed project would result in a loss of approximately 98% of the existing on-site eelgrass beds, with only a small amount of eelgrass left along the shoreline within the project site. The current study indicates that in this area the eelgrass does not grow below -8 ft mllw, therefore to allow for revegetation of the fairways, the depth of dredging is proposed to be limited to a depth of -6 ft mllw instead of the original Marina design depth of -8 ft mllw. Regardless, the temporary removal of the eelgrass bed habitat would be potentially significant.

The loss of eelgrass habitat as a result of marina and harbor maintenance dredging is addressed through the Southern California Eelgrass Mitigation Policy (SCEMP). This policy requires a minimum in kind replacement at a ratio of 1.2:1 and a five year monitoring requirement to determine success. Mitigation Measure BIO-1 below incorporates this policy and would reduce the impact caused by the project to a less than significant level.

Mitigation Measure. Mitigation Measure BIO-1 is required to avoid potentially significant impacts to sensitive eelgrass bed habitat on-site.

BIO-1 Restore Eelgrass Bed Habitat. Impacts to eelgrass shall be mitigated in accordance with the Southern California Eelgrass Mitigation Policy (SCEMP Rev. 11). Tetra Tech, Inc. prepared the *Eelgrass Survey and Draft Mitigation Plan for the Maintenance Dredging Project* (November 2008) to discuss the methods and schedule for planting eelgrass at Cerritos Bahia Marina and post-planting monitoring as required by the SCEMP. The Mitigation Plan includes the following information, as relevant to the eelgrass mitigation sites: baseline conditions, location, transplant methods, transplant timing, success criteria, and a five year monitoring program. Monitoring the success of eelgrass mitigation shall be required for a period of five years. The SCEMP Rev. 11 is also included in Appendix A of Tetra Tech, Inc's (2008) Eelgrass Mitigation Plan.

The project proponent shall mitigate the loss of eelgrass in accordance with the SCEMP mitigation ratio of at least 1.2:1. A 1.4:1 mitigation ratio (totaling 6,789 m² of transplanted eelgrass) is recommended to provide extra eelgrass mitigation area to increase likelihood of success in meeting the 1.2 to 1 requirement at the end of the five-year monitoring period. The actual amount of eelgrass mitigation necessary will be determined by the difference in eelgrass area determined by comparing the pre-construction and post-construction surveys.

The following measures shall be conducted as part of the eelgrass mitigation:

- 1) A pre-construction eelgrass survey will be conducted of the entire Marina including the channel and opposite bank to the south. This survey will be conducted in accordance with the SCEMP (Revision 11) during the period of March through October and no more than 60 days prior to the commencement of any construction/dredging activities. Pre-construction survey results will be submitted to the National Marine Fisheries Service (NMFS) and the California Department of Fish and Game (CDFG).
- 2) A qualified project marine biologist shall mark the positions of eelgrass beds with buoys prior to the initiation of any construction to minimize damage to eelgrass beds outside the construction zone.
- 3) The project marine biologist shall meet with the construction crews prior to dredging to review areas of eelgrass to avoid and to review proper construction techniques.
- 4) If barges and work vessels are used during construction, measures shall be taken to ensure that eelgrass beds are not impacted through grounding, propeller damage, or other activities that may disturb the sea floor. Such measures shall include speed restrictions, establishment of off-limit areas, and use of shallow draft vessels.
- 5) A post-construction survey will be conducted within 30 days of the completion of construction activities to determine the actual area of eelgrass affected for mitigation purposes. The amount of mitigation necessary will be determined by the difference between the pre-construction and post-construction surveys.
- 6) Eelgrass mitigation (transplant) will be initiated within 135 days of project inception.
- 7) An eelgrass transplant report will be completed following the transplant and monitoring surveys conducted at 6, 12, 24,

36, 48, and 60 months post-transplant. All monitoring work will be conducted during the active vegetative growth period and shall avoid the winter months of November through February. The project proponent shall ensure that project achievement of specific milestones and criteria for success, as directed in the SCEMP along with guidelines for remedial actions, are documented. If the success criteria are not met, construction of a Supplementary Transplant Area and monitoring for an additional 5 years may be required by the NMFS.

Significance after Mitigation. Implementation of Mitigation Measure BIO-1 would reduce impacts associated with eelgrass removal to a less than significant level.

c. Would the project have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?

- Potentially Significant Impact Less Than Significant with Mitigation Incorporation Less Than Significant Impact No Impact

The project site contains federally protected wetlands as defined by Section 404 of the Clean Water Act; however, the proposed work would be conducted under an existing permit issued to the City of Long Beach by the U.S. Army Corps of Engineers (Corps) (Craig Chalfant, Long Beach Development Services Department, June 23, 2009). All dredging activities associated with the proposed project would be conducted per the permit conditions required by the Corps to minimize substantial adverse effects on federally protected wetlands to a less than significant level and therefore no further environmental analysis is necessary.

d. Would the project interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?

- Potentially Significant Impact Less Than Significant with Mitigation Incorporation Less Than Significant Impact No Impact

Dredging of the Marina would temporarily disturb subtidal habitat (eelgrass bed). This aquatic habitat within the Marina is not located in any important fish or wildlife movement corridor or located in any identified native wildlife nursery site,

though the eelgrass beds are likely to provide this resource. Mobile marine organisms such as fish are anticipated to avoid the immediate vicinity of construction activities when operations are taking place; however, fish are expected to return to the project area in the absence of dredging activities, especially at night, and subsequent to project completion.

The project would be using a Rapid Dewatering System that separates dredged particles from the water. The return water is then piped to a clarifier and finally pumped back to the Marina. This procedure would also reduce impacts to fish resources on-site by improving the work area water quality during operations. Therefore, the temporary impacts to local fish and wildlife that would result from the proposed project would be less than significant and no further environmental analysis is necessary.

e. Would the project conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?

- Potentially Significant Impact Less Than Significant with Mitigation Incorporation Less Than Significant Impact No Impact

The proposed project would not conflict with any local policies or ordinances protecting biological resources. The Conservation Element of the City of Long Beach General Plan identifies a variety of important biological resources including marine vegetation and wildlife and calls for their conservation and protection. No policies specifically apply to eelgrass or eelgrass habitat. Mitigation and habitat protection as part of the project and mitigation strategy would be consistent with implied City goals related to protection of marine resources. No further environmental analysis is therefore necessary.

f. Would the project conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?

- Potentially Significant Impact Less Than Significant with Mitigation Incorporation Less Than Significant Impact No Impact

The proposed project site is not within the area of any adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan. The National Marine Fisheries Service's Southern California Eelgrass Mitigation Policy does apply to the project; however, the proposed project and mitigation strategy are consistent with

this state policy, as discussed above and noted in Mitigation Measure BIO-1. No further environmental analysis is therefore necessary.

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V. CULTURAL RESOURCES

Evidence indicates that primitive peoples inhabited portions of the City as early as 5,000 to 2,000 B.C. Much of the remains and artifacts of these ancient peoples were destroyed during the first century of the City's development. The remaining archaeological sites are located predominantly in the southeast sector of the City.

a. Would the project cause a substantial adverse change in the significance of a historical resource as defined in Section 15064.5?

- Potentially Significant Impact Less Than Significant with Mitigation Incorporation Less Than Significant Impact No Impact

There are no designated historic buildings on the project site and the project is not located in a historic district. Project implementation would have no impact on any historic resources in the City. No further environmental analysis is necessary.

b. Would the project cause a substantial adverse change in the significance of an archaeological resource pursuant to Section 15064.5?

- Potentially Significant Impact Less Than Significant with Mitigation Incorporation Less Than Significant Impact No Impact

No archaeological resources are known to exist in or around the project site. The probability that project implementation could impact any archaeological deposits is considered to be very low, given that the project site has been previously disturbed by past dredging activities. Any excavation related to this project would not be expected to occur at a lower depth than previous dredging activities. If any previously undiscovered cultural materials are encountered during project dredging, all dredging work would be required under State law to stop until a qualified archaeologist can evaluate the nature and significance of any such find. Impacts related to archaeological resources would therefore be less than significant.

c. Would the project directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?

- Potentially Significant Impact Less Than Significant with Mitigation Incorporation Less Than Significant Impact No Impact

The project does not involve excavation that would extend deep enough into the marina soils to reach native sediments that are old enough to contain fossils. In addition, the project site does not contain unique geologic features. Impacts to paleontological resources or unique geological features are therefore not anticipated, and no mitigation is necessary.

d. Would the project disturb any human remains, including those interred outside of formal cemeteries?

- Potentially Significant Impact Less Than Significant with Mitigation Incorporation Less Than Significant Impact No Impact

Due to past ground disturbances (i.e. previous maintenance dredging) and the fully urbanized character of the surrounding area, no conditions exist that

suggest human remains are likely to found on the project site. It is not anticipated that project implementation would disturb any human remains, included those interred outside of formal cemeteries. If human remains are found, such remains would be subject to the provisions of California Public Resources Health and Safety Code Section 7050.5-7055. As required by State law, the requirements and procedures set forth in Section 5097.98 of the California Public Resources Code would be implemented, including notification of the County Coroner, notification of the California Native American Heritage Commission (NAHC) and consultation with the individual(s) identified by the NAHC as the "most likely descendent." If human remains are found during any dredging activities, work must stop in the vicinity of the find as well as any area that is reasonably suspected until the County Coroner has been called out and the remains have been investigated and appropriate recommendations have been made for the treatment and disposition of the remains. Following compliance with State regulations, which detail the appropriate actions necessary in the event human remains are encountered, impacts would be considered less than significant.

VI. GEOLOGY AND SOILS

a. Would the project expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:

- i. **Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42.**

Potentially Significant Impact Less Than Significant with Mitigation Incorporation Less Than Significant Impact No Impact

Per Plate 2 of the Seismic Safety Element of the General Plan, the most significant fault system in the City is the Newport-Inglewood fault zone. This fault zone runs in a northwest to southeast angle across the southern half of the City. A portion of the Newport-Inglewood Fault Zone is located within one mile of the project site. However, project implementation would not expose people or structures to potentially substantial adverse effects involving fault rupture since the project does not involve the use or construction of any buildings, and dredging activities are only temporary. Moreover, the dredging is being conducted at a superficial depth, which will not aggravate the Fault Zone. Project dredging and operations are not anticipated to result in any significant impacts related to fault rupture and no further analysis is necessary.

ii. Strong seismic ground shaking?

- Potentially Significant Impact Less Than Significant with Mitigation Incorporation Less Than Significant Impact No Impact

The Newport-Inglewood fault zone could create substantial ground shaking if a seismic event occurred along that fault. Similarly, a strong seismic event on any other fault system in Southern California has the potential to create considerable levels of ground shaking throughout the City. However, numerous variables determine the level of damage to a specific location. Given these variables, it is not possible to determine the level of damage that may occur on the site during a seismic event. However, the project would not increase the likelihood of an earthquake or increase the severity of earthquake induced seismic ground shaking. The project would not involve the use or construction of any buildings and therefore project impacts would be less than significant. Please see Section VI. (a)(i) above for further discussion.

iii. Seismic-related ground failure, including liquefaction?

- Potentially Significant Impact Less Than Significant with Mitigation Incorporation Less Than Significant Impact No Impact

The project site is located within an area of Long Beach where liquefiable materials are mapped and/or where liquefaction has occurred in the past. However, project implementation would not expose people or structures to potentially substantial adverse effects involving seismic-related ground failure since the project does not involve the use or construction of any buildings.

iv. Landslides?

- Potentially Significant Impact Less Than Significant with Mitigation Incorporation Less Than Significant Impact No Impact

Per the Seismic Safety Element, the City is relatively flat and characterized by slopes that are not high (less than 50 feet) or steep (generally sloping flatter than 1-1/2:1, horizontal to vertical). The State Seismic Hazard Zone map of the Long Beach Quadrangle indicates that the lack of steep terrain (except for a few slopes on Signal Hill and Reservoir Hill) results in only about 0.1 percent of the City lying within the earthquake-induced landslide zone for this quadrangle. Adherence to all applicable seismic codes and requirements during project implementation would reduce to a less than significant level any impacts related

to landslides that could result from project dredging. No further environmental analysis is required.

b. Would the project result in substantial soil erosion or the loss of topsoil?

- Potentially Significant Impact Less Than Significant with Mitigation Incorporation Less Than Significant Impact No Impact

There is potential for some soil erosion to occur at the site during implementation of the project. Large volumes of soils and sediment will be dredged and excavated, which could expose new areas of soil to water erosion. However, after the completion of dredging and slope recontouring, erosion potential will be minimal. The project would be required to adhere to all applicable construction standards regarding erosion control, including Best Management Practices (BMPs), to minimize runoff and erosion impacts from dredging activities. Project impacts would therefore be less than significant. No further environmental analysis is necessary.

c. Would the project be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse?

- Potentially Significant Impact Less Than Significant with Mitigation Incorporation Less Than Significant Impact No Impact

Please see Section VI. (b) above for discussion. Per the Long Beach General Plan Seismic Safety Element, the project site is not located in an area of slope instability. Soil instability from project implementation would not be a significant consideration since the project consists of maintenance dredging of a marina and no structures would be constructed for human occupancy.

d. Would the project be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property?

- Potentially Significant Impact Less Than Significant with Mitigation Incorporation Less Than Significant Impact No Impact

Per the City's Seismic Safety Element, the City is divided into four predominant soil profiles, designated as Profiles A through D. The project site is located in

Profile B, which is composed of sandy and clayey alluvial materials composed of interlayered lenses of cohesionless and cohesive material overlying the shallow Gaspar or Recent aquifers. The near surface soils are characterized as consisting of alternating layers of cohesionless and cohesive soils. The cohesionless soils consist generally of silty sand and sandy silt and are typically loose to medium dense. The cohesive soil layers are generally clayey silts and silty clays of soft to stiff consistency. Therefore, the project site is not characterized by more expansive types of soils and impacts would be less than significant.

e. Would the project have soils incapable of adequately supporting the use of septic tanks or alternative waste water disposal systems where sewers are not available for the disposal of wastewater?

- Potentially Significant Impact Less Than Significant with Mitigation Incorporation Less Than Significant Impact No Impact

The entire City is served by an existing sewer system and therefore no need exists for septic tanks or any other alternative waste water disposal systems. No further environmental analysis is required.

VII. HAZARDS AND HAZARDOUS MATERIALS

a. Would the project create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?

- Potentially Significant Impact Less Than Significant with Mitigation Incorporation Less Than Significant Impact No Impact

The dried sediments extracted from the dredging of the Cerritos Bahia Marina are to be used as daily cover at a landfill. The concentrations of contaminants contained in the sediments are unlikely to pose a health risk to humans or the environment when disposed as landfill cover. The concentrations of contaminants as detected in the five soil samples collected from the Marina sediments (see Appendix C) and analyzed by TetraTech were compared to the published *Screening Levels for Chemical Contaminants*, Oak Ridge National Laboratory, 2008. The screening levels listed in this document use a health risk approach to determine whether contaminants in soils under both residential and industrial settings would pose a health risk to residential or industrial occupants of a property. Not all chemicals that were identified in the TetraTech soil samples have a defined Screening Level. However, where there is a defined screening level, such as for pesticides, metals, PCBs, and PAHs, the

concentrations detected in the samples obtained from the Marina were below the listed Screening Levels. The exception to this is the natural metal arsenic. The concentration of arsenic in soil exceeded the Screening Level for arsenic in industrial or residential soil. Naturally occurring arsenic concentrations in California soils exceed the arsenic Screening Level. The State of California Department of Toxic Substances Control (DTSC) will normally allow arsenic concentrations of up to 12 milligrams per kilogram (mg/kg) to remain at public school sites in California. The concentration of arsenic detected in the five samples analyzed from the Marina ranged from 4.15 mg/kg to 15.56 mg/kg. One sample had a concentration of over 12 mg/kg. However, because the soil is to be used as daily landfill cover, it is unlikely to pose a health risk to landfill operators.

The dredging will create a temporary re-suspension of sediments within the water column in the area dredged. Most of the sediments will settle back onto the sea floor within two hours of disturbance. Thus, the increase in turbidity created by the dredging operation will be temporary. The use of the dredged material as landfill cover is not expected to create a health risk to workers at the landfill and is expected to be within the allowable concentrations of contaminants that the landfill can accept. Therefore, negative impacts associated with the dredging would be less than significant and no further environmental analysis is necessary.

b. Would the project create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?

- Potentially Significant Impact Less Than Significant with Mitigation Incorporation Less Than Significant Impact No Impact

Please see Section VII. (a) above for discussion.

c. Would the project emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one quarter-mile of an existing or proposed school?

- Potentially Significant Impact Less Than Significant with Mitigation Incorporation Less Than Significant Impact No Impact

Please see Section VII. (a) above for discussion. The project site is not located within one quarter mile of an existing or proposed school.

d. Would the project be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?

- Potentially Significant Impact Less Than Significant with Mitigation Incorporation Less Than Significant Impact No Impact

The project is not located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5, and would therefore not create significant hazard to the public or environment. No further environmental analysis is needed.

e. For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard for people residing or working in the project area?

- Potentially Significant Impact Less Than Significant with Mitigation Incorporation Less Than Significant Impact No Impact

The project site is located more than five miles southeast of the Long Beach Airport. Dredging of the existing project site would not impact airport operations, alter air traffic patterns or in any way conflict with established Federal Aviation Administration (FAA) flight protection zones. No further environmental analysis is necessary.

f. For a project within the vicinity of a private airstrip, would the project result in a safety hazard for people residing or working in the project area?

- Potentially Significant Impact Less Than Significant with Mitigation Incorporation Less Than Significant Impact No Impact

There are no private airstrips located within or adjacent to the City. No further environmental analysis is required.

g. Would the project impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?

- Potentially Significant Impact Less Than Significant with Mitigation Incorporation Less Than Significant Impact No Impact

The project would not create any structures or alter any travel routes that could potentially impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan. No further environmental analysis is required.

h. Would the project expose people or structures to a significant risk of loss, injury or death involving wild land fires, including where wild lands are adjacent to urbanized areas or where residences are intermixed with wild lands?

- Potentially Significant Impact Less Than Significant with Mitigation Incorporation Less Than Significant Impact No Impact

The City is a highly urbanized community and there are no wild lands in the project site vicinity. There would be no risk of exposing people or structures to a significant risk of loss, injury or death involving wild land fires. No further environmental analysis is required.

VIII. HYDROLOGY AND WATER QUALITY

The Federal Emergency Management Agency (FEMA) produced a series of Flood Insurance Rate Maps (FIRMs) designating potential flood zones (based on the projected inundation limits for breach of the Hansen Dam and that of the Whittier Narrows Dam, as well as the 100-year flood as delineated by the U.S. Army Corps of Engineers) which was adopted in July 1998.

a. Would the project violate any water quality standards or waste discharge requirements?

- Potentially Significant Impact Less Than Significant with Mitigation Incorporation Less Than Significant Impact No Impact

The proposed project involves maintenance dredging of the Cerritos Bahia Marina. Dredging will disturb the submarine sediments and re-suspend sediments to some extent. The finer grained that the sediments are, the greater the potential for re-suspension to occur and the longer such sediments would remain re-suspended. The primary potential repercussions of the project with respect to water quality involve disturbance of sediments and associated

temporary increase in turbidity. In addition, pollutants contained in the re-suspended sediments may come in contact with any sensitive receptors present. The effects of dredging on local water quality would depend upon the nature of disturbed sediments and whether or not elevated concentrations of contaminants are present.

Tetra Tech, Inc. collected five soil samples from the Marina on August 26, 2008. The samples were collected using a vibra-core sampler to a depth of two feet beyond the design depth of -8 feet mean lower low water (mllw). The sediment samples were analyzed for the following:

- Grain size
- General chemistry
- Trace metals
- Pesticides
- Polynuclear aromatic hydrocarbons (PAHs)
- Polychlorinated biphenyls (PCBs)
- Phthalates
- Phenols and organotins

The Tetra Tech Sediment Summary report can be found in Appendix C.

The grain size analysis identified that sand sized grains are the predominant sediment size, comprising 57.3% to 80.1% of the sediment sampled. The percent clay in the five samples analyzed comprises 3.76% to 8.75% of the sediments. The amount of silt in the five samples ranged from 16.14% to 35.47% of the sediment. The majority of the material is comprised of silt and sand sized grains. These sized grains settle out of the water column relatively fast compared to clay sized grains. Sand sized grains will settle out of water in a timeframe of less than 2 minutes. Silt sized grains will settle out of water in about two hours. Clay sized grains will stay suspended in water for many hours and will settle out of water only when the water is quite still. Because the grain sizes measured at the Cerritos Bahia Marina are comprised of between 91.25% to 96.24% silt and sand, over 90% of the re-suspended sediments will be re-settled within two hours of disturbance. Because over 90% of suspended sediments will settle out of the water column within two hours of disturbance, dredging-derived increases in turbidity will be temporary.

The general chemistry analysis considered oil and grease, percent solids, nitrogen, organic carbon, phosphorous, sulfides, and total recoverable petroleum hydrocarbons (TRPH). Other analyses performed identified total metals, pesticides, PCBs, and other contaminants. These analyses detect naturally occurring substances, such as total metals, nitrogen, organic carbon, phosphorous and sulfides as well as man-made substances such as PCBs, pesticides, and PAHs. Most compounds were either not detected, within

naturally occurring background concentrations, or detected at low concentrations. In addition, the organotin Tributyltin was detected in all five samples.¹

The proposed dredging process uses a suction dredge to remove sediment from the Marina's fairways and under the docks, pumping the material through a pipeline to a dewatering unit and disposing of the material as landfill cover soil in an approved upland disposal facility via truck. Though this process has some potential to temporarily increase turbidity in the water and disperse pollutants, the proposed dredging system would create a slurry of dredged material and water that would be transported via a 10-inch diameter pipeline to an on-shore dewatering system. From there, sand and rocks would be separated and stockpiled, and a polymer would be added to the slurry to facilitate flocculation (separation of sediment from a fluid) of the remaining fine particles. These particles would then be separated from the water and stockpiled, while the remaining water would be clarified and returned to the Marina. By removing sediments that have detectable concentrations of contaminants, the dredging would generally improve water quality as pollutants contained in the sediments would be removed from the Marina. Moreover, the project would be subject to applicable Regional Water Quality Control Board (RWQCB) waste discharge monitoring requirements through the dredging operation, which are anticipated to entail twice daily monitoring of water quality and adherence to appropriate remedial procedures in the event that pollutant concentrations exceed levels allowed under dredging permit conditions.

The processing area for the dredged material would be located in the parking lot immediately north of the Marina. While stockpiled prior to transport to a disposal facility, material would have the potential to run off back into the Marina. However, the applicant has proposed to use dewatered dredge material to create a berm around the processing area to contain sediment. In addition, the applicant would be required to develop and implement a Stormwater Management Plan to eliminate sediment from escaping the processing area. This plan, which would have to comply with RWQCB requirements, would be required to include various Best Management Practices (BMPs) to control sediment runoff, such as silt fences, fiber rolls, gravel bag berms, and sandbag barriers. Implementation of these BMPs, in combination with applicant-proposed runoff control methods, would reduce impacts relating to runoff from the material processing area to a less than significant level.

The dried sediments extracted from the dredging are to be used as daily cover at a landfill. The concentrations of contaminants contained in the sediments are unlikely to pose a health risk to humans or the environment when disposed as landfill cover (See Section VII. (a) above for further discussion).

The dredging will create a temporary re-suspension of sediments within the water column in the area dredged. Most of the sediments will settle back onto the sea

¹ Tributyltin has been extensively used as a marine anti-biofouling agent.

floor within two hours of disturbance. Thus, the increase in turbidity created by the dredging operation will be temporary. The use of the dredged material as landfill cover is not expected to create a health risk to workers at the landfill and is expected to be within the allowable concentrations of contaminants that the landfill can accept. Therefore, water quality impacts and waste discharge impacts associated with the dredging would be less than significant and no further environmental analysis is necessary.

b. Would the project substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted)?

- Potentially Significant Impact Less Than Significant with Mitigation Incorporation Less Than Significant Impact No Impact

The proposed project involves maintenance dredging within the existing Cerritos Bahia Marina. This activity would not directly affect groundwater, nor would it increase demand for water or create impervious surface area. As such, it would have no impact with respect to recharge potential and no further environmental analysis is necessary.

c. Would the project substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on- or off-site?

- Potentially Significant Impact Less Than Significant with Mitigation Incorporation Less Than Significant Impact No Impact

The project site is Cerritos Bahia Marina and the proposed project involves maintenance dredging within this Marina. This activity would not affect surface runoff levels or direction, nor would it increase the potential for flooding or erosion. No impact would occur and no further environmental analysis is necessary.

d. Would the project substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on-or off-site?

- Potentially Significant Impact Less Than Significant with Mitigation Incorporation Less Than Significant Impact No Impact

Please see Section VIII. (c) above for discussion.

e. Would the project create or contribute runoff water which would exceed the capacity of existing or planned storm water drainage systems or provide substantial additional sources of polluted runoff?

- Potentially Significant Impact Less Than Significant with Mitigation Incorporation Less Than Significant Impact No Impact

Please see Section VIII. (a) above for discussion.

f. Would the project otherwise substantially degrade water quality?

- Potentially Significant Impact Less Than Significant with Mitigation Incorporation Less Than Significant Impact No Impact

Please see Section VIII. (a) above for discussion.

g. Would the project place housing within a 100-year flood hazard area as mapped on a Federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map?

- Potentially Significant Impact Less Than Significant with Mitigation Incorporation Less Than Significant Impact No Impact

The Cerritos Bahia Marina is within Los Cerritos Channel and is subject to tidal variations that could potentially create risks to people and property. The proposed project involves maintenance dredging with this existing Marina, which would not increase exposure of people, housing, or other property to risks associated with flooding. Thus, no impact would occur and no further environmental analysis is necessary.

h. Would the project place within a 100-year flood hazard area structures which would impede or redirect flood flows?

- Potentially Significant Impact Less Than Significant with Mitigation Incorporation Less Than Significant Impact No Impact

Please see Section VIII. (g) above for discussion.

i. Would the project expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam?

- Potentially Significant Impact Less Than Significant with Mitigation Incorporation Less Than Significant Impact No Impact

As noted above, the project site is subject to tidal variations. However, the Marina is not subject to flooding due to levee or dam failure. The proposed maintenance dredging project would not increase exposure to risks associated with levee or dam failure. No impact would occur and no further environmental analysis is necessary.

j. Would the project result in inundation by seiche, tsunami or mudflow?

- Potentially Significant Impact Less Than Significant with Mitigation Incorporation Less Than Significant Impact No Impact

A tsunami is a series of traveling ocean waves of extremely long length generated primarily by vertical movement on a fault (earthquake) occurring along the ocean floor. As a tsunami reaches the shallow waters of the coast, the waves slow down and the water can pile up into a wall 30 feet or more in height. The effect can be amplified where a bay, harbor or lagoon funnels the wave as it moves inland. Large tsunamis have been known to rise over 100 feet. Even a tsunami one to three feet in height can be very destructive and cause many deaths and injuries, especially within Port and harbor facilities.

The Cerritos Bahia Marina is within a designated tsunami hazard area. In addition, it could be vulnerable to a seiche (inland tsunami). Based on the historic record, the probability of a tsunami or seiche is low (City of Long Beach, *Natural Hazards Mitigation Plan*, 2004). Nevertheless, the Marina is potentially subject to hazards associated with both tsunamis and seiches. However, the proposed maintenance dredging project would not increase the severity of such risks as it would not add people or activities to the existing facility. No impact would occur and no further environmental analysis is necessary.

Sources

City of Long Beach, Natural Hazards Mitigation Plan, 2004.

Tetra Tech, Inc., Cerritos Bahia Sediment Sampling Results, August 2008.

Oak Ridge National Laboratory, Screening Levels for Chemical Contaminants, 2008.

IX. LAND USE AND PLANNING

a. Would the project physically divide an established community?

- Potentially Significant Impact Less Than Significant with Mitigation Incorporation Less Than Significant Impact No Impact

The maintenance dredging of the Cerritos Bahia Marina would not physically divide or in any way impact an established community. Beyond the temporary closure of up to two docks at a time during dredging activities, no changes to Marina uses and operations would occur from project implementation. No further environmental analysis is necessary.

b. Would the project conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to the general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect?

- Potentially Significant Impact Less Than Significant with Mitigation Incorporation Less Than Significant Impact No Impact

The project site is located in General Plan Land Use Designation (LUD) No. 7M Mixed Use District Residential District. This LUD district is intended for moderate to high-density uses in multi-purpose activity centers. The project site zoning district is Planned Development (PD) District 1, the "Southeast Area Development and Improvement Plan", Sub-area 15, with the use defined as commercial. The project site is not located in any historic district and there are no historic buildings on the project site. The project site is located in the Coastal Zone and is included within the Local Coastal Plan (LCP). The project would not conflict with any applicable land use plans. All dredging activities would be consistent with the LCP and would require a Local Coastal Development Permit for the storage of dredged materials in the parking lot. No further environmental analysis is necessary.

c. Would the project conflict with any applicable habitat conservation plan or natural communities conservation plan?

- Potentially Significant Impact Less Than Significant with Mitigation Incorporation Less Than Significant Impact No Impact

See Sections IX. (a) and (b) above for discussion. The City is highly urbanized environment characterized by in-fill development projects that recycle previously developed properties. No habitat conservation plan or natural communities conservation plan would be impacted by project implementation.

X. MINERAL RESOURCES

Historically, the primary mineral resources within the City of Long Beach have been oil and natural gas. However, oil and gas extraction operations have diminished over the last century as the resource has become depleted. Today, extraction operations continue but on a reduced scale compared to past levels.

a. Would the project result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?

- Potentially Significant Impact Less Than Significant with Mitigation Incorporation Less Than Significant Impact No Impact

The project site and surrounding properties are part of a fully urbanized area with only one known area where mineral resources of value or mineral extraction operations could potentially occur (i.e., land located south of the project site, which has wetlands characteristics). However, there are no mineral resource activities that would be altered or displaced by the project. No further environmental analysis is necessary.

b. Would the project result in the loss of availability of a locally-important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan?

- Potentially Significant Impact Less Than Significant with Mitigation Incorporation Less Than Significant Impact No Impact

Please see Section X. (a) above for discussion. The project site is not located in a mineral extraction operations area. The project does not involve a mineral

resource recovery site and therefore no impacts from project implementation would occur. No further environmental analysis is necessary.

XI. NOISE

Noise is defined as unwanted sound that disturbs human activity. Environmental noise levels typically fluctuate over time, and different types of noise descriptors are used to account for this variability. Noise level measurements include intensity, frequency, and duration, as well as time of occurrence.

Some land uses are considered more sensitive to ambient noise levels than other uses due to the amount of noise exposure and the types of activities involved. Residences, motels, hotels, schools, libraries, churches, nursing homes, auditoriums, parks and outdoor recreation areas are more sensitive to noise than are commercial and industrial land uses.

The City of Long Beach uses the State Noise/Land Use Compatibility Standards, which suggests a desirable exterior noise exposure at 65 dBA Community Noise Equivalent Level (CNEL) for sensitive land uses such as residences. Less sensitive commercial and industrial uses may be compatible with ambient noise levels up to 70 dBA. The City of Long Beach has adopted a Noise Ordinance (Long Beach Municipal Code Chapter 8.80) that sets exterior and interior noise standards.

a. Would the project result in exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance or applicable standards of other agencies?

- Potentially Significant Impact Less Than Significant with Mitigation Incorporation Less Than Significant Impact No Impact

The proposed dredging and associated activities would generate temporary noise levels that could affect sensitive receptors near the project site for up to 66 days. Noise impacts are a function of the type of activity being undertaken and the distance to the receptor location. Nearby noise-sensitive land uses include a hotel located about 150 feet to the north of Dock E and a mobile home park located about 170 feet to the northwest of Dock I.

The Long Beach City Noise Ordinance (Long Beach Municipal Code Section 8.80) prohibits any “unnecessary, excessive, and annoying” noise in the City. This Ordinance applies to all noise sources located on private property and identifies specific noise districts and allowable noise volumes. The proposed project would be subject to the exterior noise standards in Noise District One, which includes residential uses. Additionally, the Noise Ordinance specifies interior noise standards which are established to protect interior living and

working spaces from excessive noise. Both exterior and interior noise standards are identified in Table 3.

Table 3
Exterior and Interior Noise Standards

Noise District or Land Use	Time Interval	Allowable Noise Level
Exterior – District One	10 PM to 7 AM	45 dBA Leq
	7 AM to 10 PM	50 dBA Leq
Interior – Residential	10 PM to 7 AM	35 dBA
	7 AM to 10 PM	45 dBA

Source: City of Long Beach Municipal Code § 8.80

Table 4 shows typical noise levels associated with implementation of the proposed project. Noise-generating activities that would occur include dredging, dewatering, and truck trips. Dredging procedures would create the highest construction noise levels because of the operation of the heaviest equipment. The primary sound emitted from the dewatering equipment may be compared to the sound of a waterfall as much of the noise is from water flushing through the system.

Table 4
Typical Noise Levels for the Proposed Project

Construction Phase	Leq at 50 Feet
Dredging	88 dBA
Dewatering	60 dBA
Truck Trips	85 dBA

Sources: *Bolinas Lagoon Ecosystem Restoration Feasibility Study, Draft Environmental Impact Statement/Environmental Impact Report, June 2002.*; HDR Engineering, Inc., *Noise impacts Related to Lake Restoration Activities at Lake Kittamanquindi and Lake Elkhorn, April 2007*

Noise levels associated with these activities would temporarily affect the identified sensitive receptors near the project site. Noise from point sources generally decreases by about 6 dBA per doubling of distance. Therefore, the maximum noise level during dredging activities at the exterior of the hotel and the mobile home park, located about 150 feet and 170 feet, respectively, would measure about 80 dBA. As the existing ambient noise level at these locations is lower than the noise that would be produced, temporary construction noise would be clearly audible at these receptor locations and is expected to exceed exterior noise standards, and likely interior noise standards as well, as listed in Table 3. However, pursuant to Section 8.80.202 of the City of Long Beach’s municipal

code, it is prohibited for noise associated with construction activities to exceed the allowable exterior noise level for any zone (Zone 1 in this case) during specific hours when noise-sensitive land uses are most sensitive to noise, as follows:

- Weekdays (including federal holidays): 7:00 PM to 7:00 AM
- Saturdays: 7:00 PM Fridays to 9:00 AM Saturdays, and after 6:00 PM Saturdays
- Sundays: Any time on Sundays

Therefore, because noise impacts would be temporary (lasting approximately 66 days) and because the proposed project would be required to comply with the City's municipal code requirements restricting hours of excessive noise generation, impacts related to temporary construction noise would be less than significant. No further environmental analysis is necessary.

b. Would the project result in exposure of persons to or generation of excessive ground borne vibration or ground borne noise levels?

- Potentially Significant Impact Less Than Significant with Mitigation Incorporation Less Than Significant Impact No Impact

Activities that result in the generation of groundbourne vibrations are typically associated with construction activities such as blasting, grading or pile driving. The proposed project does not include these activities. Dredging activities, which involve the use of a hydraulic suction dredging apparatus, typically do not result in high levels of groundbourne vibration. Dewatering procedures would similarly not result in the generation of groundbourne vibrations that would affect nearby land uses. Therefore, impacts related to groundbourne vibration would be less than significant. No further environmental analysis is necessary.

c. Would the project create a substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?

- Potentially Significant Impact Less Than Significant with Mitigation Incorporation Less Than Significant Impact No Impact

The proposed dredging and dewatering of dredged materials would be temporary (approximately 66 days) and would not be a permanent noise source. After the project is completed, the noise levels would be similar to existing conditions. Therefore, no impacts associated with a permanent increase in noise would occur. No further environmental analysis is necessary.

d. Would the project create a substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?

- Potentially Significant Impact Less Than Significant with Mitigation Incorporation Less Than Significant Impact No Impact

Please see Section XI. (a) for discussion.

e. For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?

- Potentially Significant Impact Less Than Significant with Mitigation Incorporation Less Than Significant Impact No Impact

The project entails dredging and dewatering of the Cerritos Bahia Marina, and would not expose people to noise associated with air traffic. The project site is located more than five miles southeast of the Long Beach Airport. No residences or development that would increase population near airports are proposed. Therefore, no impacts associated with airport noise conflicts would occur as a result of the proposed project. No further environmental analysis is necessary.

f. For a project within the vicinity of a private airstrip, would the project expose people residing or working in the project area excessive noise levels?

- Potentially Significant Impact Less Than Significant with Mitigation Incorporation Less Than Significant Impact No Impact

Please see Section XI. (e) for discussion.

XII. POPULATION AND HOUSING

The City of Long Beach is the second largest city in Los Angeles County. At the time of the 2000 Census, Long Beach had a population of 461,522, which was a 7.5 percent increase from the 1990 Census. The 2000 Census reported a total of 163,088 households in Long Beach, with an average household size of 2.8 persons and a Citywide vacancy rate of 6.32 percent. As of January 1, 2009, the City of Long Beach

has an estimated population of 492,682 (State of California, Department of Finance E-1 Report).

According to SCAG projections, City population growth is expected to be six percent during 2005 to 2015 and increase another three percent during 2015 to 2020, for an annual growth rate of less than one percent per year over the next two decades. Long Beach is expected to increase in population to approximately 503,450 by the year 2010 and exceed 533,000 by 2020. Based on SCAG projections of approximately 503,450 persons in Long Beach by the year 2010, this would represent 179,804 households (assuming the 2.8 household size remains constant), an increase of 16,716 households from 2000 to 2010.

a. Would the project induce substantial population growth in an area, either directly or indirectly?

- Potentially Significant Impact Less Than Significant with Mitigation Incorporation Less Than Significant Impact No Impact

The project would not directly or indirectly induce population growth in the project vicinity. The project would not create any new housing units or employment generating land uses. The Marina is intended to accommodate existing boat demands and would therefore have no population growth impacts.

b. Would the project displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere?

- Potentially Significant Impact Less Than Significant with Mitigation Incorporation Less Than Significant Impact No Impact

There are no housing units on the project site or people residing on the project site in any form of temporary housing. The project would therefore not displace any existing housing units or people from the project site.

c. Would the project displace substantial numbers of people, necessitating the construction of replacement housing elsewhere?

- Potentially Significant Impact Less Than Significant with Mitigation Incorporation Less Than Significant Impact No Impact

Please see Section XII. (b) above for discussion.

XIII. PUBLIC SERVICES

Fire protection would be provided by the Long Beach Fire Department. The Fire Department is divided into bureaus of Fire Prevention, Fire Suppression, the Bureau of Instruction, and the Bureau of Technical Services. The Fire Department is accountable for medical, paramedic, and other first aid rescue calls from the community.

Police protection would be provided by the Long Beach Police Department. The Police Department is divided into bureaus of Administration, Investigation, and Patrol. The City is divided into four Patrol Divisions: East, West, North and South.

The City of Long Beach is served by the Long Beach Unified School District, which also serves the City of Signal Hill, Catalina Island and a large portion of the City of Lakewood. This School District has been operating at or over capacity during the past decade.

Would the proposed project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services:

a. Fire protection?

- Potentially Significant Impact Less Than Significant with Mitigation Incorporation Less Than Significant Impact No Impact

The project does not include any new buildings or structures, as the work scope involves only for dredging and eelgrass replacement activities. Therefore, this project would not significantly impact existing fire service ratios and response times. It would also not increase the demand for additional fire protection services. No further environmental analysis is necessary.

b. Police protection?

- Potentially Significant Impact Less Than Significant with Mitigation Incorporation Less Than Significant Impact No Impact

Please refer to Section XIII. (a) above for discussion. The project would not significantly impact existing police service ratios and response times, and would not increase the demand for additional police protection services.

The project does not include any new buildings or structures, as the work scope involves only for dredging and eelgrass replacement activities. Therefore, this project would not significantly impact existing police protection ratios and response times. It would also not increase the demand for additional police services. No further environmental analysis is necessary.

c. Schools?

- Potentially Significant Impact Less Than Significant with Mitigation Incorporation Less Than Significant Impact No Impact

The project does not involve any housing units or employment generating land uses and therefore would not create the demand for any new school facilities.

d. Parks?

- Potentially Significant Impact Less Than Significant with Mitigation Incorporation Less Than Significant Impact No Impact

The project does not involve new housing units or construction of new parks or recreational facilities. The project will not increase the capacity of the Marina boat slips. The project would therefore not create any new demands for parks or recreational facilities.

e. Other public facilities?

- Potentially Significant Impact Less Than Significant with Mitigation Incorporation Less Than Significant Impact No Impact

No other impacts have been identified that would require the provision of new or physically altered governmental facilities. Due to the nature and scope of the proposed maintenance dredging, project implementation would not increase the demand for any other public facilities (e.g., libraries) or create the need for alteration or construction of any governmental buildings. No further environmental analysis is necessary.

XIV. RECREATION

a. Would the project increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?

- Potentially Significant Impact Less Than Significant with Mitigation Incorporation Less Than Significant Impact No Impact

Please see Section XIII. (d) above for discussion. The project does not involve new housing units or construction of new parks or any other type of recreational facilities. The project would not create any new demands for parks or recreational facilities and therefore no further environmental analysis is necessary.

b. Does the project include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment?

- Potentially Significant Impact Less Than Significant with Mitigation Incorporation Less Than Significant Impact No Impact

Please see Section XIV. (a) above for discussion. The project site is a recreational facility, but project activities would not involve any expansion of the Marina or any other recreational facilities. Project impacts would therefore be less than significant and no further environmental analysis is necessary.

XV. TRANSPORTATION/TRAFFIC

a. Would the project cause an increase in traffic which is substantial in relation to the existing traffic load and capacity of the street system (i.e., result in a substantial increase in either the number of vehicle trips, the volume to capacity ratio on roads, or congestion at intersections)?

- Potentially Significant Impact Less Than Significant with Mitigation Incorporation Less Than Significant Impact No Impact

The project involves the maintenance dredging of the Cerritos Bahia Marina. The dredging activities would include truck and construction vehicle trips. A few construction vehicle trips would be required for movement of dredging equipment. Most project vehicle trips would involve the transport of dredged materials to landfills. An estimated 250 total truck trips would occur throughout the entire project (approximately 66 days) for delivery of dredged materials to the disposal locations. All dredging-related traffic impacts would cease at the end of the project dredging and eelgrass transplantation phases. Based on the nominal amount of daily work trips required for project dredging, dredging worker trips are

not anticipated to significantly contribute to traffic levels on surrounding roadways.

The project does not involve the development of any trip-generating land uses, but rather is intended to serve the existing client base of the Marina. Project implementation would therefore not cause any substantial temporary or permanent increase in traffic volumes and no further environmental analysis is necessary.

b. Would the project exceed, either individually or cumulatively, a level of service standard established by the county congestion management agency for designated roads or highways?

- Potentially Significant Impact Less Than Significant with Mitigation Incorporation Less Than Significant Impact No Impact

Please see Section XV. (a) for discussion.

c. Would the project result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks?

- Potentially Significant Impact Less Than Significant with Mitigation Incorporation Less Than Significant Impact No Impact

The Long Beach Airport is located within the City just north of the 405 freeway between Cherry Avenue and Lakewood Boulevard. The project site is located more than five miles southeast of this Airport. The maintenance dredging of the Marina would not impact airport operations, alter air traffic patterns or in any way conflict with established Federal Aviation Administration (FAA) flight protection zones. No further environmental analysis is necessary.

d. Would the project substantially increase hazards to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?

- Potentially Significant Impact Less Than Significant with Mitigation Incorporation Less Than Significant Impact No Impact

The project would not alter the design features of any streets or alleys and would not introduce or encourage any incompatible land uses in the project vicinity. No further environmental analysis is required.

e. Would the project result in inadequate emergency access?

- Potentially Significant Impact Less Than Significant with Mitigation Incorporation Less Than Significant Impact No Impact

The project would not alter any land uses, transportation patterns, or emergency access routes. No further environmental analysis is required.

f. Would the project result in inadequate parking capacity?

- Potentially Significant Impact Less Than Significant with Mitigation Incorporation Less Than Significant Impact No Impact

Project activities include storage of dewatering equipment and dredged materials in the Marina parking lot. The project will occupy approximately 34 parking spaces for the Material Processing Area (dredged materials) and approximately 86 parking spaces for the entire dewatering process. However, there are a total of 201 spaces in this parking lot and is rarely more than half full. Peak parking lot demand tends to be on weekends, while weekdays typically only have approximately 20-50 parked vehicles. Therefore, this parking lot has considerable excess capacity and the temporary maintenance dredging of the Marina will not result in inadequate parking capacity. Furthermore, this project will not expand Marina operations or otherwise create significant additional parking lot demand after project completion. Impacts would be less than significant and no further environmental analysis is necessary.

g. Would the project conflict with adopted policies supporting alternative transportation (e.g., bus turnouts, bicycle racks)?

- Potentially Significant Impact Less Than Significant with Mitigation Incorporation Less Than Significant Impact No Impact

The project would not set forth or encourage any proposals or projects that would conflict with any adopted alternative transportation policies. No further environmental analysis is required.

XVI. UTILITIES AND SERVICE SYSTEMS

a. Would the project exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board?

- Potentially Significant Impact Less Than Significant with Mitigation Incorporation Less Than Significant Impact No Impact

b. Would the project require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?

- Potentially Significant Impact Less Than Significant with Mitigation Incorporation Less Than Significant Impact No Impact

c. Would the project require or result in the construction of new storm water drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?

- Potentially Significant Impact Less Than Significant with Mitigation Incorporation Less Than Significant Impact No Impact

d. Would the project have sufficient water supplies available to serve the project from existing entitlement and resources, or are new or expanded entitlement needed?

- Potentially Significant Impact Less Than Significant with Mitigation Incorporation Less Than Significant Impact No Impact

e. Would the project result in a determination by the wastewater treatment provider which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?

- Potentially Significant Impact Less Than Significant with Mitigation Incorporation Less Than Significant Impact No Impact

f. Would the project be served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs?

- Potentially Significant Impact Less Than Significant with Mitigation Incorporation Less Than Significant Impact No Impact

g. Would the project comply with federal, state, and local statutes and regulations related to solid waste?

- Potentially Significant Impact Less Than Significant with Mitigation Incorporation Less Than Significant Impact No Impact

For Sections XVI. (a) through (g) – The project would not create any housing units or growth inducing commercial, industrial or institutional land uses and therefore the project would not create any substantial demands or place an undue burden on any utility or service system. The City of Long Beach is an urbanized setting with all utilities and services fully in place. No further environmental analysis is necessary.

XVII. MANDATORY FINDINGS OF SIGNIFICANCE

a. Does the project have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory?

- Potentially Significant Impact Less Than Significant with Mitigation Incorporation Less Than Significant Impact No Impact

The dredging of the proposed project area will result in a temporary loss of eelgrass within the Marina. The project has been designed to minimize impacts to eelgrass by limiting the dredging to a depth of –6 feet mean lower low water (mllw) instead of the original Marina design depth of –8 feet mllw. This eelgrass resource provides important functions to the ecosystem and is regulated by state and federal agencies. Impacts to eelgrass will therefore need to be mitigated in accordance with the Southern California Eelgrass Mitigation Policy (SCEMP Rev. 11).

Monitoring the success of eelgrass mitigation shall be required for a period of five years in accordance with the Southern California Eelgrass Mitigation Policy. An eelgrass mitigation plan shall be prepared to discuss the methods and schedule for planting eelgrass at the Marina, and post-planting monitoring. The mitigation

plan will include the following information, as relevant to the eelgrass mitigation sites: baseline conditions, transplant methods, transplant timing, success criteria, and a five year monitoring program.

Eelgrass beds provide nursery habitat for some species of invertebrates and fish. The existing eelgrass will be supplemented by the creation of additional eelgrass habitat and transplanting. Any loss of eelgrass within the marina during dredging will be offset through implementation of Mitigation Measure BIO-1. Therefore, impacts to potential aquatic nursery sites are less than significant with mitigation incorporation.

b. Does the project have impacts that are individually limited, but cumulatively considerable? (“Cumulatively considerable” means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects)?

- Potentially Significant Impact Less Than Significant with Mitigation Incorporation Less Than Significant Impact No Impact

The project would only involve the maintenance dredging of the Marina to serve existing boating needs. The project would not involve expansion of Marina operations and there are no past, current or probable future projects involving the Marina that would be cumulatively considerable. Due to the project’s limited nature and scope, project implementation would not have any impacts that are individually limited but cumulatively considerable.

c. Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?

- Potentially Significant Impact Less Than Significant with Mitigation Incorporation Less Than Significant Impact No Impact

Potential project impacts related to aesthetics, air quality, hazardous materials, noise and other environmental issues have been analyzed in this Negative Declaration. As concluded in the discussions on these issues, the project with recommended Mitigation Measure BIO-1 would have a less than significant impact on the environment and would not have significant adverse effects on human beings.

**MITIGATION MONITORING PLAN
MITIGATED NEGATIVE DECLARATION ND 08-09
CERRITOS BAHIA MARINA
MAINTENANCE DREDGING PROJECT**

IV. BIOLOGICAL RESOURCES

Mitigation Measure BIO-1

Restore Eelgrass Bed Habitat. Impacts to eelgrass shall be mitigated in accordance with the Southern California Eelgrass Mitigation Policy (SCEMP Rev. 11). Tetra Tech, Inc. prepared the *Eelgrass Survey and Draft Mitigation Plan for the Maintenance Dredging Project* (November 2008) to discuss the methods and schedule for planting eelgrass at Cerritos Bahia Marina and post-planting monitoring as required by the SCEMP. The Mitigation Plan includes the following information, as relevant to the eelgrass mitigation sites: baseline conditions, location, transplant methods, transplant timing, success criteria, and a five year monitoring program. Monitoring the success of eelgrass mitigation shall be required for a period of five years. The SCEMP Rev. 11 is also included in Appendix A of Tetra Tech, Inc's (2008) Eelgrass Mitigation Plan.

The project proponent shall mitigate the loss of eelgrass in accordance with the SCEMP mitigation ratio of at least 1.2:1. A 1.4:1 mitigation ratio (totaling 6,789 m² of transplanted eelgrass) is recommended to provide extra eelgrass mitigation area to increase likelihood of success in meeting the 1.2 to 1 requirement at the end of the five-year monitoring period. The actual amount of eelgrass mitigation necessary will be determined by the difference in eelgrass area determined by comparing the pre-construction and post-construction surveys.

The following measures shall be conducted as part of the eelgrass mitigation:

- 1) A pre-construction eelgrass survey will be conducted of the entire marina including the channel and opposite bank to the south. This survey will be conducted in accordance with the SCEMP (Revision 11) during the period of March through October and no more than 60 days prior to the commencement of any construction/dredging activities. Pre-construction survey results will be submitted to National Marine Fisheries Service (NMFS) and the California Department of Fish and Game (CDFG).
- 2) A qualified project marine biologist shall mark the positions of eelgrass beds with buoys prior to the initiation of any construction to minimize damage to eelgrass beds outside the construction zone.

- 3) The project marine biologist shall meet with the construction crews prior to dredging to review areas of eelgrass to avoid and to review proper construction techniques.
- 4) If barges and work vessels are used during construction, measures shall be taken to ensure that eelgrass beds are not impacted through grounding, propeller damage, or other activities that may disturb the sea floor. Such measures shall include speed restrictions, establishment of off-limit areas, and use of shallow draft vessels.
- 5) A post-construction survey will be conducted within 30 days of the completion of construction activities to determine the actual area of eelgrass affected for mitigation purposes. The amount of mitigation necessary will be determined by the difference between the pre-construction and post-construction surveys.
- 6) Eelgrass mitigation (transplant) will be initiated within 135 days of project inception.
- 7) An eelgrass transplant report will be completed following the transplant and monitoring surveys conducted at 6, 12, 24, 36, 48, and 60 months post-transplant. All monitoring work will be conducted during the active vegetative growth period and shall avoid the winter months of November through February. The Project Proponent shall ensure that project achievement of specific milestones and criteria for success, as directed in the SCEMP along with guidelines for remedial actions, are documented. If the success criteria are not met, construction of a Supplementary Transplant Area and monitoring for an additional 5 years may be required by NMFS.

Significance after Mitigation. Implementation of Mitigation Measure BIO-1 would reduce impacts associated with eelgrass removal to a less than significant level.

APPENDIX A AIR QUALITY DATA

Project: Cerritos Bahia Marina Dredging
City: Long Beach

CY	Season	AvgDays	Code	Equipment	Fuel	MaxHP	Class	C/R	Pre	Hand	Port	Population
2010	Annual	Mon-Sun	2.27E+09	Dredger	D	750	Dredging	U	N	NHH	P	2.30E-01
Activity	Consumption	ROG	CO	NOX	CO2	SO2	PM	N2O	CH4			
5.55E-01	8.82E+00	8.62E-05	3.03E-04	9.46E-04	9.71E-02	9.53E-07	3.35E-05	0.00E+00	7.78E-06			

Emission factors, lbs per hour

Dredge	750 hp	0.311	1.093	3.409	350.157	0.003	0.121	0.000	0.028
Dewatering	25 hp	0.022	0.074	0.137	17.6	0.001	0.006	0	0.002
8hr/day	Daily emissions								
	Dredge	2.49	8.74	27.27	2801.25	0.03	0.97	0.00	0.22
	Dewatering	0.18	0.59	1.10	140.80	0.01	0.05	0.00	0.02

Sources

CARB. Off-road software. 2007
 SCAQMD. Off-road Mobile Source Emissions Factors. 2007.

6/30/2009 3:03:49 PM

Construction Unmitigated Detail Report:

CONSTRUCTION EMISSION ESTIMATES Summer Pounds Per Day, Unmitigated

Time Slice	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10	PM2.5 Dust	PM2.5 Exhaust	PM2.5	CO2
10/1/2009-12/31/2009 Active Days: 66	1.83	19.69	8.86	0.02	0.06	0.93	0.99	0.02	0.85	0.87	2,234.62
Mass Grading 10/01/2009-12/31/2009	1.83	19.69	8.86	0.02	0.06	0.93	0.99	0.02	0.85	0.87	2,234.62
Mass Grading Dust	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mass Grading Off Road Diesel	0.70	5.52	2.86	0.00	0.00	0.31	0.31	0.00	0.29	0.29	479.33
Mass Grading On Road Diesel	1.12	14.15	5.71	0.02	0.06	0.61	0.67	0.02	0.57	0.58	1,724.19
Mass Grading Worker Trips	0.01	0.02	0.29	0.00	0.00	0.00	0.00	0.00	0.00	0.00	31.10

Phase Assumptions

Phase: Mass Grading 10/1/2009 - 12/31/2009 - Default Mass Site Grading/Excavation Description

Total Acres Disturbed: 0

Maximum Daily Acreage Disturbed: 0

Fugitive Dust Level of Detail: Default

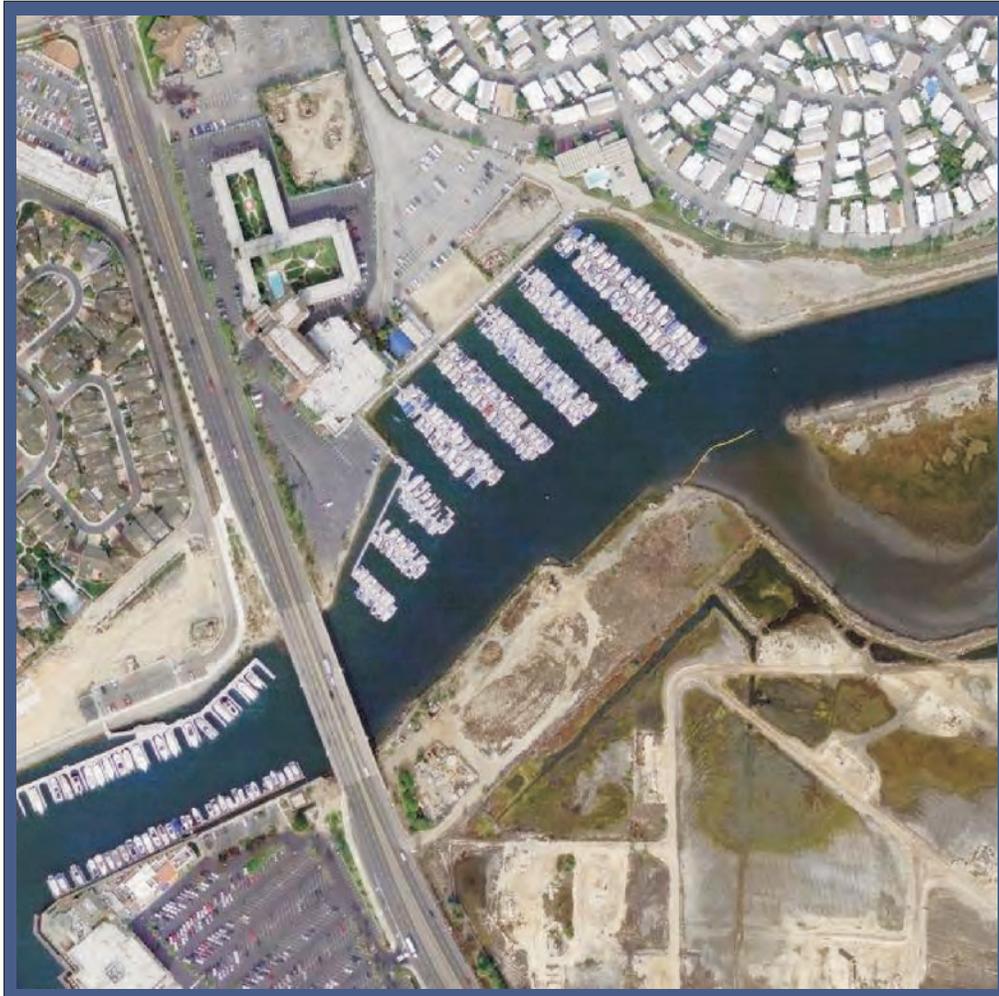
20 lbs per acre-day

On Road Truck Travel (VMT): 406.8

Off-Road Equipment:

1 Rubber Tired Loaders (164 hp) operating at a 0.54 load factor for 8 hours per day

APPENDIX B EELGRASS SURVEY AND DRAFT MITIGATION PLAN



Eelgrass Survey and Draft Mitigation Plan

Cerritos Bahia Marina Maintenance Dredging Project

November 2008

Prepared For:
Cerritos Bahia Marina
6289 E. Pacific Coast Hwy.
Long Beach, California 90803

Prepared By:
Tetra Tech, Inc.
401 East Ocean Blvd., Ste. 420
Long Beach, California



PROJECT STAFF

Project Manager

Rafael Holcombe, P.E.

Marine Scientists

Sarah E. McFadden
Shannon Feeney

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APPENDICES

Appendix A: Southern California Eelgrass Mitigation Policy (Rev. 11)

Appendix B: Eelgrass Survey Data and Mitigation Quantities by Fairway

Appendix C: Plan View of Eelgrass in Cerritos Bahia Marina

Appendix D: Completed Caulerpa Survey Form

1.0 INTRODUCTION

The owners of Cerritos Bahia Marina intend to dredge the marina to a depth of -6 ft mean lower low water (mllw). The purpose of this project is to perform maintenance dredging for the Cerritos Bahia Marina to maintain sufficient water depth for marina operations. Cerritos Bahia Marina is located at 6289 East Pacific Coast Highway in Long Beach, California (Figure 1 and Figure 2). The site is in the northeastern part of Alamitos Bay. The marina is on the north side of the Los Cerritos Channel and east of Pacific Coast Highway. The project area is approximately 7.8 acres in size (Figure 3). Based on recent bathymetric data, the project design consists of dredging an area of approximately 3.9 acres including area beneath docks. In order to determine the impact this project would have on eelgrass (*Zostera marina*) Tetra Tech, Inc. was contracted to conduct an eelgrass survey of the area of potential effect.

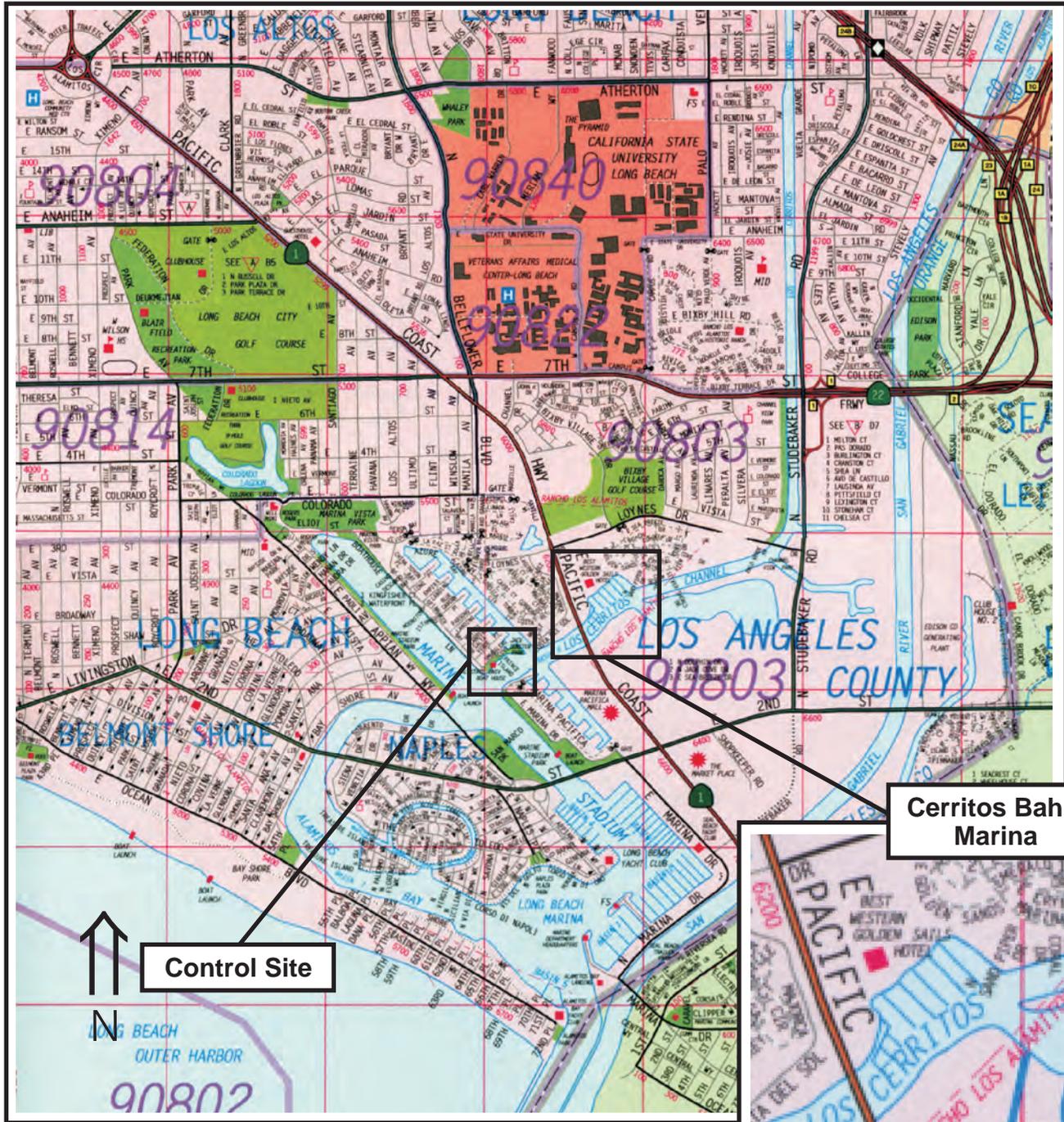
A Bathymetric survey of Cerritos Bahia Marina and the adjacent channel was conducted on October 22, 2008. Depths in the Cerritos Bahia Marina range from -2 to -11 ft mllw. Depths in the channel that runs along the southeast side of the marina range from -3 to -12 ft mllw. The marina and channel area is open on both ends and is tidally influenced from the west. The entrance to the marina channel is at the west end at the Pacific Coast Highway Bridge.

Eelgrass habitat has been identified as a sensitive marine resource by the California Department of Fish and Game, the National Marine Fisheries Service, and the U.S. Fish and Wildlife Service. Eelgrass beds serve as refuges, foraging areas, and nursery habitats for various coastal and bay invertebrates and fishes. Due to the ecological importance of eelgrass, the Southern California Eelgrass Mitigation Policy (revision 11) was developed to specify requirements for eelgrass mitigation. This Policy is presented in Appendix A.

The area of potential eelgrass habitat within the survey area is limited by factors such as substrate type and depth, water clarity, currents, boat traffic, and shading from docks. Depth appears to be the predominant limiting factor to eelgrass growth for the soft bottom areas where no shading from docks occurs. In previous surveys conducted at sites within Alamitos Bay, the eelgrass beds typically extended to a depth of -7ft mllw then stopped even though the substrate was the same at greater depths.

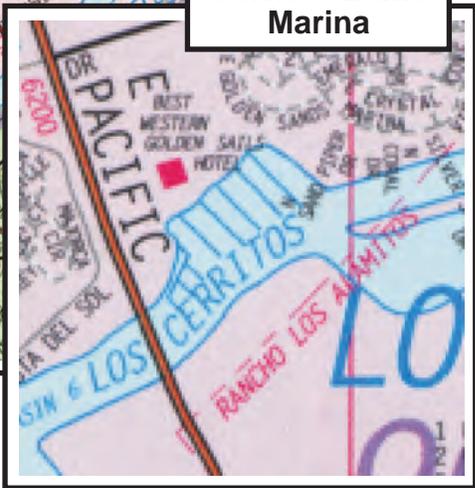
Eelgrass occurs throughout the Cerritos Bahia Marina. In a previous survey of the marina, conducted in March 15, 2007 (Tetra Tech, unpublished), the total area of eelgrass found within the survey areas was 1,883 m² (0.19 ha). Any impacts to eelgrass will require in-kind mitigation in accordance with the Southern California Eelgrass Mitigation Policy (SCEMP). Monitoring the success of eelgrass mitigation shall be required for a period of five years. This eelgrass mitigation plan has been prepared to discuss the methods and schedule for planting eelgrass at Cerritos Bahia Marina, and post-planting monitoring. This mitigation plan includes the following information, as relevant to the eelgrass mitigation sites: baseline conditions, location, transplant methods, transplant timing, success criteria, and a five year monitoring program.





Cerritos Bahia Marina

Control Site



Source: Thomas Bros. Maps



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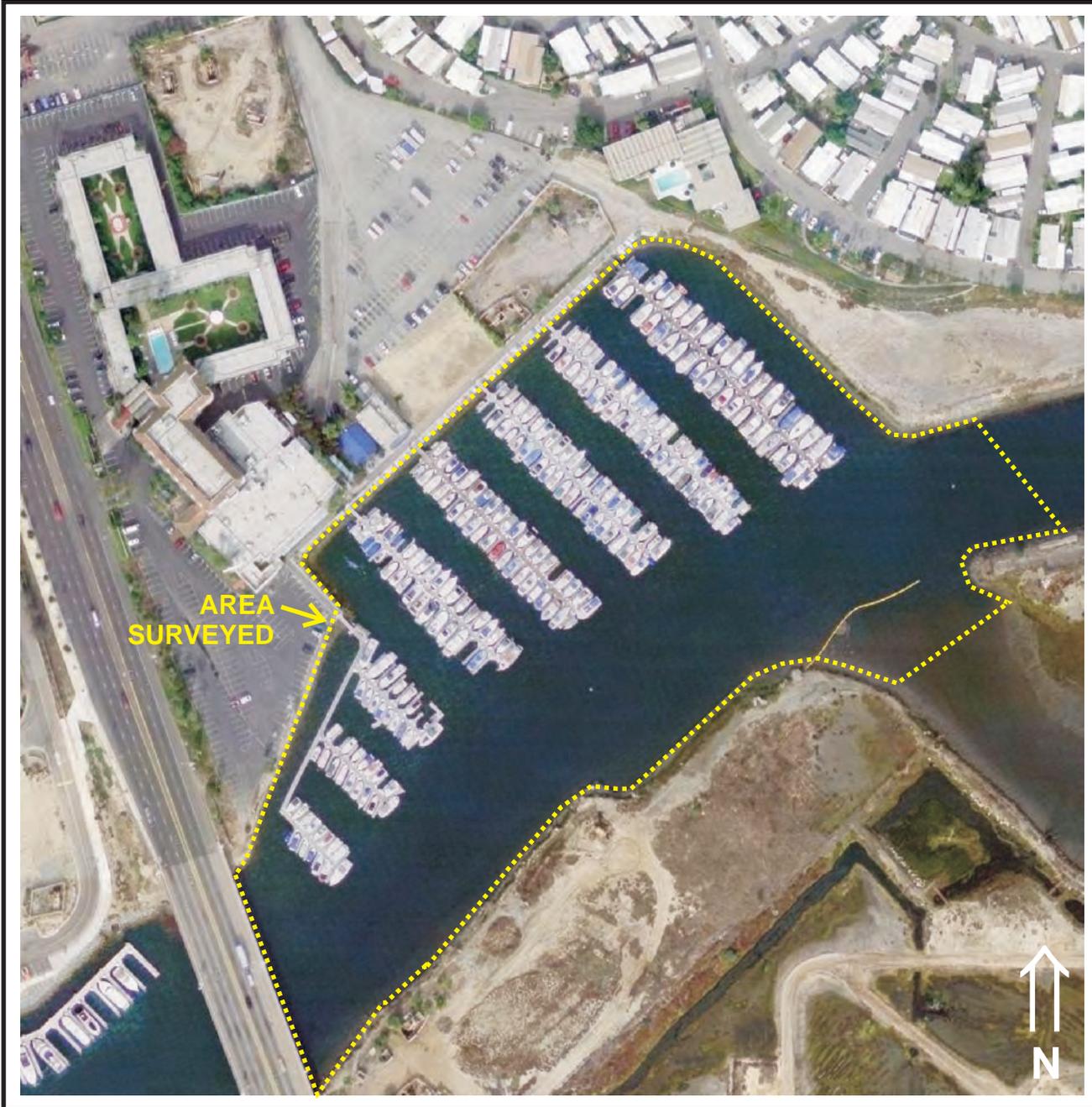
401 East Ocean Blvd., Suite 420
Long Beach, California 90802
Ph. (562) 495-0495 fax (562) 495-5029

Site Vicinity Map

Cerritos Bahia Marina
Long Beach, California

FIGURE 1

November 2008



Source: USGS 2004



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**Aerial Photograph
Eelgrass Survey Location**

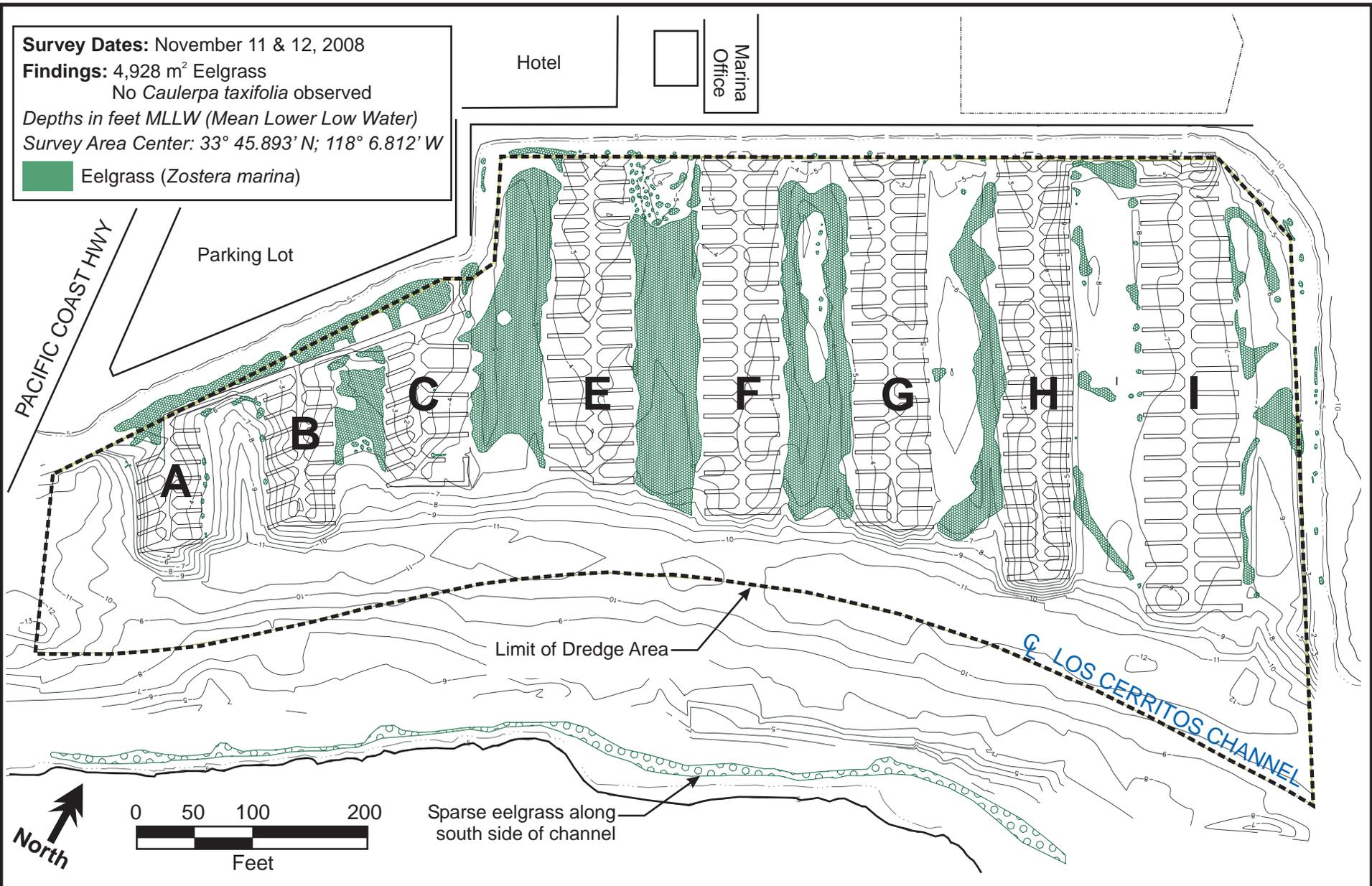
**Cerritos Bahia Marina
Long Beach, California**

FIGURE 2

November 2008

Survey Dates: November 11 & 12, 2008
Findings: 4,928 m² Eelgrass
 No *Caulerpa taxifolia* observed
 Depths in feet MLLW (Mean Lower Low Water)
 Survey Area Center: 33° 45.893' N; 118° 6.812' W

 Eelgrass (*Zostera marina*)



Tetra Tech, Inc.
 ENGINEERS ARCHITECTS SCIENTISTS
 401 East Ocean Blvd., Suite 420
 Long Beach, California 90802
 Ph. (562) 495-0495 fax (562) 495-5029

Site Plan
Eelgrass (*Zostera marina*) Survey
Cerritos Bahia Marina
Alamitos Bay, Long Beach, California

FIGURE 3

November 2008

2.0 EELGRASS SURVEY METHODS

In October and November 2008 personnel from Tetra Tech conducted an eelgrass mapping survey of the project area (Cerritos Bahia Marina) including the area of potential affect surrounding the project footprint (Figure 2). The survey area is approximately 500-ft by 1,200-ft and includes the dredge footprint and surrounding area where equipment anchors may be placed or other associated impacts may occur. The area surveyed includes the area between the marina shoreline, the Pacific Coast Highway Bridge, the southeast shoreline across the channel, and 100 feet up the Los Cerritos Channel. Cerritos Bahia Marina was surveyed on October 22nd, 28th, and 30th, 2008. The south side of the channel and the Control Site (Jack Dunster Marine Biological Reserve) were surveyed on November 19, 2008.

One scientific diver, experienced in eelgrass ecology swam along the bottom in transects using a compass and measuring tapes. Transects were run parallel at distances of two to five feet apart depending on visibility. Field data collected include distribution and density of eelgrass in the project area. During the surveys, underwater visibility was approximately 5 to 8 feet. Depths in the area surveyed at the project site ranged from +2 ft to -12 ft mean lower low water. Turion shoot density was measured within eelgrass beds using a 1/8m² quadrat.

The information on distribution of eelgrass was digitally plotted, to scale, using AutoCAD® 2008 software. A plan view drawing (Figure 3) was then created to show the survey area and eelgrass. The eelgrass area was analyzed by depth and location within each fairway (large open area between docks). Each fairway was delineated by the shoreline to the northwest, the ends of the dock fingers, and the outside end of the docks along the channel.

The project site was also surveyed for *Caulerpa* in accordance with the *Caulerpa* Protocol prepared by National Marine Fisheries Service and California Department of Fish & Game. The purpose of the survey is to determine the presence or absence of *Caulerpa taxifolia* prior to construction activities. *Caulerpa taxifolia* is a non-native alga that poses a threat to coastal marine life. It has been found in Carlsbad and in Huntington Harbour. Currently Alamitos Bay is not designated as an infected system.

The bathymetric survey of the project sites was conducted by Tetra Tech October 22, 2008. The survey was conducted from a boat. An integrated system of bathymetric equipment was used including a Trimble Ag122 Differential GPS (DGPS) receiver, a Meridata 100 digital fathometer and a laptop computer running Trimble HYDRO Pro software. This system records real-time DGPS position, depth and time at 1-second intervals as the boat traverses the survey area. Accuracies for the survey system are ± 3 feet horizontally and ± 0.5 feet vertically. In areas that are inaccessible by boat, surveyors used a lead line to take depth measurements.

In order to correct depth readings for tidal variation, tidal elevations are observed from a calibrated tide staff and recorded at frequent intervals. Observations of the tidal elevations from the tide staff(s) were used to adjust all depth data to the correct datum during post-processing. At the completion of the survey, the data was reviewed, edited for false readings, and tidal corrections applied. The DGPS coordinates were converted to California State Plane Coordinates based on the North American Datum 1983 (NAD83). Contour lines were constructed for the data set of adjusted depths and coordinates. The data set was imported in to AutoCAD® to create a drawing which was used for plotting the eelgrass.

3.0 EELGRASS SURVEY RESULTS

Results of the October 2008 eelgrass survey indicate that patches and beds of eelgrass occur throughout the marina (Figure 3 and Table 1). The total area of eelgrass found within the marina survey area was 4,928 m² (0.49 ha). Eelgrass was found at depths between -2ft mllw and -8ft mllw. Eelgrass predominantly occurs at -6ft mllw and shallower. No eelgrass was found in the channel beyond the end of the docks. Sparse eelgrass was found along the southeast side of the channel opposite the marina (Figure 3). The area of eelgrass along the south side of the channel was 547 m² (0.054 ha).

Table 1. Summary of eelgrass (*Zostera marina*) survey areas and results, Cerritos Bahia Marina, Long Beach, California, October 2008.

Location	Eelgrass Area (m ²)			Eelgrass Area (ha)		
	Within Dredge Footprint*	Outside Dredge Footprint	Total	Within Dredge Footprint*	Outside Dredge Footprint	Total
Inside Long Dock (includes south of dock A)	166.6	238.2	404.8	0.017	0.024	0.040
Fairway A - B	21.1	0.0	21.1	0.002	0.000	0.002
Fairway B - C	243.1	0.0	243.1	0.024	0.000	0.024
Fairway C - E	991.6	42.5	1034.1	0.099	0.004	0.103
Fairway E - F	1,136.9	5.2	1142.1	0.114	0.001	0.114
Fairway F - G	1,034.5	2.0	1036.5	0.103	0.000	0.104
Fairway G - H	543.5	1.0	544.5	0.054	0.000	0.054
Fairway H - I	215.6	0.3	215.9	0.022	0.000	0.022
North of Dock I	258.2	27.7	285.9	0.026	0.003	0.029
Marina Total	4,849.3	78.7	4,928	0.485	0.008	0.493
* Dredge Footprint includes entire marina as indicated in Figure 3.						

Eelgrass patches in the marina ranged in size from 0.09 m² to 1,082 m². Most of the eelgrass occurs in the middle of the marina in the fairways from Dock B to Dock G. The largest patch of eelgrass is located in the fairway between Dock E and Dock F which had 75% cover of eelgrass. The total area of eelgrass found within the proposed dredge footprint area was 4,849 m² (0.48 ha). Eelgrass turion density within eelgrass beds ranged from 1 to 128 turions per square meter and averaged 43.7 turions per square meter.

No *Caulerpa* was observed in the survey area. The completed *Caulerpa* survey reporting form is

included in Appendix D of this report.

3.1 Eelgrass Depth Ranges

Eelgrass was found at depths between -2ft mllw and -8ft mllw (Table 2). Eelgrass within the marina predominantly occurs at -6ft mllw and shallower. Approximately 84% of the eelgrass area in the current survey was found at 6ft mllw and shallower. Approximately 16% was found at depths greater than 6ft mllw.

Table 2. Summary of total eelgrass area and percent cover at each depth range, Cerritos Bahia Marina, Long Beach, California, October 2008.

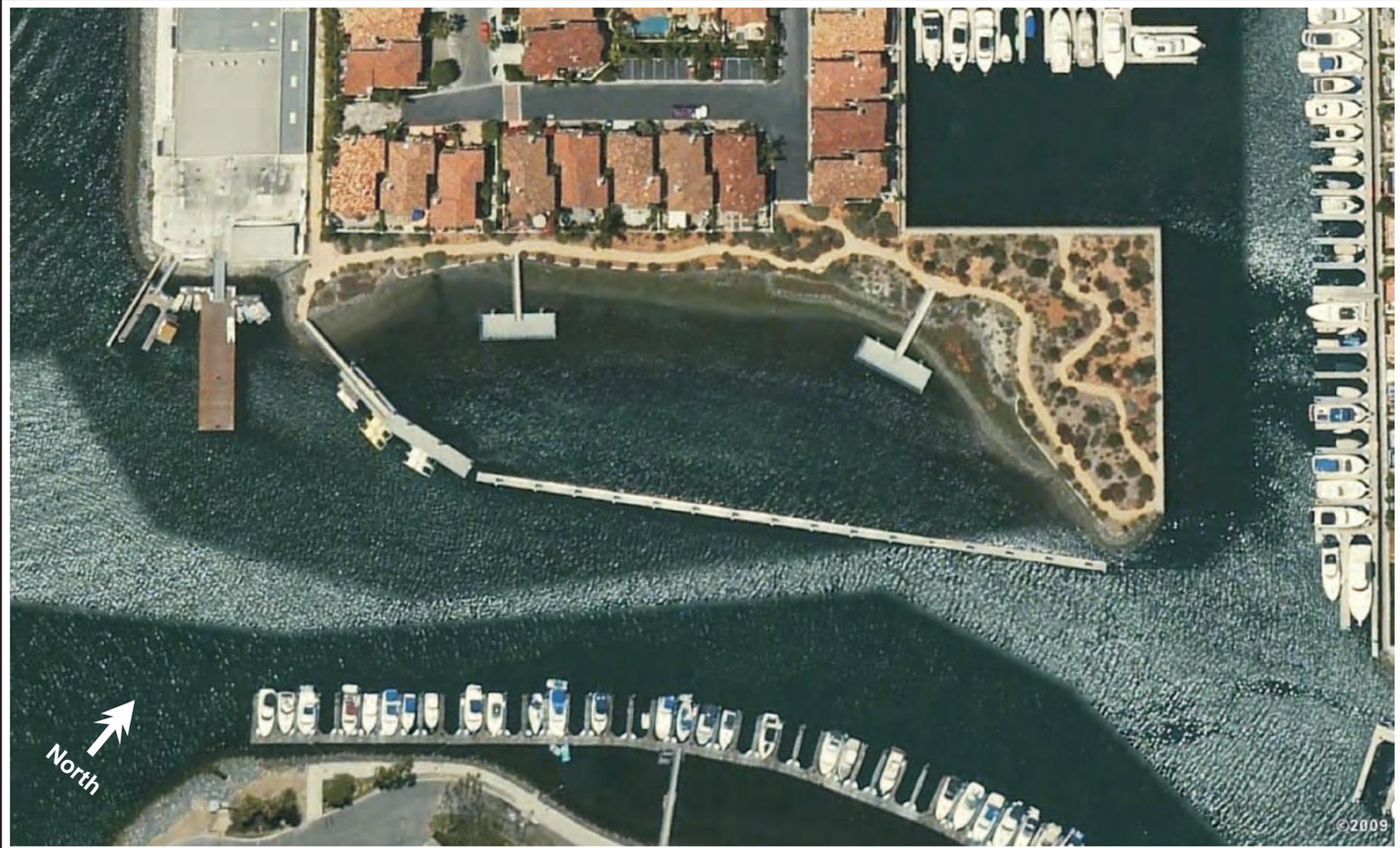
Depth Range (ft mllw)	Total Area*		Eelgrass Area (m ²)			Eelgrass Area (ha)			Percent of Total Eelgrass Area
	m ²	ha	Within Dredge Footprint**	Outside Dredge Footprint	Total	Within Dredge Footprint**	Outside Dredge Footprint	Total	
<5	3,535.0	0.35	2,046.7	78.7	2,125.4	0.20	0.01	0.21	43
5-6	3,523.3	0.35	2,021.8	0.0	2,021.8	0.20	0.00	0.20	41
6-7	2,218.1	0.22	524.0	0.0	524.0	0.05	0.00	0.05	11
7-8	2,133.5	0.21	256.7	0.0	256.7	0.03	0.00	0.03	5
>8	332.1	0.03	0.0	0.0	0.0	0.00	0.00	0.00	0
Total	11,742.0	1.17	4,849.3	78.7	4,927.9	0.48	0.01	0.49	100

* Total Area includes open water area at each depth within marina minus the dock area which is shaded.

** Dredge Footprint includes entire marina as indicated in Figure 3.

3.2 Control Site

The selected Control Site survey area is Jack Dunster Marine Biological Reserve in Alamitos Bay (Figure 1 and Figure 4). This site is 0.25 mile from the project site and has similar orientation to the sun and similar depths. The Control Site was surveyed on November 19, 2008. The eelgrass beds at this site are protected from boat traffic by a floating breakwater. The Control Site was surveyed for comparison with the project site post-construction and the transplant monitoring surveys for this project. Based on previous eelgrass surveys in Alamitos Bay, the eelgrass has been found to be variable from year to year. In the November 2008 survey 1,788.8 m² (0.18 ha) of eelgrass was found at the Control Site. During the survey, underwater visibility was approximately 6 to 8 feet. Depths in the area surveyed ranged between 0 ft and -16 ft mllw. Eelgrass was found between depths from -1ft mllw to -8.5ft mllw. Turion density within eelgrass beds ranged from 1 to 112 turions per square meter. The average turion density within eelgrass beds at the control site was 52.3 turions per square meter. The Control Site will be surveyed concurrently with the pre-construction, post-construction, and transplant monitoring eelgrass surveys.



Source: Google Earth July 2007



Tetra Tech, Inc.

ENGINEERS ARCHITECTS SCIENTISTS

401 East Ocean Blvd., Suite 420
Long Beach, California 90802
Ph. (562) 495-0495 fax (562) 495-5029

Aerial Photo
Eelgrass (*Zostera marina*) Survey
Control Site - Jack Dunster Marine Biological Reserve
Alamitos Bay, Long Beach, California

FIGURE 4

November 2008

4.0 EELGRASS SURVEY DISCUSSION

Eelgrass habitat has been identified as a sensitive marine resource by the California Department of Fish and Game, the National Marine Fisheries Service, and the U.S. Fish and Wildlife Service. Eelgrass beds serve as refuges, foraging areas, and nursery habitats for various coastal and bay invertebrates and fishes.

The area of potential eelgrass habitat within the survey area is limited by factors such as substrate type and depth, water clarity, currents, boat traffic, and shading. Depths in the area surveyed ranged from -2-ft mllw to -12-ft mllw. Approximately 84 percent of the eelgrass was found at the depths of -6ft mllw and shallower (Table 2). Besides the shading from docks, depth appears to be the predominant limiting factor for the soft bottom areas. In a previous survey conducted at Marine Stadium in Alamitos Bay, the eelgrass beds extended to a depth of -7ft mllw then stopped even though the substrate was the same at greater depths. However Cerritos Bahia Marina has eelgrass at greater depths likely due to greater circulation than Marine Stadium.

Based on this survey, the Cerritos Bahia Marina Dredge project would result in a temporary loss of eelgrass within the marina. Due to the presence of eelgrass within the marina, the project design has been modified to minimize potential impacts to eelgrass. The depth of dredging will be limited to a depth of -6ft mean lower low water (mllw) instead of the design depth of -8ft mllw. In addition, eelgrass along the outer edges of the project footprint will be protected. This resource provides important ecological functions to the ecosystem and is regulated by state and federal agencies. Impacts to eelgrass will therefore need to be mitigated in accordance with the Southern California Eelgrass Mitigation Policy (SCEMP Rev. 11). The Project Proponent proposes in-kind and on-site mitigation of these resources at a minimum ratio of 1.2 to 1.

5.0 EELGRASS IMPACT CALCULATIONS

The potential impacts to eelgrass are discussed below for the project area. Table 3 summarizes the amount of eelgrass found within the dredge footprint in each fairway and the respective 1.2 to 1 mitigation areas. Based on the current survey findings the proposed project would impact a maximum of approximately 4,849 square meters of eelgrass beds. The actual amount of eelgrass to be impacted may be considerably less. In a previous survey of the marina, conducted in March 15, 2007 (Tetra Tech, unpublished), the total area of eelgrass found within the survey areas was 1,883 m² (0.19 ha) which would result in a significantly lower impact quantity. The actual mitigation quantities will be based on the pre-construction eelgrass survey that will be conducted within 60 days of the commencement of dredging.

Table 3. Potential eelgrass impact areas and required mitigation areas by fairway, Cerritos Bahia Marina, Long Beach, California, October 2008.

Location	Potential Impact Area		Required Mitigation (1.2 to 1 Ratio)		Recommended Mitigation (1.4 to 1 Ratio)	
	m ²	ha	m ²	ha	m ²	ha
Inside Long Dock (includes south of dock A)	166.6	0.017	200	0.020	233	0.023
Fairway A - B	21.1	0.002	25	0.003	30	0.003
Fairway B - C	243.1	0.024	292	0.029	340	0.034
Fairway C - E	991.6	0.099	1190	0.119	1388.3	0.139
Fairway E - F	1136.9	0.114	1364	0.136	1592	0.159
Fairway F - G	1034.5	0.103	1241	0.124	1448	0.145
Fairway G - H	543.5	0.054	652	0.065	761	0.076
Fairway H - I	215.6	0.022	259	0.026	302	0.030
North of Dock I	258.2	0.026	310	0.031	361	0.036
Total	4,849	0.485	5,819	0.582	6,789	0.679

6.0 EELGRASS MITIGATION REQUIREMENTS

This report has been prepared to assess the potential effects of the proposed project on eelgrass. Dredging operations would affect the eelgrass at the site. Applicable mitigation measures are also discussed below. Under the California Environmental Quality Act (CEQA) *mitigation* includes the following:

- a) **Avoiding** the impact altogether by not taking a certain action or parts of an action.
- b) **Minimizing** impact by limiting the degree or magnitude of the action and its implementation.
- c) **Rectifying** the impact by repairing, rehabilitating, or restoring the impacted environment.
- d) **Reducing or Eliminating** the impact over time by preservation and maintenance operations during the life of the action
- e) **Compensating** for the impact by replacing or providing substitute resources or environments.

This project has been designed to avoid eelgrass where possible and minimize impacts to eelgrass by revising the proposed dredge depth from -8ft mllw to -6ft mllw. Unavoidable impacts will be mitigated in-kind by transplanting eelgrass back into the marina.

A total of 4,928 m² of eelgrass habitat was mapped in the project area (Table 1). Eelgrass occurs predominantly in the central fairways at depths of minus 6-ft mllw or shallower. Based on the October 2008 eelgrass survey, dredging the marina would result in an impact to 4,849 m² (Table 3). The remaining 79 m² of eelgrass is outside of the dredge footprint and would be avoided. In addition the eelgrass along the south side of the channel would be avoided.

Due to the project design of dredging to -6ft mllw no potential eelgrass habitat, where eelgrass does not currently occur, will be impacted.

The reduction in acreage of eelgrass habitat must be mitigated according to State and Federal environmental policies (SCEMP), which include the replacement, in kind, of these habitat types. According to the Policy, a minimum of 1.2 to 1 mitigation is required. If the total impact is 4,849 m², at least 5,819 m² must be transplanted as mitigation. However, it is recommended to mitigate at a ratio of 1.4 to 1, which would be a total of 6,789 m². This provides extra eelgrass area to increase likelihood of success of meeting the 1.2 to 1 requirement at the end of the 5-year monitoring period.

Prior to construction activities, a pre-construction eelgrass survey will be required. This survey is in order to update actual eelgrass locations, determine anticipated impacts, and to determine if any eelgrass can be avoided and protected in place. In the case where eelgrass occurs outside of the dredge footprint and can be avoided, an Anchor Management Plan is required. If an Anchor Management Plan is required, the following measures will be implemented in order to protect eelgrass that occurs outside of the project footprint:

- Maps depicting all eelgrass in and around the project area will be provided to the contractor prior to commencement of any work.

- At sites where avoidable eelgrass occurs, boundaries of the avoidable eelgrass shall be marked with buoys prior to the initiation of work so that equipment and vessel operators will avoid damage to that eelgrass.
- Barges or other vessels shall be anchored away from avoidable eelgrass. Anchors and/or spuds shall not impinge upon any avoidable eelgrass.
- Eelgrass beds located on adjacent parcels shall be protected from any impacts by maintaining a buffer area of at least 5 feet between the placement of a spud and the eelgrass.

Upon completion of the project, a post-construction eelgrass survey will be required to determine the actual impact to eelgrass as a result of the project. Mitigation requirements will be based on this impact quantity.

An eelgrass mitigation project must be conducted in compliance with the SCEMP (Appendix A) and includes the following tasks: (1) selecting a potential eelgrass receiver site, (2) conducting eelgrass transplants at a replacement ratio of at least 1.2 to 1 for eelgrass, (3) conducting mitigation monitoring surveys to evaluate the level of transplant success, and (4) if required, conducting additional transplants if the primary transplant does not meet project success criteria. These components are described in full in the (SCEMP).

7.0 PROPOSED EELGRASS MITIGATION PLAN

To mitigate for impacts to approximately 4,800 m² (0.48 ha) of eelgrass, the project proponent proposes to re-create approximately 6,000 m² (0.60 ha) of eelgrass beds within the marina. However the actual mitigation quantities will be determined with the pre-construction eelgrass survey results. This section provides the site specific details of the proposed mitigation effort.

7.1 Transplant Methodology and Techniques

The new eelgrass transplant will involve several steps; collecting stock material from donor sites including the project sites prior to construction, preparing the material for transplanting, replanting the eelgrass in the mitigation area receiver sites, following up the transplant with monitoring surveys, and evaluating the success of the transplant.

Biologist divers will collect eelgrass from sites Alamitos Bay, Anaheim Bay and Sunset Harbor (Figure 6) and replant it in the marina. The proposed transplant size will be at a 1.4 to 1 ratio in order to provide additional area and increase the likelihood of meeting the success criteria of the SCEMP. The estimated area available for transplanting (-6 ft mllw or shallower) at the site after dredging will be 7,058 m² (0.71 ha).

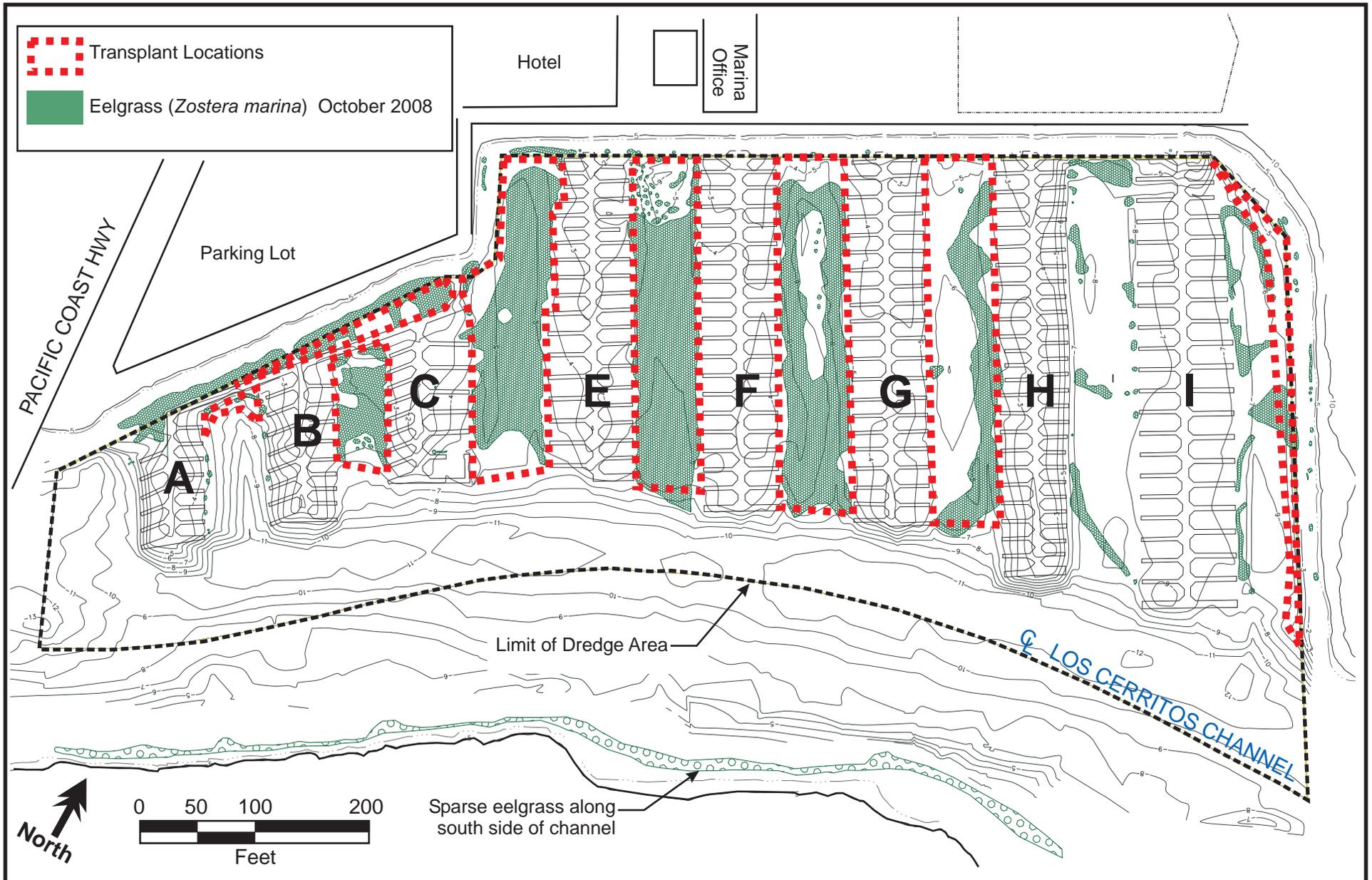
The proposed technique will be a bare root anchor/bundle technique method. The donor stock material will be assembled into eelgrass bundle units. For an impact of 4,800 m² (0.48 ha), the 1.2 ratio would be 5,760 m² (0.576 ha). Eelgrass habitat would be replanted at depths between -2 ft and -6 ft mllw along pre-determined planting grids. Bundles will be planted on the nearest 1-meter centers. Each bundle will consist of 8 to 12 shoots of eelgrass.

For a mitigation site of 6,000 m² (0.60 ha), the project would require the removal of approximately 6,000 transplant bundles of eelgrass comprised of up to 80,000 shoots of eelgrass from other nearby locations. The donor stock eelgrass material will be collected by biologist divers within Alamitos Bay and from nearby Anaheim Bay and Sunset Harbor eelgrass meadows (Figure 7). If feasible, eelgrass will be salvaged from the project site prior to dredging. Eelgrass will be salvaged from within the dredge footprint as the project proceeds. This will depend in part on the timing of planting efforts and when project impacts may occur. At the offsite donor beds no more than 10% of the eelgrass shoots will be collected. Written permission will be obtained from the California Department of Fish and Game before collection of donor stock commences.

7.2 Field Monitoring and Transplant Evaluation

Once completed, the transplant area would be surveyed and checked for planting quality. Each transplanted bundle is inspected and repaired or replaced as needed to ensure proper planting of the entire site. Immediately following the transplant the location of the transplant area is to be mapped and documented using GPS and area landmarks. Divers will also perform an underwater survey of the pre-determined control site to document the eelgrass area and density. An Eelgrass Transplant Report documenting the transplant methodologies and control site survey results is then prepared and submitted to the associated regulatory and resource agencies.

A series of six (7) monitoring surveys will be required to evaluate transplant success. A survey will be conducted immediately after the transplant is completed. Subsequent monitoring surveys will be conducted during the active vegetative growth periods of eelgrass (March through October) at intervals of 6 months, 12 months, 24 months, 36 months, 48 months, and 60 months after the transplant to determine the health of the transplanted vegetation and to evaluate transplant success based on established criteria (SCEMP rev 11). Additional monitoring beyond the 60 month period may be required by the agencies.



Tetra Tech, Inc.
 ENGINEERS ARCHITECTS SCIENTISTS
 401 East Ocean Blvd., Suite 420
 Long Beach, California 90802
 Ph. (562) 495-0495 fax (562) 495-5029

**Proposed Eelgrass Transplant Locations
 Maintenance Dredging Project
 Cerritos Bahia Marina
 Alamitos Bay, Long Beach, California**

FIGURE 6

November 2008



Source: USGS 2004



Tetra Tech, Inc.

ENGINEERS ARCHITECTS SCIENTISTS

401 East Ocean Blvd., Suite 420
Long Beach, California 90802
Ph. (562) 495-0495 fax (562) 495-5029

Eelgrass Donor Sites

Cerritos Bahia Marina

Long Beach, California

FIGURE 7

November 2008

The percent cover and shoot density of eelgrass will be determined during each monitoring survey. The undisturbed areas of eelgrass at the nearby Control Site will be used when assessing the results of the transplant.

If yearly transplant criteria are not met, then a replant will be conducted. The amount to be replanted is based upon a formula that takes into account area and/or density deficiencies (SCEMP). Table 4 shows the area requirements for a mitigation requirement of 6,000 m² assuming that the density requirement is met each year.

Table 4. Annual eelgrass transplant success criteria for a mitigation transplant of 6,000 square meters of eelgrass.

Post Transplant Year	Percent of Transplant Area	SUCCESS CRITERIA	
		Minimum Area	
		(m ²)	ha
Year 1	70	4,200	0.42
Year 2	85	5,100	0.51
Year 3	100	6,000	0.60
Year 4	100	6,000	0.60
Year 5	100	6,000	0.60

Note: Transplant of 6,000 m² is for example only and is based on an impact to 5,000m². Project may result in an impact requires a different mitigation quantity.

As stated in the SCEMP, criteria for determination of transplant success shall be based upon a comparison of vegetation coverage (area) and density (turions per square meter) between the adjusted project impact area (i.e., original impact area multiplied by 1.2) and mitigation site(s). Extent of vegetated cover is defined as that area where eelgrass is present and where gaps in coverage are less than one meter between individual turion clusters. Density of shoots is defined by the number of turions per area present in representative samples within the original impact area, control or transplant bed.

Specific criteria are as follows:

- a. the mitigation site shall achieve a minimum of 70 percent area of eelgrass and 30 percent density as compared to the adjusted project impact area after the first year.
- b. the mitigation site shall achieve a minimum of 85 percent area of eelgrass and 70 percent density as compared to the adjusted project impact area after the second year.

- c. the mitigation site shall achieve a sustained 100 percent area of eelgrass bed and at least 85 percent density as compared to the adjusted project impact area for the third, fourth and fifth years.

Should the required eelgrass transplant fail to meet any of the established criteria, then a Supplementary Transplant Area (STA) shall be constructed, if necessary, and planted. The size of this STA shall be determined by the following formula:

$$STA = MTA \times (|A_t + D_t| - |A_c + D_c|)$$

MTA = mitigation transplant area.

A_t = transplant deficiency or excess in area of coverage criterion (%).

D_t = transplant deficiency in density criterion (%).

A_c = natural decline in area of control (%).

D_c = natural decline in density of control (%).

The STA formula shall be applied to actions that result in the degradation of habitat (i.e., either loss of areal extent or reduction in density).

Five conditions apply:

- 1) For years 2-5, an excess of only up to 30% in area of coverage over the stated criterion with a density of at least 60% as compared to the project area may be used to offset any deficiencies in the density criterion.
- 2) Only excesses in area criterion equal to or less than the deficiencies in density shall be entered into the STA formula.
- 3) Densities which exceed any of the stated criteria shall not be used to offset any deficiencies in area of coverage.
- 4) Any required STA must be initiated within 120 days following the monitoring event that identifies a deficiency in meeting the success criteria. Any delays beyond 120 days in the implementation of the STA shall be subject to the penalties as described in Section 8 of the SCEMP.
- 5) Annual monitoring will be required of the STA for five years following the implementation and all performance standards apply to the STA.

7.3 Reporting

Field survey results will be submitted to the resource agencies in report format within 30 days of each of the surveys. The reports will present eelgrass percent cover and density data, an assessment of the functional quality of the area, a qualitative assessment of invertebrate and fish use of the area, and recommended remedial measures if the transplant is not meeting mitigation success criteria.

8.0 SCHEDULING OF MITIGATION ACTIVITIES

A proposed schedule of project sequencing is provided in Table 5. The schedule takes into account the typical approved in-water work period of September 1 to March 15. The assumed dredge start date of November 1, 2009 was used to provide the resulting dates and deadlines. Once the project is permitted and scheduled, a construction schedule which includes specific starting and ending dates for all work including mitigation activities will be provided to the resource agencies for approval at least 30 days prior to initiating in-water construction.

Table 5. Sequence of mitigation activities based on a project start date of November 1, 2009.

Task	Comments	Start Date	End Date
Pre-dredge Eelgrass Survey of Project Site and Control Site	30 to 60 days prior to project commencement	2-Sep-2009	2-Oct-2009
Pre-dredge Bathymetry			
Establish eelgrass avoidance measures	Avoid eelgrass as much as is practical		
Dredging	30 to 60 days duration (assumes 60 days) excavate mitigation site to appropriate elevations	1-Nov-2009	31-Dec-2009
Post-dredge Eelgrass Survey	within 30 days of project completion		30-Jan-2010
Post-dredge Bathymetric Survey	within 30 days of project completion establish cross-sections to be used in monitoring site stability		30-Jan-2010
Impact Determination		30-Jan-2010	6-Feb-2010
Final Mitigation Plan based on Impact and Bathymetry	2 weeks	6-Feb-2010	20-Feb-2010
Site Settlement	60 days duration Survey cross-sections to monitor site stability	31-Dec-2009	1-Mar-2010
Conduct Transplant	2 weeks	1-Mar-2010	15-Mar-2010
Transplant Verification/Monitoring Survey: 0-month	upon completion of transplant; to include transplant and control sites	16-Mar-2010	
6-month Transplant Monitoring Survey	survey transplant and control sites determine if any corrective measures are needed	15-Sep-2010	
12-month Transplant Monitoring Survey	survey transplant and control sites determine if any corrective measures are needed	16-Mar-2011	
24-month Transplant Monitoring Survey	survey transplant and control sites determine if any corrective measures are needed	15-Mar-2012	
36-month Transplant Monitoring Survey	survey transplant and control sites determine if any corrective measures are needed	15-Mar-2013	
48-month Transplant Monitoring Survey	survey transplant and control sites determine if any corrective measures are needed	15-Mar-2014	
60-month Transplant Monitoring Survey	survey transplant and control sites determine if any corrective measures are needed	15-Mar-2015	

The following measures will be conducted as part of this project:

- 1) A pre-construction eelgrass survey will be conducted of the entire marina including the channel and opposite bank to the south. This survey will be conducted in accordance with the Southern California Eelgrass Mitigation Policy (SCEMP Revision 11). This

survey will be conducted during the period of March through October. The survey is considered valid by NMFS for a period of no more than 60 days, with the exception that surveys conducted in August through October which will be valid until the following March 1. Pre-construction survey results will be submitted to National Marine Fisheries Service (NMFS) and the California Department of Fish and Game (CDFG) in an appropriate data format for the information to be mapped on the project drawings.

- 2) A project marine biologist shall mark the positions of eelgrass beds with buoys prior to the initiation of any construction to minimize damage to eelgrass beds outside the construction zone.
- 3) The project marine biologist shall meet with the construction crews prior to dredging to review areas of eelgrass to avoid and to review proper construction techniques.
- 4) If barges and work vessels are used during construction, measures shall be taken to ensure that eelgrass beds are not impacted through grounding, propeller damage, or other activities that may disturb the sea floor. Such measures shall include speed restrictions, establishment of off-limit areas, and use of shallow draft vessels.
- 5) A post-construction survey will be conducted within 30 days of the completion of construction activities to determine the actual area of eelgrass affected for mitigation purposes. The Project Proponent will be required to mitigate the loss of eelgrass in accordance with the Southern California Eelgrass Mitigation Policy (SCEMP Revision 11). As per the SCEMP the loss of eelgrass habitat must be mitigated at a minimum 1.2:1 ratio.
- 6) Eelgrass mitigation (transplant) will be initiated within 135 days of project inception. The amount of mitigation necessary will be determined by the difference between the pre-construction and post-construction surveys.
- 7) An eelgrass transplant report will be completed following the transplant and monitoring surveys conducted at 6, 12, 24, 36, 48, and 60 months post-transplant. All monitoring work will be conducted during the active vegetative growth period and shall avoid the winter months of November through February. The Project Proponent shall ensure that project achievement of specific milestones and criteria for success, as directed in the SCEMP along with guidelines for remedial actions, are documented. If the success criteria are not met, construction of a Supplementary Transplant Area and monitoring for an additional 5 years may be required by NMFS.

9.0 CONCLUSION

Eelgrass is in the proposed project area that would be impacted as a result of the maintenance dredging project. A total of 4,928 m² of eelgrass habitat was mapped in the project area in October 2008 at depths between -2ft mllw and -8ft mllw. Of this, an estimated 4,849 m² would be directly impacted by dredging. However, eelgrass has been found to be variable from year to year and the actual impact is expected to be less. Approximately 547 m² of eelgrass was mapped along the south side of the channel. Due to the distance and channel currents this eelgrass is unlikely to be affected by the project. The project has been designed to minimize and compensate for impacts to eelgrass. Compensation consists of transplanting eelgrass back into the marina after the dredging is completed. The estimated area available for transplanting (-6 ft mllw or shallower) at the site after dredging will be 7,058 m². It is recommended that a ratio of 1.4 to 1 of eelgrass be transplanted to increase the likelihood of meeting the 1.2 to 1 requirement. Mitigation, monitoring, and reporting would be conducted in accordance with the Southern California Eelgrass Mitigation Policy (Revision 11) which is included in Appendix A.

10.0 REFERENCES

Fonseca, Mark S., W. Judson Kenworthy, and Gordon W. Thayer. 1998. *Guidelines for the conservation and restoration of seagrasses in the United States and adjacent waters*. NOAA Coastal Ocean Program Decision Analysis Series No. 12. NOAA Coastal Ocean Office, Silver Spring, MD. 222 pp.

National Marine Fisheries Service Southwest Region, 2003. *Caulerpa Control Protocol (Ver. 1.2b)*. (<http://swr.ucsd.edu/hcd/caulerpa/ccp.pdf>)

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APPENDIX A

Southern California Eelgrass Mitigation Policy (Rev. 11)

SOUTHERN CALIFORNIA EELGRASS MITIGATION POLICY

(Adopted July 31, 1991)

Eelgrass (*Zostera marina*) vegetated areas are recognized as important ecological communities in shallow bays and estuaries because of their multiple biological and physical values. Eelgrass habitat functions as an important structural environment for resident bay and estuarine species, offering both predation refuge and a food source. Eelgrass functions as a nursery area for many commercially and recreationally important finfish and shellfish species, including those that are resident within bays and estuaries, as well as oceanic species that enter estuaries to breed or spawn. Eelgrass also provides a unique habitat that supports a high diversity of non-commercially important species whose ecological roles are less well understood.

Eelgrass is a major food source in nearshore marine systems, contributing to the system at multiple trophic levels. Eelgrass provides the greatest amount of primary production of any nearshore marine ecosystem, forming the base of detrital-based food webs and as well as providing a food source for organisms that feed directly on eelgrass leaves, such as migrating waterfowl. Eelgrass is also a source of secondary production, supporting epiphytic plants, animals, and microbial organisms that in turn are grazed upon by other invertebrates, larval and juvenile fish, and birds.

In addition to habitat and resource attributes, eelgrass serves beneficial physical roles in bays and estuaries. Eelgrass beds dampen wave and current action, trap suspended particulates, and reduce erosion by stabilizing the sediment. They also improve water clarity, cycle nutrients, and generate oxygen during daylight hours.

In order to standardize and maintain a consistent policy regarding mitigating adverse impacts to eelgrass resources, the following policy has been developed by the Federal and State resource agencies (National Marine Fisheries Service, U.S. Fish and Wildlife Service, and the California Department of Fish and Game). While the intent of this Policy is to provide a basis for consistent recommendations for projects that may impact existing eelgrass resources, there may be circumstances (e.g., climatic events) where flexibility in the application of this Policy is warranted. As a consequence, deviations from the stated Policy may be allowed on a case-by-case basis. This policy should be cited as the Southern California Eelgrass Mitigation Policy (revision 11).

For clarity, the following definitions apply. "Project" refers to work performed on-site to accomplish the applicant's purpose. "Mitigation" refers to work performed to compensate for any adverse impacts caused by the "project". "Resource agencies" refers to National Marine Fisheries Service (NMFS), U.S. Fish and Wildlife Service (USFWS), and the California Department of Fish and Game (CDFG).

1. **Mitigation Need.** Eelgrass transplants shall be considered only after the normal provisions and policies regarding avoidance and minimization, as addressed in the Section 404 Mitigation Memorandum of Agreement between the Corps of Engineers and Environmental Protection Agency, have been pursued to the fullest extent possible prior to the development of any mitigation program. Mitigation will be required for the loss of

existing vegetated areas, loss of potential eelgrass habitat, and/or degradation of existing/potential eelgrass habitat. Mitigation for boat docks and/or related work is addressed in section 2.

2. Boat Docks and Related Structures. Boat docks, ramps, gangways and similar structures should avoid eelgrass vegetated or potential eelgrass vegetated areas to the maximum extent feasible. If avoidance of eelgrass or potential eelgrass areas is infeasible, impacts should be minimized by utilizing, to the maximum extent feasible, construction materials that allow for greater light penetration (e.g., grating, translucent panels, etc.). For projects where the impact cannot be determined until after project completion (i.e., vessel shading, vessel traffic) a determination regarding the amount of mitigation shall be made based upon two annual monitoring surveys conducted during the time period of August to October which document the changes in the bed (areal extent and density) in the vicinity of the footprint of the boat dock, moored vessel(s), and/or related structures. Any impacts determined by these monitoring surveys shall be mitigated per sections 3-12 of this policy. Projects subject to this section must include a statement from the applicant indicating their understanding of the potential mitigation obligation which may follow the initial two-year monitoring.

3. Mitigation Map. The project applicant shall map thoroughly the area, distribution, density and relationship to depth contours of any eelgrass beds likely to be impacted by project construction. This includes areas immediately adjacent to the project site which have the potential to be indirectly or inadvertently impacted as well as potential eelgrass habitat areas. Potential habitat is defined as areas where eelgrass would normally be expected to occur but where no vegetation currently exists. Factors to be considered in delineating potential habitat areas include appropriate circulation, light, sediment, slope, salinity, temperature, dissolved oxygen, depth, proximity to eelgrass, history of eelgrass coverage, etc.

Protocol for mapping shall consist of the following format:

1) Bounding Coordinates

Horizontal datum - Universal Transverse Mercator (UTM), NAD 83, Zone 11 is the preferred projection and datum. If another projection or datum is used, the map and spatial data must include metadata that accurately defines the projection and datum.

Vertical datum - Mean Lower Low Water (MLLW), depth in feet.

2) Units

Transects and grids in meters.

Area measurements in square meters/hectares.

3) File format

A spatial data layer compatible with readily available geographic information system software must be sent to NMFS and any other interested resource agency when the area mapped has greater than 10 square meters of

eelgrass. For those areas with less than 10 square meters, a table must be provided giving the bounding x,y coordinates of the eelgrass areas. In addition to a spatial layer or table, a hard-copy map should be included within the survey report. The projection and datum should be clearly defined in the metadata and/or an associated text file.

All mapping efforts must be completed during the active growth phase for the vegetation (typically March through October) and shall be valid for a period of 60 days with the exception of surveys completed in August - October. Surveys completed after unusual climatic events (i.e., high rainfall) may have modified requirements and surveyors should contact NMFS, CDFG, and USFWS to determine if any modifications to the standard survey procedures will be required. A survey completed in August - October shall be valid until the resumption of active growth (i.e., in most instances, March 1). After project construction, a post-project survey shall be completed within 30 days. The actual area of impact shall be determined from this survey.

4. **Mitigation Site.** The location of eelgrass transplant mitigation shall be in areas similar to those where the initial impact occurs. Factors such as, distance from project, depth, sediment type, distance from ocean connection, water quality, and currents are among those that should be considered in evaluating potential sites.

5. **Mitigation Size.** In the case of transplant mitigation activities that occur concurrent to the project that results in damage to the existing eelgrass resource, a ratio of 1.2 to 1 shall apply. That is, for each square meter adversely impacted, 1.2 square meters of new suitable habitat, vegetated with eelgrass, must be created. The rationale for this ratio is based on, 1) the time (i.e., generally three years) necessary for a mitigation site to reach full fishery utilization and 2) the need to offset any productivity losses during this recovery period within five years. An exception to the 1.2 to 1 requirement shall be allowed when the impact is temporary and the total area of impact is less than 100 square meters. Mitigation on a one-for-one basis shall be acceptable for projects that meet these requirements (see section 11 for projects impacting less than 10 square meters).

Transplant mitigation completed three years in advance of the impact (i.e., mitigation banks) will not incur the additional 20 percent requirement and, therefore, can be constructed on a one-for-one basis. However, all other annual monitoring requirements (see sections 8-9) remain the same irrespective of when the transplant is completed.

Project applicants should consider increasing the size of the required mitigation area by 20-30 percent to provide greater assurance that the success criteria, as specified in Section 10, will be met. In addition, alternative contingent mitigation must be specified, and included in any required permits, to address situation where performance standards (see section 10) are not likely to be met.

For potential eelgrass habitat, a ratio of 1 to 1 of equivalent habitat shall be created.

Degradation of existing eelgrass vegetated habitat that results in a reduction of density greater than 25 percent shall be mitigated on a one-for-one basis. For example, a 25

percent reduction in density of a 100 square meter (100 turions/meter) eelgrass bed to 75 turions/meter would require the establishment of 25 square meters of new eelgrass with a density at or greater than the pre-impact density. All other provisions of the Policy would apply.

6. Mitigation Technique. Techniques for the construction and planting of the eelgrass mitigation site shall be consistent with the best available technology at the time of the project. Donor material shall be taken from the area of direct impact whenever possible, but also should include a minimum of two additional distinct sites to better ensure genetic diversity of the donor plants. No more than 10 percent of an existing bed shall be harvested for transplanting purposes. Plants harvested shall be taken in a manner to thin an existing bed without leaving any noticeable bare areas. Written permission to harvest donor plants must be obtained from the California Department of Fish and Game.

Plantings should consist of bare-root bundles consisting of 8-12 individual turions. Specific spacing of transplant units shall be at the discretion of the project applicant. However, it is understood that whatever techniques are employed, they must comply with the stated requirements and criteria.

7. Mitigation Timing. For off-site mitigation, transplanting should be started prior to or concurrent with the initiation of in-water construction resulting in the impact to the eelgrass bed. Any off-site mitigation project which fails to initiate transplanting work within 135 days following the initiation of the in-water construction resulting in impact to the eelgrass bed will be subject to additional mitigation requirements as specified in section 8. For on-site mitigation, transplanting should be postponed when construction work is likely to impact the mitigation. However, transplanting of on-site mitigation should be started no later than 135 days after initiation of in-water construction activities. A construction schedule which includes specific starting and ending dates for all work including mitigation activities shall be provided to the resource agencies for approval at least 30 days prior to initiating in-water construction.

8. Mitigation Delay. If, according to the construction schedule or because of any delays, mitigation cannot be started within 135 days of initiating in-water construction, the eelgrass replacement mitigation obligation shall increase at a rate of seven percent for each month of delay. This increase is necessary to ensure that all productivity losses incurred during this period are sufficiently offset within five years.

9. Mitigation Monitoring. Monitoring the success of eelgrass mitigation shall be required for a period of five years for most projects. Monitoring activities shall determine the area of eelgrass and density of plants at the transplant site and shall be conducted at initial planting, 6, 12, 24, 36, 48, and 60 months after completion of the transplant. All monitoring work must be conducted during the active vegetative growth period and shall avoid the winter months of November through February. Sufficient flexibility in the scheduling of the 6 month surveys shall be allowed in order to ensure the work is completed during this active growth period. Additional monitoring beyond the 60 month period may be required in those instances where stability of the proposed transplant site is questionable or where other factors may influence the long-term success of transplant.

The monitoring of an adjacent or other acceptable control area (subject to the approval of the resource agencies) to account for any natural changes or fluctuations in bed width or density must be included as an element of the overall program.

A monitoring schedule that indicates when each of the required monitoring events will be completed shall be provided to the resource agencies prior to or concurrent with the initiation of the mitigation (see attached monitoring and compliance summary form).

Monitoring reports shall be provided to the resource agencies within 30 days after the completion of each required monitoring period and shall include the summary sheet included at the end of this policy.

10. Mitigation Success. Criteria for determination of transplant success shall be based upon a comparison of vegetation coverage (area) and density (turions per square meter) between the **adjusted project impact area** (i.e., original impact area multiplied by 1.2) and **mitigation site(s)**. Extent of vegetated cover is defined as that area where eelgrass is present and where gaps in coverage are less than one meter between individual turion clusters. Density of shoots is defined by the number of turions per area present in representative samples within the original impact area, control or transplant bed. Specific criteria are as follows:

- a. the mitigation site shall achieve a minimum of 70 percent area of eelgrass and 30 percent density as compared to the adjusted project impact area after the first year.
- b. the mitigation site shall achieve a minimum of 85 percent area of eelgrass and 70 percent density as compared to the adjusted project impact area after the second year.
- c. the mitigation site shall achieve a sustained 100 percent area of eelgrass bed and at least 85 percent density as compared to the adjusted project impact area for the third, fourth and fifth years.

Should the required eelgrass transplant fail to meet any of the established criteria, then a Supplementary Transplant Area (STA) shall be constructed, if necessary, and planted. The size of this STA shall be determined by the following formula:

$$STA = MTA \times (|A_t + D_t| - |A_c + D_c|)$$

MTA = mitigation transplant area.

A_t = transplant deficiency or excess in area of coverage criterion (%).

D_t = transplant deficiency in density criterion (%).

A_c = natural decline in area of control (%).

D_c = natural decline in density of control (%).

The STA formula shall be applied to actions that result in the degradation of habitat (i.e., either loss of areal extent or reduction in density).

Five conditions apply:

- 1) For years 2-5, an excess of only up to 30% in area of coverage over the stated criterion with a density of at least 60% as compared to the project area may be used to offset any deficiencies in the density criterion.
- 2) Only excesses in area criterion equal to or less than the deficiencies in density shall be entered into the STA formula.
- 3) Densities which exceed any of the stated criteria shall not be used to offset any deficiencies in area of coverage.
- 4) Any required STA must be initiated within 120 days following the monitoring event that identifies a deficiency in meeting the success criteria. Any delays beyond 120 days in the implementation of the STA shall be subject to the penalties as described in Section 8.
- 5) Annual monitoring will be required of the STA for five years following the implementation and all performance standards apply to the STA.

11. **Mitigation Bank.** Any mitigation transplant success that, after five years, exceeds the mitigation requirements, as defined in section 10, may be considered as credit in a "mitigation bank". Establishment of any "mitigation bank" and use of any credits accrued from such a bank must be with the approval of the resource agencies and be consistent with the provisions stated in this policy. Monitoring of any approved mitigation bank shall be conducted on an annual basis until all credits are exhausted.

12. **Exclusions.**

1) Placement of a single pipeline, cable, or other similar utility line across an existing eelgrass bed with an impact corridor of no more than 1 meter wide may be excluded from the provisions of this policy with concurrence of the resource agencies. After project construction, a post-project survey shall be completed within 30 days and the results shall be sent to the resource agencies. The actual area of impact shall be determined from this survey. An additional survey shall be completed after 12 months to insure that the project or impacts attributable to the project have not exceeded the allowed 1 meter corridor width. Should the post-project or 12 month survey demonstrate a loss of eelgrass greater than the 1 meter wide corridor, then mitigation pursuant to sections 1-11 of this policy shall be required.

2) Projects impacting less than 10 square meters. For these projects, an exemption may be requested by a project applicant from the mitigation requirements as stated in this policy, provided suitable out-of-kind mitigation is proposed. A case-by-case evaluation and determination regarding the applicability of the requested exemption shall be made by the resource agencies.

(last revised 08/30/05)

Southern California Eelgrass Mitigation Policy Monitoring and Compliance Reporting Summary

PERMIT DATA:

Permit (Type, Number)	Issuance Date	Expiration Date	Agency Contact
ACOE: _____			
CDP: _____			
Other: _____			

EELGRASS IMPACT AND MITIGATION REQUIREMENTS SUMMARY:

Permitted Eelgrass Impact Estimate	(m ²)	
Actual Eelgrass Impact	(m ²)	(post-const. survey date)
Eelgrass Mitigation Requirement	(m ²)	(mitigation plan ref.)
Impact Site Location		(location)
Impact Site Center Coordinates		(define projection and datum)
Mitigation Site Location		(location)
Mitigation Site Center Coordinates		(define projection and datum)

PERMITTEE CONTACT INFORMATION:

Project Name	(same as permit ref.)
Permittee Information	(permittee name)
	(mailing address)
	(city, state, zip)
	(permittee contact)
Mitigation Consultant	(phone, fax., e-mail)
	(consultant contact)
	(phone, fax., e-mail)

PROJECT ACTIVITY DATA:

Activity	Start Date	End Date	Reference Info.
<i>Eelgrass Impact</i>			
Installation of Eelgrass Mitigation			
<i>Initiation of Mitigation Monitoring</i>			

MITIGATION STATUS DATA:

Mitigation Milestone	Scheduled Survey	Survey Date	Area (m ²)	Density (turions/m ²)	Reference Info.
<i>Requirement</i>					
<i>0-month</i>					
6-month					
12-month					
24-month					
36-month					
48-month					
60-month					

FINAL ASSESSMENT:

Was mitigation met?	
Were mitigation and monitoring performed timely?	
Was delay penalty required or were supplemental mitigation programs necessary?	

APPENDIX B

Eelgrass Data and Mitigation Quantities by Fairway

Appendix A. Eelgrass (*Zostera marina*) & survey areas and results by depth range, Cerritos Bahia Marina, Long Beach, California, October 2008.

Location	Area within -8 ft contour ft ²	Depth Range (ft mllw)	Depth Range of Eelgrass (ft mllw)	Eelgrass Area (ft ²)		Total Eelgrass Area			Potential Impact Area			Required Mitigation (1.2 to 1 Ratio)		
				Within Dredge Footprint	Outside Dredge Footprint	ft ²	m ²	ha	ft ²	m ²	ha	ft ²	m ²	ha
Inside Long Dock (includes south of dock A)	7,900	-2 to -11	-2 to -5	1,793	2,564	4,357	404.8	0.040	1,793	166.6	0.017	2,152	200	0.02
Fairway A - B	520	<5				96	8.9	0.001						
Fairway A - B	1,000	5-6				104	9.7	0.001						
Fairway A - B	1,200	6-7				16	1.5	0.000						
Fairway A - B	1,230	7-8				11	1.0	0.000						
Fairway A - B	2,250	>8				0	0.0	0.000						
Fairway A - B Total	6,200	-5 to -11	-5 to -8	227	0	227	21.1	0.002	227	21.1	0.002	272	25	0.00
Fairway B - C	3,840	<5				2,549	236.8	0.024						
Fairway B - C	455	5-6				68	6.3	0.001						
Fairway B - C	810	6-7				0	0.0	0.000						
Fairway B - C	490	7-8				0	0.0	0.000						
Fairway B - C	30	>8				0	0.0	0.000						
Fairway B - C Total	5,625	-5 to -8	-5 to -6	2,617	0	2,617	243.1	0.024	2,617	243.1	0.024	3,140	292	0.03
Fairway C - E	6,400	<5			457	4,019	373.4	0.037						
Fairway C - E	8,900	5-6				6,959	646.5	0.065						
Fairway C - E	850	6-7				153	14.2	0.001						
Fairway C - E	0	7-8				0	0.0	0.000						
Fairway C - E	0	>8				0	0.0	0.000						
Fairway C - E Total	16,150	-5 to -8	-5 to -7	10,674	457	11,131	1034.1	0.103	10,674	991.6	0.099	12,809	1190	0.12
Fairway E - F	10,965	<5			56	8,227	764.3	0.076						
Fairway E - F	4,780	5-6				3,633	337.5	0.034						
Fairway E - F	550	6-7				331	30.8	0.003						
Fairway E - F	50	7-8				102	9.5	0.001						
Fairway E - F	0	>8				0	0.0	0.000						
Fairway E - F Total	16,345	-4 to -8	-4 to -8	12,237	56	12,293	1142.1	0.114	12,237	1136.9	0.114	14,684	1364	0.14

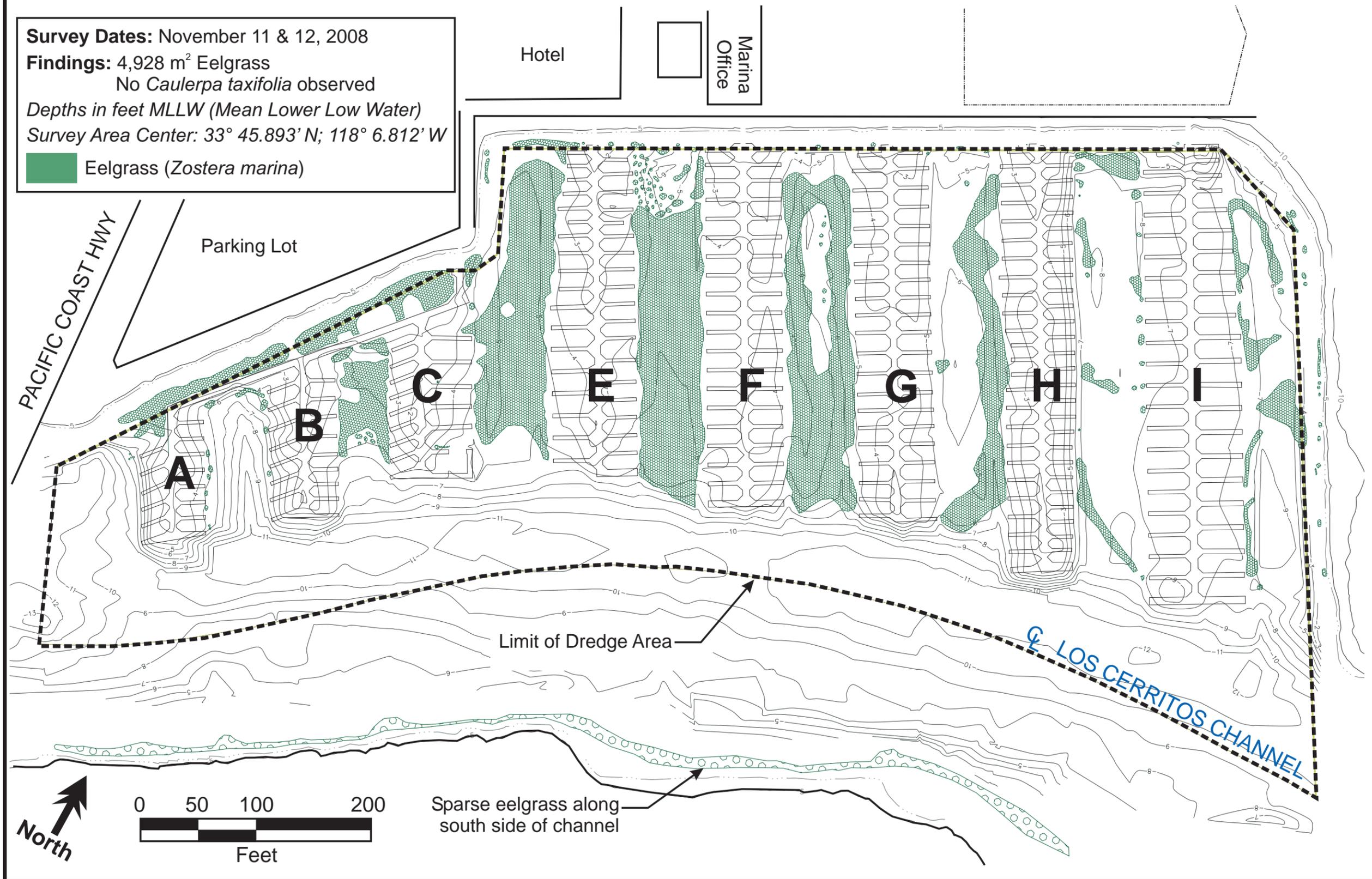
Appendix A. Eelgrass (*Zostera marina*) & survey areas and results by depth range, Cerritos Bahia Marina, Long Beach, California, October 2008.

Location	Area within -8 ft contour ft ²	Depth Range (ft mllw)	Depth Range of Eelgrass (ft mllw)	Eelgrass Area (ft ²)		Total Eelgrass Area			Potential Impact Area			Required Mitigation (1.2 to 1 Ratio)		
				Within Dredge Footprint	Outside Dredge Footprint	ft ²	m ²	ha	ft ²	m ²	ha	ft ²	m ²	ha
Fairway F - G	4,355	<5			22	1,912	177.6	0.018						
Fairway F - G	7,990	5-6				6,478	601.8	0.060						
Fairway F - G	4,850	6-7				2,628	244.1	0.024						
Fairway F - G	390	7-8				139	12.9	0.001						
Fairway F - G	25	>8				0	0.0	0.000						
Fairway F - G Total	17,610	-4 to -8	-4 to -8	11,135	22	11,157	1036.5	0.104	11,135	1034.5	0.103	13,362	1241	0.12
Fairway G - H	3,725	<5			11	1,351	125.5	0.013						
Fairway G - H	10,280	5-6				4,065	377.7	0.038						
Fairway G - H	4,485	6-7				445	41.3	0.004						
Fairway G - H	470	7-8				0	0.0	0.000						
Fairway G - H	200	>8				0	0.0	0.000						
Fairway G - H Total	19,160	-4 to -9	-4 to -7	5,850	11	5,861	544.5	0.054	5,850	543.5	0.054	7,020	652	0.07
Fairway H - I	50	<5			3	15	1.4	0.000						
Fairway H - I	300	5-6				124	11.5	0.001						
Fairway H - I	3,580	6-7				891	82.8	0.008						
Fairway H - I	16,000	7-8				1,294	120.2	0.012						
Fairway H - I	1,070	>8				0	0.0	0.000						
Fairway H - I Total	21,000	-5 to -8	-5 to -8	2,321	3	2,324	215.9	0.022	2,321	215.6	0.022	2,785	259	0.03
North of Dock I	295	<5			298	352	32.7	0.003						
North of Dock I	4,220	5-6				332	30.8	0.003						
North of Dock I	7,550	6-7				1,176	109.3	0.011						
North of Dock I	4,335	7-8				1,217	113.1	0.011						
North of Dock I	0	>8				0	0.0	0.000						
North of Dock I Total	16,400	-4 to -8	-6 to -8	2,779	298	3,077	285.9	0.029	2,779	258.2	0.026	3,335	310	0.03
Entire Marina	38,050	<5			847	22,878	2125.4	0.213						
Entire Marina	37,925	5-6				21,763	2021.8	0.202						
Entire Marina	23,875	6-7				5,640	524.0	0.052						
Entire Marina	22,965	7-8				2,763	256.7	0.026						
Entire Marina	3,575	>8				0	0.0	0.000						
Marina Total	126,390	-2 to -11	-2 to -8	52,197	847	53,044	4,928	0.493	52,197	4,849	0.485	62,636	5,819	0.58

APPENDIX C

Plan View of Eelgrass in Cerritos Bahia Marina

Survey Dates: November 11 & 12, 2008
Findings: 4,928 m² Eelgrass
 No *Caulerpa taxifolia* observed
 Depths in feet MLLW (Mean Lower Low Water)
 Survey Area Center: 33° 45.893' N; 118° 6.812' W
 Eelgrass (*Zostera marina*)



Tetra Tech, Inc.
 ENGINEERS ARCHITECTS SCIENTISTS
 401 East Ocean Blvd., Suite 420
 Long Beach, California 90802
 Ph. (562) 495-0495 fax (562) 495-5029

Site Plan
Eelgrass (*Zostera marina*) Survey
Cerritos Bahia Marina
Alamitos Bay, Long Beach, California

FIGURE 3

November 2008

APPENDIX D

Caulerpa Survey Reporting Form

Caulerpa Survey Reporting Form

This form is required to be submitted for any surveys conducted for the invasive exotic alga *Caulerpa taxifolia* that are required to be conducted under federal or state permits and authorizations issued by the U.S. Army Corps of Engineers or Regional Water Quality Control Boards (Regions 8 & 9). The form has been designed to assist in controlling the costs of reporting while ensuring that the required information necessary to identify and control any potential impacts of the authorized actions on the spread of *Caulerpa*. Surveys required to be conducted for this species are subject to modification through publication of revisions to the *Caulerpa* survey policy. It is incumbent upon the authorized permittee to ensure that survey work is following the latest protocols. For further information on these protocols, please contact: Robert Hoffman, National Marine Fisheries Service (NOAA Fisheries), (562) 980-4043, or William Paznokas, California Department of Fish & Game, (858) 467-4218).

Report Date:	10/22/08 & 10/30/2008
Name of bay, estuary, lagoon, or harbor:	Cerritos Bahia Marina, Alamitos Bay, Long Beach, CA
Specific Location Name: (address or common reference)	6289 East Pacific Coast Highway The site is comprised of the area of potential effect in and around the marina (Figure 2 of eelgrass report).
Site Coordinates: (UTM, Lat./Long., datum, accuracy level, and an electronic survey area map or hard copy of the map must be included)	Lat 33° 45' 49.40" N, Long 118° 06' 54.96" W Lat 33° 45' 57.99" N, Long 118° 06' 48.14" W Lat 33° 45' 46.50" N, Long 118° 06' 53.54" W Lat 33° 45' 54.40" N, Long 118° 06' 40.94" W
Survey Contact: (name, phone, e-mail)	Sarah McFadden (Caulerpa Surveyor) Environmental Scientist Tetra Tech, Inc. 401 East Ocean Blvd., Suite 420 Long Beach, CA 90802 (562) 495-0495; cell (626) 945-1456 Sarah.McFadden@tetrattech.com
Personnel Conducting the Survey: (if other than above): (name, phone, email)	Rafael Holcombe Principal Engineer Tetra Tech, Inc. 401 East Ocean Blvd., Suite 420 Long Beach, CA 90802 (562) 495-0495 Rafael.Holcombe@tetrattech.com

Caulerpa Survey Reporting Form

Permit Reference: (ACOE Permit No., RWQCB Order or Cert. No.)	199915256-JLB	
Is this the first or second survey for this project?	1st Survey	
Was <i>Caulerpa</i> Detected: (if <i>Caulerpa</i> is found, please immediately contact NOAA Fisheries or CDFG personnel identified above)	<p style="text-align: center;">_____ Yes, <i>Caulerpa</i> was found at this site and</p> <p style="text-align: center;">_____ has been contacted on _____ date.</p> <p style="text-align: center;"><u> X </u> No, <i>Caulerpa</i> was not found at this site.</p>	
Description of Permitted Work: (describe briefly the work to be conducted at the site under the permits identified above)	The project design consists of removing the maintenance dredging to -6ft mllw throughout the marina. The project area is approximately 7.8 acres in size.	
Description of Site: (describe the physical and biological conditions within the survey area at the time of the survey and provide insight into variability, if known. Please provide units for all numerical information).	<i>Depth range:</i>	-3ft to -12ft MLLW
	<i>Substrate type:</i>	Silt & Mud; riprap along shoreline to north and east Mussel shells covering shallower areas
	<i>Temperature:</i>	58° F (14.4° C)
	<i>Salinity:</i>	Normal
	<i>Dominant flora:</i>	Eelgrass (<i>Zostera marina</i>)
	<i>Dominant fauna:</i>	Mussels on riprap to depth of approximately -4-ft mllw
	<i>Exotic species encountered (including any other <i>Caulerpa</i> species:</i>	None
	<i>Other site description notes:</i>	The marina is on the north side of the Los Cerritos Channel and east of Pacific Coast Highway.

Caulerpa Survey Reporting Form

<p>Description of Survey Effort: (please describe the surveys conducted including type of survey (SCUBA, remote video, etc.) and survey methods employed, date of work, and survey density (estimated percentage of the bottom actually viewed). Describe any limitations encountered during the survey efforts.</p>	<p><i>Survey date and time period:</i></p>	<p>October 22 & 30, 2008 Between 9:00 am and 3:30 pm PDT</p>
	<p><i>Horizontal visibility in water:</i></p>	<p>5-ft to 8-ft</p>
	<p><i>Survey type and methods:</i></p>	<p>One scientific diver using SCUBA swam transects.</p>
	<p><i>Survey personnel:</i></p>	<p>Sarah McFadden (diver) Rafael Holcombe Shannon Feeney</p>
	<p><i>Survey density:</i></p>	<p>High Intensity Surveillance <50 % visual coverage</p>
	<p><i>Survey limitations:</i></p>	<p>None</p>
<p>Other Information: (use this space to provide any additional information or references to attached materials such as maps, reports, etc.)</p>	<p>Survey conducted in conjunction with an eelgrass (<i>Zostera marina</i>) survey in which eelgrass was mapped.</p> <p>Eelgrass Report prepared for this project</p>	

Caulerpa Survey Reporting Form (version 1.2, November 22, 2002)

APPENDIX C SEDIMENT SAMPLING RESULTS

1.0 Introduction

The project proponent is proposing to conduct maintenance dredging of the Cerritos Bahia Marina. This site is located in the northeast portion of Alamitos Bay in Long Beach, California (Figure 1). The project design consists of dredging a total of approximately 37,064 cubic yards of material from the project site. This quantity of material includes 22,120 cubic yards of material to a design depth of -8 feet (-2.4 meters) Mean Lower-Low Water (mllw) plus a -2 foot (-0.6m) over-depth allowance, which results in an additional 14,944 cubic yards.

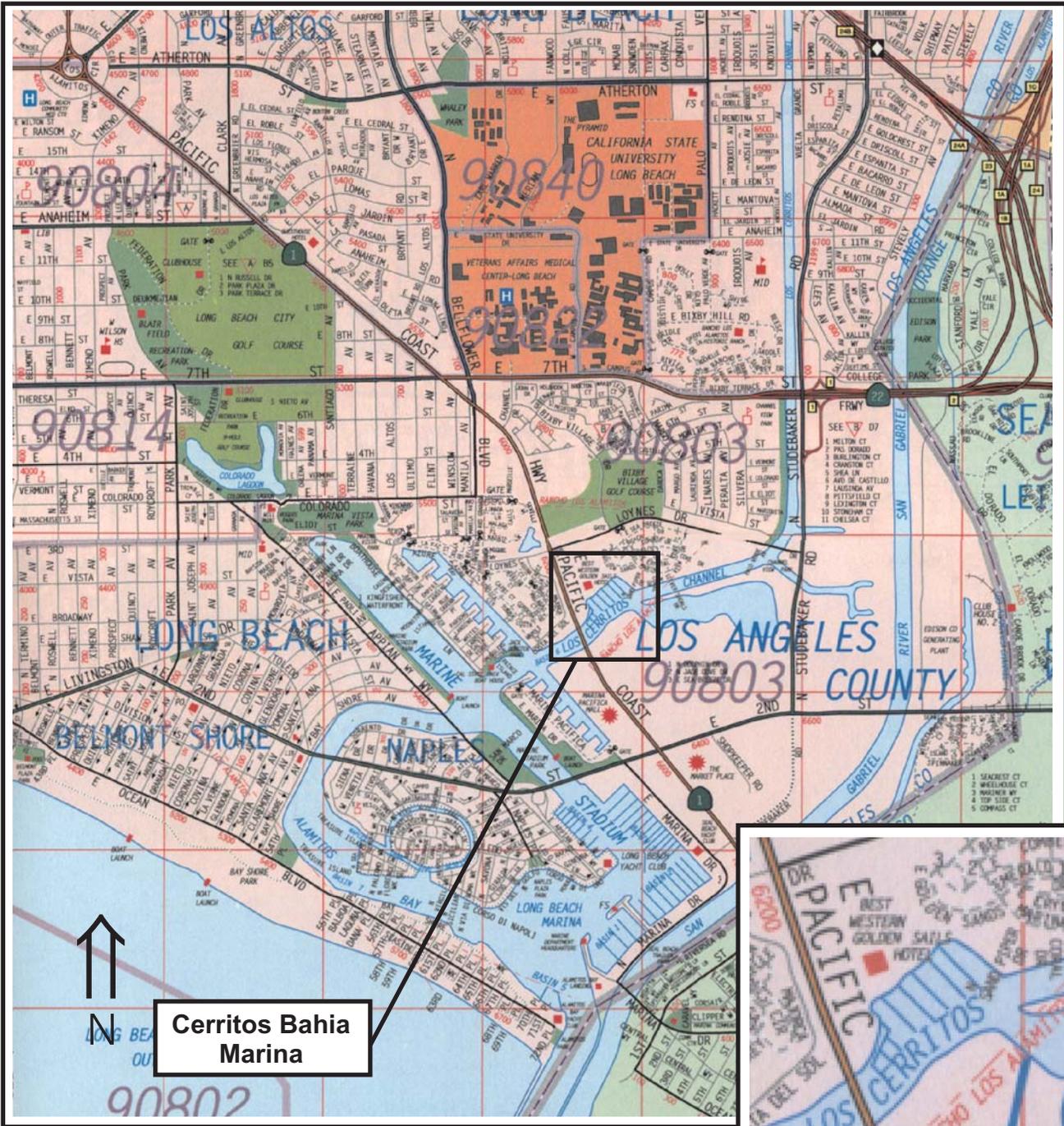
Cerritos Bahia Marina is located at 6289 East Pacific Coast Highway in Long Beach, California (Figure 1). The marina is on the north side of the Los Cerritos Channel and east of Pacific Coast Highway. The project area is approximately 7.8 acres in size (Figure 2).

On August 26, 2008, Tetra Tech, Inc. collected five samples from the Cerritos Bahia Marina (Figure 2). The samples were collected using a vibra-core sampler to a depth of two feet beyond the design depth of -8 feet mllw. All field and laboratory work was performed in accordance with the methods and procedures described in the Sampling and Analysis Plan (SAP) for this project (Tetra Tech 2006).

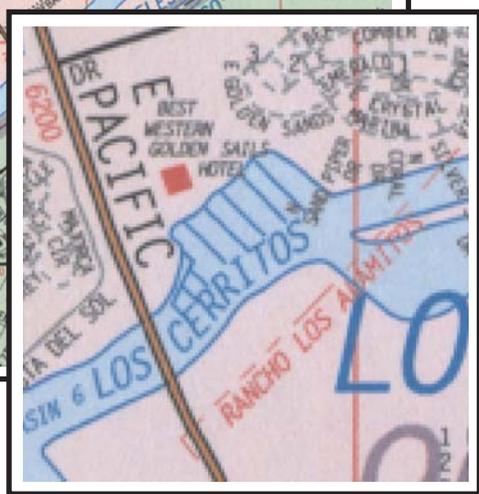
The vibracore unit consists of a vibrating unit (vibra-head) with two counter-rotating motors in a waterproof housing with an eight foot long, four inch diameter aluminum tube. The end of the tube is fitted with a stainless steel cutting tip and stainless steel core catcher. Prior to each deployment, the vibracore unit was washed, the inside of the vibracore tube was lined with a clean food-grade polyethylene liner, and the tip and core catcher were cleaned using a de-contaminating soap and rinsed with de-ionized water.

Once on station, the water depth was measured using a lead line and the vibracore was lowered from the vessel using the winch. Once the vibracore reached the bottom, it was lowered into the mud until it reached the desired depth at which point the unit was retrieved and brought on board using the winch. Once on board the vessel, the length of recovered sediment core inside the tube was measured. The core tube was then detached from the vibra-head, and the core cutter and catcher were removed. The bottom end of the core liners was sealed and the core removed from the top and sealed at the top end of the sediment using another zip tie. Immediately after sampling, the sediment samples were delivered in a cooler with blue ice to CRG Marine Laboratories, Inc. (CRG) in Torrance, California for physical and chemical analyses.

The results of the bulk sediment chemical analyses are presented below. Original chemistry reports are included in Appendix A. The chemical levels obtained in this study are compared to the Effects Range-Low (ER-L), and Effects Range-Median (ER-M). These effects levels are not available for all constituents analyzed.



Cerritos Bahia Marina



Source: Thomas Bros. Maps



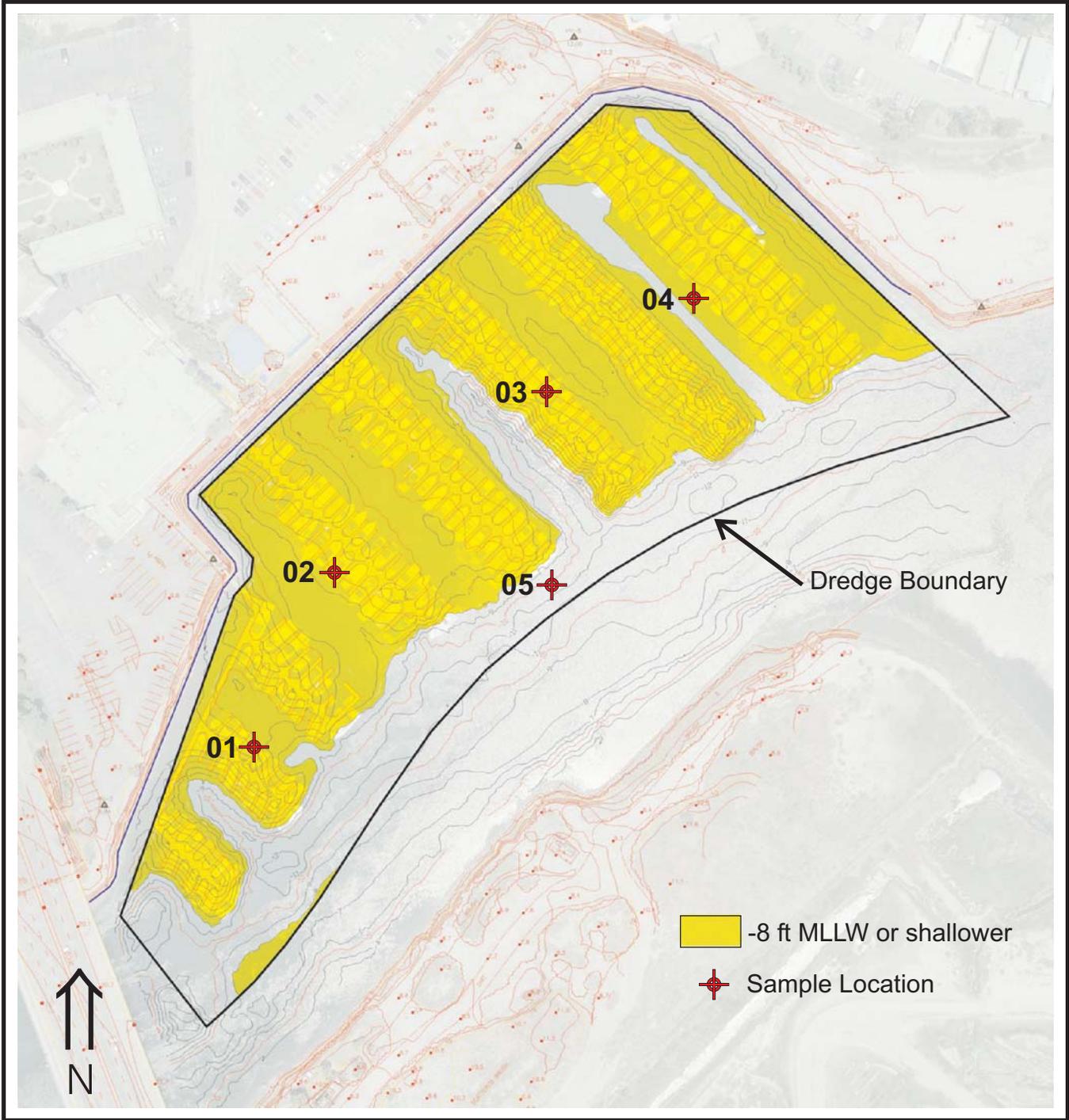
Tetra Tech, Inc.
ENGINEERS ARCHITECTS SCIENTISTS

401 East Ocean Blvd., Suite 420
Long Beach, California 90802
Ph. (562) 495-0495 fax (562) 495-5029

Site Vicinity Map
Cerritos Bahia Marina
Long Beach, California

FIGURE 1

August 2008



Tetra Tech, Inc.
 ENGINEERS ARCHITECTS SCIENTISTS

401 East Ocean Blvd., Suite 420
 Long Beach, California 90802
 Ph. (562) 495-0495 fax (562) 495-5029

Project Area with Sampling Locations

**Cerritos Bahia Marina
 Long Beach, California**

FIGURE 2

August 2008

2.0 Grain Size

The sediment samples ranged from 57 to 80 percent sand. The median grain size ranged from 60 to 106 microns.

TABLE 1 Sediment Grain Size	Station				
	CBM-08-01	CBM-08-02	CBM-08-03	CBM-08-04	CBM-08-05
Median Grain Size (microns)	59.41	106.73	91.08	74.00	59.76
% Gravel	0.00	0.00	0.00	0.00	0.00
% Sand	58.93	80.10	70.42	65.65	57.30
% Silt	35.47	16.14	23.90	27.31	33.96
% Clay	5.60	3.76	5.68	7.05	8.75

3.0 General Chemistry

Oil & Grease was analyzed using Method SM 5520 E. Oil & Grease results were at or just above the reporting limit of 0.02 percent dry weight. Percent solids (Method EPA 160.3) ranged from 62.3 percent to 69.9 percent. The Total Organic Carbon (TOC) content of the samples ranged from 0.38 to 1.52 percent. Total Sulfides ranged from 2.76 to 25.23 mg/kg dry weight. All of these results are within normal ranges. Total recoverable petroleum hydrocarbons (TRPH) were not detected in any of the five samples.

TABLE 2 General Chemistry	Station				
	CBM-08-01	CBM-08-02	CBM-08-03	CBM-08-04	CBM-08-05
Oil & Grease (% dry wt.)	0.04	0.05	0.04	0.02	0.02
Percent Solids	63.3	66.9	62.3	73.5	69.9
pH	8.2	8.6	8.5	8.2	8.1
Total Nitrogen (mg/dry kg)	590.4	402.9	477.9	251.8	355.9
Total Organic Carbon (%)	1.52	0.72	0.96	0.38	0.7
Total Phosphorus-High Range (mg/dry kg)	691.86	729.85	898.44	598	759.33
Total Sulfides (mg/dry kg)	25.23	2.76	24.75	5.35	3.37
TRPH (% dry wt.)	"	"	"	"	"
" = not detected; TRPH Reporting Limit 0.02					

4.0 Soluble Threshold Limit Concentrations (STLC)

Soluble threshold limit concentrations (STLC) results correspond to concentrations in the leachate (mg/L). The results for both copper and lead were well below the California threshold limits of 25 mg/L and 5 mg/L respectively.

TABLE 3 Soluble Threshold Limit Concentrations (STLC)	Station					STLC
	CBM-08-01	CBM-08-02	CBM-08-03	CBM-08-04	CBM-08-05	
Copper (mg/L)	"	"	"	0.119	"	25
Lead (mg/L)	0.217	1.820	0.540	0.740	0.745	5
" = not detected						

5.0 Toxicity Characteristic Leaching Procedure (TCLP)

TCLP Toxicity Characteristic Leaching Procedure results for copper ranged from 0.0474 mg/L to 0.8537 mg/L, and from 0.083 mg/L to 0.247 mg/L for lead.

TABLE 4 Toxicity Characteristic Leaching Procedure (TCLP)	Station					TCLP
	CBM-08-01	CBM-08-02	CBM-08-03	CBM-08-04	CBM-08-05	
Copper (mg/L)	0.0474	0.0599	0.8537	0.0773	0.0906	
Lead (mg/L)	0.2124	0.2475	0.2316	0.0831	0.11	5

6.0 Trace Metals

Metal results (dry weight) are presented in Table 5. All of the analyzed metals were detected in all five samples. Arsenic, cadmium, copper, lead, nickel, and zinc levels exceeded the Effects Range-Low (ER-L) levels at three to five stations each. No metals were found to exceed the Effects Range-Median (ER-M) levels at any of the five stations.

TABLE 5 Metals (µg/dry g)	Station					Effects Range- Low (ER-L)	Effects Range- Median (ER-M)
	CBM-08-01	CBM-08-02	CBM-08-03	CBM-08-04	CBM-08-05		
Aluminum (Al)	16940	18000	21450	14160	28600		
Antimony (Sb)	0.86	0.95	1.09	0.64	0.61		
Arsenic (As)	9.16	15.56	10.91	4.15	4.53	8.2	70
Barium (Ba)	161.2	278.8	247.9	144.4	115.2		
Beryllium (Be)	0.599	0.790	0.726	0.411	0.562		
Cadmium (Cd)	0.849	0.739	0.866	0.204	0.292	1.2	9.6
Chromium (Cr)	40.35	60.27	42.46	26.26	31.52	81	370
Cobalt (Co)	12.53	19.99	14.44	10.08	10.39		
Copper (Cu)	73.6	71.4	104.8	37.0	48.9	34	270
Iron (Fe)	29510	29820	34570	25120	46920		
Lead (Pb)	61.71	67.05	74.35	17.56	26.85	46.7	218
Manganese (Mn)	351.6	363.6	437.0	343.7	551.0		
Mercury (Hg)	0.15	0.15	0.17	0.05	0.10	0.15	0.71
Molybdenum (Mo)	2.232	1.689	1.631	0.698	0.936		
Nickel (Ni)	27.11	39.1	29.9	18.9	21.5	20.9	51.6
Selenium (Se)	0.287	0.245	0.201	0.093	0.192		
Silver (Ag)	0.204	0.204	0.303	0.219	0.231	1.00	3.7
Strontium (Sr)	97.29	74.33	82.90	37.27	83.45		
Thallium (Tl)	0.251	0.257	0.245	0.163	0.215		
Tin (Sn)	13.6	2.6	3.2	1.3	1.7		
Titanium (Ti)	1462	1449	1757	1566	2554		
Vanadium (V)	63.2	109.4	70.1	49.5	55.6		
Zinc (Zn)	167.2	191.9	167.9	96.0	113.4	150	410

Bold: ≥ER-L (Effects Range-Low reported by Long, et al. 1995)
All values presented as dry weight

5.0 Pesticides

The pesticides detected included DDTs (2,4'-DDD, 2,4'-DDE, 4,4'-DDD, 4,4'-DDE), Chlordanes (Chlordane-alpha, Chlordane-gamma, cis-Nonachlor, and trans-Nonachlor) and Dicofol.

TABLE 6 Pesticides (ng/dry g)	Station					Effects Range- Low (ER-L)	Effects Range- Median (ER-M)
	CBM-08-01	CBM-08-02	CBM-08-03	CBM-08-04	CBM-08-05		
<u>2,4'-DDD</u>	5.3	18.5	20.6	"	"	2.0	20
<u>2,4'-DDE</u>	J 4.4	7.1	8.5	"	"	2.2	27
2,4'-DDT	"	"	"	"	"	1.0	7
<u>4,4'-DDD</u>	18.0	63.4	73.4	J 1.5	"	2.0	20
<u>4,4'-DDE</u>	40.5	61.9	54.2	15.8	20.4	2.2	27
4,4'-DDT	"	"	"	"	"	1.0	7
Aldrin	"	"	"	"	"		
BHC-alpha	"	"	"	"	"		
BHC-beta	"	"	"	"	"		
BHC-delta	"	"	"	"	"		
BHC-gamma	"	"	"	"	"		
Chlordane-alpha	J 1.5	J 2.4	J 2.6	J 1.5	J 1.0		
Chlordane-gamma	J 2.3	J 3.0	J 3.6	"	"		
cis-Nonachlor	J 1.4	J 1.1	J 1.9	"	"		
trans-Nonachlor	"	J 1.2	J 1.3	"	"		
Oxychlordane	"	"	"	"	"		
DCPA (Dacthal)	"	"	"	"	"		
Dicofol	19.6	60.8	49.5	"	"		
Dieldrin	"	"	"	"	"	0.02	8.00
Endosulfan Sulfate	"	"	"	"	"		
Endosulfan-I	"	"	"	"	"		
Endosulfan-II	"	"	"	"	"		
Endrin	"	"	"	"	"		
Endrin Aldehyde	"	"	"	"	"		
Endrin Ketone	"	"	"	"	"		
Heptachlor	"	"	"	"	"		
Heptachlor Epoxide	"	"	"	"	"		
Methoxychlor	"	"	"	"	"		
Mirex	"	"	"	"	"		
Perthane	"	"	"	"	"		
Toxaphene	"	"	"	"	"		
<p>" = not detected Bold: ≤ER-L (Effects Range-Low reported by Long, et al. 1995) Underlined: ≤ER-M (Effects Range-Median reported by Long, et al. 1995) J = Estimated value below the reporting limit All values presented as dry weight</p>							

6.0 Polynuclear Aromatic Hydrocarbons (PAHs)

PAH results are presented in Table 7. PAHs are typical components of asphalts, fuels, oils, and greases. Various PAHs were detected at low levels in all five samples. No detected PAH levels exceeded ER-L levels in any of the samples.

TABLE 7 Polynuclear Aromatic Hydrocarbons (ng/dry g)	Station					Effects Range- Low (ER-L)	Effects Range- Median (ER-M)
	CBM-08-01	CBM-08-02	CBM-08-03	CBM-08-04	CBM-08-05		
1-Methylnaphthalene	J 1.3	J 2.5	J 2.2	"	"		
1-Methylphenanthrene	J 2.7	J 3.5	J 3.5	J 1.3	J 2.1		
2,3,5-Trimethylnaphthalene	"	J 1.6	J 1	"	"		
2,6-Dimethylnaphthalene	J 4.9	11.6	7.5	J 1.6	J 1.7		
2-Methylnaphthalene	J 3.9	7.4	6	J 1.6	J 1.4		
Acenaphthene	"	"	J 1.2	"	"	16	500
Acenaphthylene	J 1.6	J 2	J 2.3	J 1.1	J 1	44	640
Anthracene	7.6	10.5	10.2	J 2.6	J 3.5	85.3	1100
Benz[a]anthracene	24.3	18.9	22.1	11.5	17.4	261	1600
Benzo[a]pyrene	38.4	34.5	33	17.6	23	430	1600
Benzo[b]fluoranthene	56.6	43.1	50	25.3	32.3		
Benzo[e]pyrene	49.3	38.5	50.1	23.7	26.1		
Benzo[g,h,i]perylene	46.2	32.4	38	25.9	30.2		
Benzo[k]fluoranthene	23.8	21.5	22.6	11.2	13.7		
Biphenyl	J 1.0	1.2	"	"	"		
Chrysene	38.7	29.2	39.6	18.1	25.2	384	2800
Dibenz[a,h]anthracene	10.4	8.8	9.9	7.6	8.1	63.4	260
Dibenzothiophene	J 2.9	J 2.2	J 3.3	J 1.6	J 2.1		
Fluoranthene	48.9	35.3	40.4	20.6	28.7	600	5100
Fluorene	J 1.1	J 2.4	J 2	"	J 1.1	19	540
Indeno[1,2,3-c,d]pyrene	33.8	30.3	29.5	18	24.9		
Naphthalene	J 2.3	J 2.4	J 2.5	J 1.4	J 1.1	160	2100
Perylene	16.5	13	31.2	6.6	9.6		
Phenanthrene	12.5	15.7	15.6	7	10.6	240	1500
Pyrene	61	53.3	83.8	26.9	34.1	665	2600
J = Estimated value below the reporting limit " = not detected All values presented as dry weight							

7.0 Polychlorinated Biphenyls (PCBs)

PCBs results are presented in Table 8. PCBs were detected in all five samples. Aroclor 1254 was detected at levels ranging from 12 (ng/dry kg) to 154 (ng/dry kg) in four of the five samples. The levels of each of the Congener-based PCBs were relatively low with most values below the reporting limit (5 ng/dry kg).

TABLE 8 Polychlorinated biphenyls (ng/dry g)	Station				
	CBM-08-01	CBM-08-02	CBM-08-03	CBM-08-04	CBM-08-05
Aroclor 1016	"	"	"	"	"
Aroclor 1221	"	"	"	"	"
Aroclor 1232	"	"	"	"	"
Aroclor 1242	"	"	"	"	"
Aroclor 1248	"	"	"	"	"
Aroclor 1254	87	40	154	"	J 12
Aroclor 1260	"	"	"	"	"
PCB044	J 3.3	"	5.8	"	J 1.9
PCB049	6.1	"	7.8	"	J 2.1
PCB052	J 4.1	J 2.6	7.5	"	"
PCB066	J 3.8	J 1.7	J 4.6	J 1.0	J 1.2
PCB070	5.5	J 2.0	7.3	"	J 1.2
PCB087	J 3.2	"	5.0	"	"
PCB095	8.7	5.0	16.1	"	J 1.3
PCB097	J 4.8	"	9.3	"	"
PCB099	6.2	J 4.0	10.0	J 1.5	J 1.5
PCB101	13.6	8.2	25.0	J 1.9	J 2.1
PCB110	10.7	J 4.9	18.9	"	J 1.5
PCB118	9.1	"	13.7	"	"
PCB138	8.9	"	20.5	"	"
PCB149	6.2	5.0	14.2	"	J 1.9
PCB151	J 2.9	"	J 3.2	"	J 1.2
PCB153	5.9	J 3.9	14.1	"	J 1.8
PCB168+132	J 2.1	"	J 4.4	"	"
PCB174	J 2.7	J 3.3	J 3.6	"	"
PCB177	J 1.8	J 1.3	J 4.2	"	"
PCB180	J 2.7	J 3.0	J 4.3	"	"
PCB183	J 1.6	J 1.3	J 1.6	"	J 1.6
PCB187	J 2.7	J 2.8	5.0	"	J 1.8
PCB201	J 4.5	"	J 4.9	"	"
PCB203	J 1.8	"	6.9	"	"
PCB206	J 1.4	"	"	"	"

" = not detected; J = Estimated value below the reporting limit; All values presented as dry weight
The following Congener-based PCBs were analyzed and not detected: PCB003, PCB008, PCB018, PCB028, PCB031, PCB033, PCB037, PCB056/060, PCB074, PCB077, PCB081, PCB105, PCB114, PCB119, PCB123, PCB126, PCB128, PCB141, PCB156, PCB157, PCB158, PCB167, PCB169, PCB170, PCB189, PCB194, PCB195, PCB200, and PCB209.

8.0 Phthalates

The phthalate bis(2-Ethylhexyl) phthalate was detected in all five samples. Butylbenzyl phthalate was below the reporting limit at one station and not detected at the remaining four stations.

TABLE 9 Phthalates (ng/dry g)	Station				
	CBM-08-01	CBM-08-02	CBM-08-03	CBM-08-04	CBM-08-05
bis(2-Ethylhexyl) Phthalate	2789	1244	394	385	418
Butylbenzyl Phthalate	J 47	"	"	J 39	"
Diethyl Phthalate	"	"	"	"	"
Dimethyl Phthalate	"	"	"	"	"
Di-n-butyl Phthalate	"	"	"	"	"
Di-n-octyl Phthalate	"	"	"	"	"
J = Estimated value below the reporting limit " = not detected All values presented as dry weight					

9.0 Phenols & Organotins

Phenols and were not detected in any of the five samples. Only the Organotins Dibutyltin and Tributyltin were detected. Dibutyltin was found at two stations and Tributyltin was found at all five stations.

TABLE 10 Phenols (ng/dry g)	Station					Reporting Limit
	CBM-08-01	CBM-08-02	CBM-08-03	CBM-08-04	CBM-08-05	
2,4,6-Trichlorophenol	"	"	"	"	"	100
2,4-Dichlorophenol	"	"	"	"	"	100
2,4-Dimethylphenol	"	"	"	"	"	200
2,4-Dinitrophenol	"	"	"	"	"	200
2-Chlorophenol	"	"	"	"	"	100
2-Methyl-4,6-dinitrophenol	"	"	"	"	"	200
2-Nitrophenol	"	"	"	"	"	200
4-Chloro-3-methylphenol	"	"	"	"	"	200
4-Nitrophenol	"	"	"	"	"	200
Pentachlorophenol	"	"	"	"	"	100
Phenol	"	"	"	"	"	200
Organotins (ng/dry g)	CBM-08-01	CBM-08-02	CBM-08-03	CBM-08-04	CBM-08-05	Reporting Limit
Dibutyltin	12.1	"	54.9	"	"	3
Monobutyltin	"	"	"	"	"	3
Tetrabutyltin	"	"	"	"	"	3
Tributyltin	16.1	7.8	385.9	5.3	7.3	3
" = not detected						