

SAN LEANDRO MARINA HARBOR BASIN

Alternatives Study

Prepared for
City of San Leandro

March 2011



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SECTION 1

Introduction

1.1 Purpose of the Study

The City of San Leandro is considering redevelopment options for the San Leandro Marina Harbor and Shoreline Recreation Area, which are generally located on the east shore of the San Francisco Bay between the City of Oakland to the north and the City of Hayward to the south. The redevelopment would include the Harbor Basin (which would be undertaken by the City) as well as the surrounding shoreline areas (which would be undertaken by a private developer, possibly Cal-Coast Development, LLC, whose preliminary plan is discussed in Section 4 of this report).

The intent of this report is to assist the City of San Leandro in determining what types of uses would be appropriate for the Marina Harbor Basin, should the City permanently discontinue dredging its Marina basin and federally-authorized entrance Channel, reconfigure the harbor to be able to serve smaller vessels (such as kayaks, for instance), and redevelop its Marina and surrounding areas to serve the City's residents, given that the continued operations of a 465-berth boat harbor is not financially feasible. Although historically the federal Channel was dredged approximately every four to five years and the Marina berthing areas every seven to eight years, a full dredge has not occurred since 1997 due to lack of funding, specifically federal assistance, which the City has historically received from the U.S. Army Corps of Engineers (the federal Channel received a partial dredge, 5 feet plus 1 foot, in the fall of 2009). This Alternatives Study sets out to identify a range of practicable options (Section 2, *Alternatives Considered*) and describes them independently. Before contrasting them with each other, Section 3 *Dredged Materials Disposal Concept* offers an approach that could serve to postpone a final disposition of the Harbor Basin. Finally, the alternatives are compared in a systematic way across different evaluation categories for the City's decision-making process (Section 4, *Alternatives Compared*).

Although the City ultimately seeks to redevelop a much larger area, the primary study area being considered in this report is the San Leandro Harbor Basin. In addition, this study considers the Dredged Materials Management Site (DMMS) and the South Basin as auxiliary components of future development options (Section 5, *Alternatives for Future Use of the DMMS*). All of the sub-areas are described in more detail below and are illustrated in **Figure 1-1** on the following page.

1.2 Sub-Area Descriptions

The various sub-areas analyzed throughout this study are described below.



San Leandro Shoreline Area

The San Leandro Marina Shoreline area contains over 1,800 acres of public land and has operated since the 1960s. The approximately 40 acres being considered for development includes several revenue-generating uses such as the San Leandro Marina Inn (a 131-room limited service hotel), El Torito Restaurant (250-seat capacity), Horatio's Restaurant (225-seat capacity), two yacht clubs and a harbor. Other uses on the site include large paved surface parking facilities (a sizeable portion of which are unused), and patches of ornamental landscaping. The Shoreline area includes other public uses, such as the Monarch Bay Golf Club's Marina 9-Hole and Tony Lema golf courses to the east and Marina Park to the south. A local road network provides vehicle access within the Shoreline Area.

Harbor (North) Basin

The San Leandro Marina has operated since the 1960s and has approximately 40 percent of the 465 berths occupied. As noted above, the federal Channel leading into/out of the harbor received a partial dredge in late 2009, but the harbor basin itself has not been fully dredged since 1997, and there is no near-term funding or plans to dredge it.

South Basin

The South Basin (also known as the Small Boat Lagoon) is located directly south of the Harbor Basin. It is surrounded by Marina Park to the east, the Monarch Bay Golf Club to the southeast, and trails to the south and east and does not contain any boat storage facilities.

Dredged Materials Management Site

The Dredged Materials Management Site (DMMS) is bordered by the Estudillo Canal to the north, by the San Leandro Shoreline Marshlands (SLSM) (also known as the Roberts Landing area) to the south and southeast, by residential development (Marina Vista) to the east, and by the Monarch Bay Golf Club to the west. It is approximately 100 acres and consists of two enclosed basins – West Basin (Basin 1) and East Basin (Basin 2). Historically, this site has been used as a temporary drying and storage area for sediments that were dredged from the San Leandro Channel and Harbor Basin. Levees surround the DMMS with six weirs along the northern levee and one weir at the southern levee to control the flow of water into Estudillo Canal and into the DMMS, respectively. There is also a weir in the DMMS central levee to enable drainage flows between the two DMMS basins. Several bird habitat islands, created as part of post-dredge material removal activities, are located within each basin.

Types of Redevelopment Being Considered for Upland Areas

While no development application has been submitted so far to the City for the upland areas, it is anticipated that the programming for areas adjacent to the Harbor Basin would include some combination of hotel (with a conference center), office, retail and restaurants, residential, recreational, and open space uses. These uses would generally be consistent with the type of development that exists in the project vicinity, and are discussed in more detail in Section 4.2.

Although this study does not analyze any specific redevelopment options for the upland areas, it addresses the interface between the proposed Harbor Basin alternatives and the types of uses envisioned in the immediate vicinity. Moderate changes to the development concept would not impact the conclusions of this study. See Section 4.2 for this discussion.

1.3 Scope and Methodology

The central mission of the City of San Leandro Harbor Basin Alternatives Study can be stated in a straightforward way: first, to provide alternative configurations for the Harbor Basin which will retain aquatic recreational opportunities and mesh well with existing and potential landside uses but which will be in equilibrium, or near equilibrium, in terms of natural sedimentation processes; second, to consider options for the DMMS as an expanded and improved natural habitat which also can be a City amenity.

This report is based on three study sessions held on October 21 and November 17, 2010 and January 13, 2011 between the technical team, the City of San Leandro staff, and Cal-Coast, as well as review of pertinent background documentation and professional opinion. The report seeks to address the following topics and answer the following questions for each of the alternatives:

- **Recreation.** Does it provide aquatic recreation? What types? Can we determine the demand for the types of recreation offered?
- **Consistency with Cal-Coast Development Plans.** Is it complementary with Cal-Coast Development planning?
- **Sedimentation Patterns, Hydrodynamics.** Is it sustainable with natural hydrology and sediment transport processes? How close is the alternative to being self sustaining with respect to sedimentation?
- **Technical and Regulatory Opportunities and Constraints.** Which permits will be necessary? How difficult will it be to secure permits? How are the different agencies likely to view the different alternatives?
- **Relative Initial and Long-term Maintenance Costs.** All cost and revenue projections are not to be construed as a detailed fiscal analysis. On a relative basis, and solely for conceptual level planning purposes, what is the relative cost of each alternative considering:
 - Environmental review and permitting;
 - Design and implementation ;
 - Long-term maintenance (using existing City staffing categories and costs, and assuming a comparable level of service); and
 - Potential revenues, as appropriate.

In addition, Section 5 of this report provides alternatives for future use of the City's Dredged Material Management Site (DMMS). Proposed DMMS alternatives considered in this section are (1) operating the site as a DMMS for other harbors, (2) shorebird habitat enhancement, (3) tidal marsh restoration, and (4) seasonal wetland restoration. These options are considered relative to each of the alternative uses of the Harbor Basin.

SECTION 2

Alternatives Considered

This section describes the three alternatives that are being analyzed for the San Leandro Marina Harbor Basin, as well as a No Action Alternative.

2.1 No Action Alternative (Custodial Care Only)

If the City were to suspend the required periodic dredging of the Harbor Basin and Channel due to lack of funding or for some other reason, over time, the basin would fill with sediments through natural deposition. Within 4 to 5 years, Channel deposition would prevent access to the basin for the typical boats that presently use the marina. Kayaks and other hand launched craft could continue using the basin at high tides for another 4 to 5 years, at the end of which it would become difficult and unadvisable to continue. The harbor would very likely become a mud flat, and will eventually acquire salt marsh emergent vegetation over time starting at the periphery of the basin.

A complex assemblage of plants and associated wildlife could exist in the harbor basin in the long-term, although Section 4.3 makes the argument that the mud flats could persist indefinitely. If the site evolved more conventionally, California cordgrass would occur closest to the water and common pickleweed at higher elevation, interspersed with salt grass, fleshy jaumea and alkali heath. Higher marsh elevations would support species such as arrowgrass, sea lavender, and marsh pliantain. Put another way, it would resemble the restored San Leandro Shoreline Marshlands to the south, with its wildlife community including resident and transient ducks, herons, egrets, geese, rails, wading birds such as avocets, sandpipers, gulls, terns, raptors, small mammals and upland bird species. It is also noted that, in the event that no funding is available for the removal of the existing piers and other structures in the Harbor Basin, they would eventually rot and the area would likely need to be fenced off for safety reasons. In this case, the site could eventually become blighted. Design concept for the No Action Alternative is illustrated in **Figure 2-1**, on the following page.

2.2 Alternatives Descriptions

To varying degrees, all alternatives would contain wildlife high-marsh refugia, islands, high marsh¹, and low marsh areas. These wetland features would be created using the materials dredged from the basin during the next one or two dredge cycles. These wetlands would provide

¹ The terms high-marsh, refugia, and island are used interchangeably in this report. They are areas at or near high tide elevations and provide different, and usually more diverse, vegetation and habitat for additional species, especially those, such as the salt marsh harvest mouse, that seek higher ground during incoming tides. The detailed design of a selected alternative would determine the final elevations.

habitat for wildlife and serve as a visual amenity. The wetland features would be designed with elevations set to be self-sustaining over time, but with an anticipated sea-level rise of 10 to 17 inches by 2050,² the character of the features could be expected to modify itself with islands set at virtually high tide level today, and becoming high marsh areas over the next 30 to 40 years.

All alternatives would also include a perimeter multi-use promenade around the basin, generally along the existing Marina pathway. The promenade would be lighted for security purposes and to encourage nighttime use. The theme for this promenade changes slightly between alternatives as described below.

All alternatives would retain the existing overlook near Horatio's restaurant and the J/K restrooms currently located near the southeast corner of the basin. All new facilities (restrooms, other buildings, overlooks, promenades, boardwalks, and launch facilities) would be ADA-compliant.

In the interests of clarity, the hydrogeological discussion is abbreviated below. Section 4.3 provides additional information on dredging, sedimentation, and hydrology for each of the Alternatives.

Design concepts for each of the alternatives are illustrated following the discussion of each alternative.

Marina Park Alternative

This alternative would maintain an approximate 185-slip Marina in the eastern portion of the Harbor Basin, eliminating the slips in the western portion of the basin (see **Figure 2-2**). The existing fuel dock would be removed and decommissioned. Remaining wooden slips would be upgraded as necessary and would range in size from 28 to 60 feet with an emphasis on larger slips reflecting recent market trends. Approximately 11 slips would be covered, as currently configured, and a maximum of 18 slips would be allowed for live-aboard boats. A replacement restroom to accommodate the berths would be constructed on the south end of the harbor, although its exact location will be determined at a later time and in consultation with the landside developer.

The perimeter trail would be designed as a pedestrian promenade. A small, publicly accessible beach area would be developed in the northwest corner of the Harbor Basin and would also serve as an amenity for the hotel/conference center. The beach would be backdropped by a stepped shoreline suitable for seating. A stage area could be located in the center of the beach for outdoor concerts/events. Associated with the beach would be a small non-motorized boat rental concession, provided by the landside developer. There would also be boat and bike rentals at the boat launch.

The western portion of the Harbor Basin would be dominated by natural features, including a marsh, a wildlife island/refugium, and various vegetative features. The western rip-rap shoreline of the basin would be backfilled to create a natural shoreline appearance and a vegetation transition from upland to wetland habitats. Some of the existing Marina concrete pilings would be retained for visual

² <http://www.hayward-ca.gov/departments/ced/documents/planning/2010/HASPA%20Report%20v15A%20-%20with%20acknowledgements.pdf>



interest and perching habitat. A “boardwalk”-type pedestrian walkway would be constructed along the western edge of the harbor, providing opportunities for bird watching and other types of water- and wildlife-related passive recreation to hotel patrons, area workers, boating enthusiasts, and harbor visitors. Sufficient restrooms would be provided in this area, as necessary. The existing boat launch, just southeast of the Harbor Basin, would remain in place. This boat launch would allow boaters access into the South Basin.

Dredging of 105,000 cubic yards (CY) per cycle would be necessary approximately every four years to maintain the harbor, with an additional 10,000 CY for the berthing areas every alternate episode (total of 115,000 CY every 8 years). However, since the berthing area has not been dredged since 1997, this area will require additional dredging over and above that which would be required in future 8-year cycles. The first episode is therefore expected to be about 125,000 CY of dredging (105,000 CY for the Channel and 20,000 CY for the berthing area). Although this would not restore the authorized depth of 7 ft at Mean Lower Low Water (MLLW), it would allow for the continued use of a portion of the harbor for navigation. The Channel and berthing areas would be maintained to -5 feet MLLW. Project depths less than 6 feet are not advisable for sailboats, but the harbor could continue operating for smaller powerboats and hand launched craft. Because continued dredging is required for this alternative, it may prove to be economically infeasible.

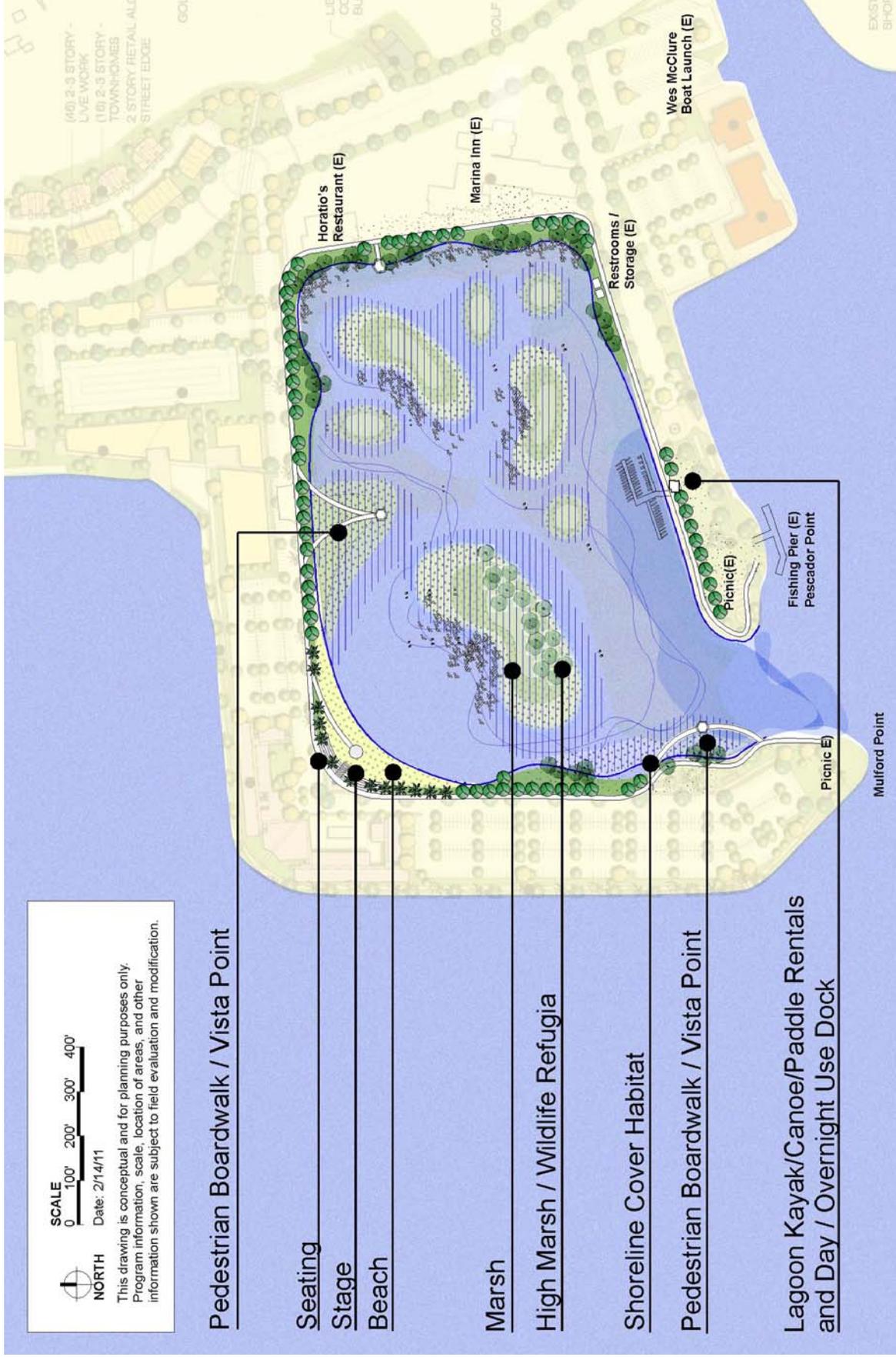
Aquatic Park Alternative

The Aquatic Park would emphasize non-motorized³ boating uses, including kayaks and canoes in a natural setting. The Harbor Basin eventually would no longer be able to accommodate motorized boating uses due to the siltation of the basin (as no on-going dredging would occur). As part of this alternative, all of the existing slips and most pilings would be removed. In their place, the Harbor Basin would be reclaimed into a series of wildlife islands, marsh areas, and other vegetative features. The western, northern, and eastern rip-rap shoreline of the basin could be backfilled to create a natural shoreline appearance and a vegetation transition from upland to wetland habitats.

A water trail would be set up around the islands to provide recreational opportunities for hotel patrons and harbor visitors. Remaining pilings would serve as interpretive markers for the water trail. Similar to Alternative 1, the perimeter trail would be designed as a pedestrian promenade and a publicly accessible beach and viewing area would be created in the northwestern corner of the harbor. Several pedestrian boardwalks would extend over the water from the shore, providing vistas across the water (one is envisioned along the northern edge and one along the western edge).

As illustrated in **Figure 2-3**, a boating school/ rental facility with a day-use dock could be constructed at the southern edge of the Harbor Basin, with space for approximately 40 non-motorized small boats and boat storage (this is assumed to be undertaken by the landside developer). Overnight docking would be permitted on a fee basis for those using the Bay Water Trail and wishing to

³ Power craft would be inconsistent with the presence of the natural marsh and inconsistent with expectations of kayakers and canoers.



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Figure 2-3
 Aquatic Park Alternative

spend the evening at one of the Marina hotels. Pending development of landside facilities, public restrooms would be provided in the southeastern corner of the Harbor Basin. The existing boat launch, just southeast of the Harbor Basin, would remain in place. This boat launch would allow boaters access into the South Basin.

Although some initial dredging would be necessary to establish this alternative, the Harbor Basin would be entirely self-sustaining with no maintenance dredging being required on an on-going, long-term basis. In the event that less fill or funding is available to create the proposed wildlife islands, a reduced amount of fill could be used to create smaller islands, with additional fill provided naturally over time through natural sedimentation.

Nature Park Alternative

The Nature Park Alternative would focus on establishing a diverse wetland environment at the Harbor Basin for passive recreational and outdoor learning / environmental educational opportunities and would not include a beach.⁴ The Nature Park would instead be a place for visitors to engage with the water and wildlife and serve as a complement to the more urbanized shoreline surroundings.

As part of this alternative, all existing slips and most pilings would be removed. Similar to Alternative 2, the basin would be dominated by a series of wildlife islands, marsh areas, and other vegetative and water-related features. The entire rip-rap shoreline of the basin would be backfilled to create a natural shoreline appearance and a vegetation transition from upland to wetland habitats (see **Figure 2-4**).

A pedestrian bridge at the entrance to the harbor, which would allow for access by kayaks and/or canoes, would create an approximately 0.75-mile-long loop trail. The perimeter trail would be designed for multiple uses and would be constructed to Bay Trail standards. A series of interpretive points / outdoor learning stations would be set up along the perimeter pedestrian promenade, some extending over the water via a boardwalk. A Nature / Interpretive Kiosk (as well as some signage along the perimeter trail), constructed at the southern edge of the basin, would provide educational enrichment to harbor visitors. An at-water level outdoor classroom and harbor access point would be located on the north side of the kiosk. The kiosk would include a small canoe/kayak rack for use by local school groups and organizations, unless such amenities are provided as part of landside development at the boat-launch ramp. Interpretive and vista points around the basin would also be conducive to passive recreational activities, such as bird watching and photography.

Non-motorized boating, such as kayaking and canoeing, would continue to be possible from the existing boat launch, just southeast of the Harbor Basin. This boat launch would be retained in its existing place and would allow boaters access into the South Basin. Non-motorized boating would be permitted within Harbor Basin. Public restrooms would be provided along the southern edge of the Harbor Basin.

⁴ A beach would require support services, such as maintenance trash collection and police protection services. It is assumed that those are not feasible with this alternative.



SCALE
 0 100' 200' 300' 400'

Date: 2/14/11



NORTH

This drawing is conceptual and for planning purposes only. Program information, scale, location of areas, and other information shown are subject to field evaluation and modification.

Pedestrian Boardwalk / Vista Point

High Marsh / Wildlife Refugia
 Interpretive Station

Shoreline Cover Habitat
 Water Access

Pedestrian Bridge / Vista Point /
 Interpretive Station

Interpretive Center

As with Alternative 2, some initial dredging would be necessary to establish this alternative. However, the wetland areas of the Harbor Basin would be entirely self-sustaining with no maintenance dredging being required on an on-going, long-term basis. Also, as with Alternative 2, in the event that less fill or funding is available to create the proposed wildlife islands, a reduced amount of fill could be used to create smaller islands, with additional fill provided naturally over time through natural sedimentation.

SECTION 3

Dredged Materials Disposal Concept

This section describes a Dredged Materials Disposal Concept and its association with the options being considered for the Harbor Basin. The dredged materials disposal concept is a means of maintaining approximately 185 slips at the existing Marina while the long-term reuse plans for the Marina are being developed. It would provide a method for beneficially reusing the dredged materials that are excavated from the recurring dredging of the Harbor Basin and Channel. Required dredging for the concept was evaluated assuming a reduced maintenance depth and width as described above for the Marina Park Alternative, i.e. dredge the Channel and the Marina berthing area to -5 feet MLLW and reduce the federal Channel 1 width (see Figure 4-2) to 120 feet from the present 200 feet).

As noted above, dredging of 105,000 cubic yards (CY) per cycle would be necessary approximately every four years to maintain the harbor, with an additional 10,000 CY for the berthing areas every alternate episode (total of 115,000 CY every 8 years). However, since the berthing area has not been dredged since 1997, this area will require additional dredging over and above that which would be required in future 8-year cycles. The first episode is therefore expected to be about 125,000 CY of dredging (105,000 CY for the Channel and 20,000 CY for the berthing area).

Dredged material from the Channel and Marina basin could be used to create high-marsh refugia in the Harbor Basin, consistent with Alternative 1, as well as within the South Basin (both are shown in **Figure 3-1**, on the following page). The refugia in the South Basin would consist of one mass about 14 acres in size or two or three refugia totaling the same amount, separated by a small channel, and the island in the North Basin would be about 5 acres in size. The South Basin refugia is able to accommodate about 204,000 CY assuming that present depths are about 1.5 feet below MLLW. The concept includes placing dredged material to an elevation of about Mean Higher High Water (MHHW). The North Basin refugia is able to accommodate about 89,000 CY assuming that present depths are about 4 feet below MLLW.⁵

Considering the high costs associated with off-haul of material from the DMMS, it may be also possible to place some of the dredged material from the first episode to the DMMS, after which it could be permanently converted to a shorebird habitat or managed marsh or seasonal wetland (see Section 5 for a discussion of the DMMS). Using the 60,000 CY estimate to convert the DMMS to

⁵ There would be some amount of sea level rise. However, sediment will continue to deposit in the area offsetting any increase in depth.



5 Acre Island Islands Totalling 14 Acres

SOURCE: ESA

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Figure 3-1
 Potential Areas for Creation of High-Marsh
 Refugia Using Dredged Materials

shorebird habitat, the total dredging potential would be about 353,000 CY (204,000 CY at South Basin refugia, 89,000 CY at North Basin refugia, and 60,000 CY at DMMS). This would allow Marina operations to continue for about 12 years (125,000 CY for the initial episode, 105,000 CY for Episode 2, and 115,000 CY for Episode 3) after which a new disposal location would be needed or the harbor converted to one of the other reuse alternatives. For cost estimating purposes, it is assumed that the new disposal location would be at a regionally authorized in-Bay or upland site. Should the market for the material within the DMMS improve to the point where the County or other flood control or restoration end users would pay for the hauling off of the material, it may be beneficial to continue using the DMMS so the “island creation” could be stretched to perhaps one additional dredge cycle.

Based on berths per acre planning data from the California Department of Boating and Waterways, half of the existing Harbor Basin can provide an approximately 185-slip boat harbor assuming a minimum vessel length of 40 feet (at that point, a market analysis should be conducted to determine demand for berths). This strategy is being proposed to assist the City in maintaining boat operations for the next 10-15 years, until the area is fully developed. At that time the City could evaluate the possibility of revenue from the development supporting all/some boat harbor operations.

Beyond that point in time, the Marina could potentially avail itself of existing regional disposal sites in the bay (upland or in-bay), where other Marinas would also be going, if economically feasible, or begin implementing Alternatives 2 or 3. **Table 3-1**, below, summarizes the dredge disposal timeline, while **Figure 3-2**, on page 3-4, provides a conceptual illustration of the Dredged Materials Disposal Concept.

**TABLE 3-1
DREDGE DISPOSAL TIMELINE**

Year	Volume (CY)	Disposal Location & Quantity (CY)			
		DMMS	So Basin*	No Basin	Other In-Bay
0	125,000 ^a	60,000		65,000	
4	105,000		105,000		
8	115,000		91,000	24,000	
12	105,000				105,000
16	115,000				115,000
20	105,000				105,000

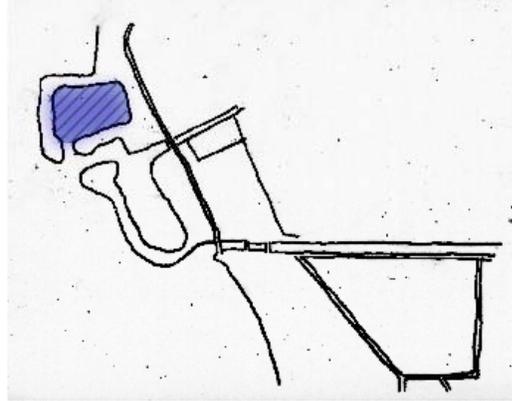
Assumption: 120 foot Channel width and a dredge depth of -5 feet MLLW, plus 1 foot over-dredge. South Basin would have capacity remaining, but it would not be necessary under this scenario to fill to capacity.

^a Because the Marina berthing area has not been dredged since 1997, this area will require additional dredging over that which would be required in future 8-year cycles, for a total of 125,000 CY.

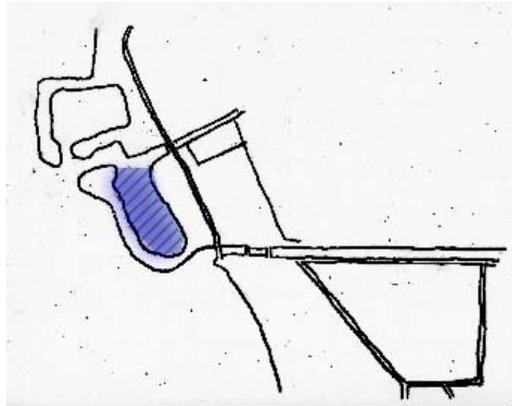
FIGURE 3-2. Illustration of the Dredged Materials Disposal Concept

Dredge material placement strategy to extend Marina life. Each step is only taken if there is no other project requiring fill to create wetlands or for other uses that would either pay for dredging or purchase dredged materials.

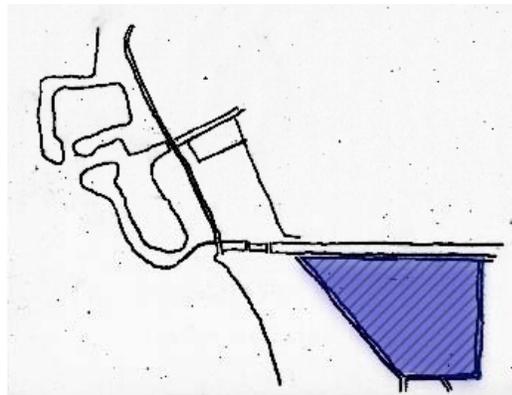
Place dredge materials within Marina to create wetlands (see three alternatives) in the North Basin. Estimated material 89,000 cubic yards (1 dredge cycle over a 4 year period)



Place dredge materials to create wetlands and a canoe/kayak water trail within the South Basin. Estimated material 204,000 cubic yards (2 dredge cycles over an 8 year period)



Place dredge materials to create permanent seasonal wetland area at the DMMS site.



SECTION 4

Alternatives Compared

As noted in Section 1, after proposing and describing practicable Alternatives, the Harbor Basin Study now attempts to compare them with each other. The Study does not, however, attempt to rate or rank the alternatives in such a manner as to make a suggestion or a recommendation for a preferred one. Rather, this section contrasts them under what might eventually comprise a list of selection criteria for the City: Recreation, Consistency with Cal-Coast's Proposed Landside Development, Sedimentation Patterns and Hydrodynamics, Technical and Regulatory Opportunities and Constraints, and Relative Initial and Long-term Maintenance Costs.

4.1 Recreation

This section describes the types of recreational uses that would be provided under each of the three alternatives being considered, makes a determination of whether those types of recreational uses would be considered "aquatic" in nature, and makes some assumptions regarding existing demand for those types of uses.

Overall, a variety of recreational uses would be provided under each of the alternatives being considered. The types of recreational uses, however, would differ from one another in terms of costs to the public and whether they would be attractive to a large percentage of the population or only to a select group. It is important to note that a range of recreational opportunities in addition to those proposed within the Harbor Basin are provided in the Marina's shoreline areas, including golf courses, a par course, Marina Park, and those being proposed by Cal-Coast. These existing or future amenities are not considered here. Section 4.2, below, considers recreational and other uses that are being proposed for the shoreline areas by Cal-Coast.

Marina Park Alternative

As described in Section 2, the Marina Park Alternative would include a smaller Marina than exists today, consisting of approximately 185 slips, a multi-use perimeter promenade along the interior edge of the Harbor Basin, and a small, publicly accessible beach area with stepped shoreline seating and a stage area. The western portion of the harbor basin would be dominated by natural features, including a marsh, wildlife refugia, and various landscape features.

In combination, these components would provide a variety of opportunities for passive and active recreational activities, including boating, water contact, walking, bird watching, and attending of performances and other events at the beach. Some proposed uses, such as boating, would be fairly

costly and may be prohibitively expensive for some community members to participate in.⁶ Most others, however, would either require no admission fees or have nominal access fees, and would therefore be open to most individuals. This would hold true for activities such as bird watching, water contact, and walking along the perimeter trail. The variety of recreational uses proposed under Alternative 1 would also appeal to families and groups with individuals who have wide-ranging interests for both active and passive recreation.. Simply stated, this Alternative would be attractive across the wide range of uses it would provide.

Most uses envisioned under this alternative would be considered aquatic in nature. Activities such as boating would clearly require a water body and would be dependent on the bay. Although bird watching, walking, and staged events do not necessarily require adjacent marine habitats, locating them proximate to the harbor would nevertheless add to their uniqueness and make them a more desirable destination.

In terms of the demand for a boat harbor at the site, a poll of San Leandro voters was conducted in November 2007 (GodbeResearch), which found that the boat harbor is among the relatively least used features (by residents) of the Shoreline Recreation Area. The poll indicated that Marina visitors patronize restaurants (74%), use shoreline walking trails and paths (71%), and use play areas and picnic facilities (54%) more often than they use the boat harbor (12%) or boat launch ramp (7%). Nevertheless, the existing Marina is approximately 40% occupied, which indicates that some demand for boat berths persists, even if it is utilized by a small fraction of the overall population. Furthermore, participants at community meetings have indicated that keeping recreational boating activities at the harbor should be a component of any future reuse plan. In terms of beach and performance stage uses, it is unknown whether these are in demand among City residents. However, they could conceivably be used by hotel patrons and visitors to the park and golf tournaments.

In conclusion, the Marina Park Alternative would provide an adequate mix of recreational uses, most of which would be aquatic in nature and publicly accessible, except for the docks themselves. The harbor, while patronized by a small number of users, would likely enhance the overall appearance of the Harbor Basin and increase its attractiveness as a local and potentially regional destination.

Aquatic Park Alternative

As described in Section 2, the Aquatic Park Alternative would emphasize non-motorized boating uses at the harbor, and would permit kayaks and canoes to be used within the basin after removing the Marina slips and eliminating all motorized boating. Recreational uses under this alternative would include a multi-use perimeter promenade along the interior edge of the Harbor Basin, and a small, publicly accessible beach area with stepped shoreline seating and a stage area, and several boardwalks/vista points overlooking the water. The western, northern, and eastern rip-rap shoreline of the basin could be backfilled to create a natural shoreline appearance and a

⁶ The partial marina would enrich the visual quality of the Harbor Basin by maintaining the marine profile along the basin. As such, even those who do not boat (or cannot afford to boat) may find their leisure time at the Harbor Basin enhanced simply by viewing the boats at the marina..

vegetation transition from upland to wetland habitats. The Harbor Basin itself would be dominated by a series of wildlife refugia, marsh areas, and other vegetative features, with a water trail set up around the islands to provide recreational opportunities for hotel patrons and Shoreline visitors. As currently envisioned, a boat rental facility could be provided by Cal-Coast Development, in the southern portion of the harbor basin (see Section 4.2, Consistency with Cal-Coast Development, for a more detailed description of landside facilities being considered).

Recreational uses under this alternative would also range in accessibility and physical activity and, in combination, would provide opportunities for passive and active recreational uses, including canoeing, kayaking, water contact, walking, bird watching, and attending performances and other small-scale events at the beach. In comparison to boating under the Marina Park Alternative, canoe and kayak rentals would be less expensive and may be accessible to a wider demographic of users. As with the Marina Park Alternative, most other proposed activities would be free or fairly inexpensive to the general public. While this alternative would exclude motorized boating within the basin (motorized boats would still be able to use the boat launch ramp), it would also remove the publicly inaccessible berths, allowing the general public access to the entire Harbor Basin

As with the Marina Park Alternative, most uses envisioned under the Aquatic Park Alternative would either be considered aquatic in nature or would be enhanced by its proximity to an aquatic setting. This would include non-motorized boating, water contact and bird watching and walking.

It is difficult to ascertain how much demand for non-motorized boat rentals exists in the City of San Leandro. No canoe or kayak rental facilities exist in the vicinity of the project. However, it is noted that the harbor is considered a priority site of the draft Bay Area Water Trail Plan.⁷ The East Bay Regional Park District provides boating opportunities at Regional Park lakes along the bay shoreline areas. Canoes, motorized boats, or rowboats are available for rent at Lake Chabot (Castro Valley), Lake Del Valle (Livermore-Pleasanton area), and Shadow Cliffs (Pleasanton). However, these facilities are not located anywhere near the San Leandro Harbor Basin. The community *has* indicated that there is demand for walking trails and passive recreational areas. This alternative would meet those needs.

Nature Park Alternative

As described in Section 2, the Nature Park Alternative would establish a diverse wetland environment at the Harbor Basin, which would be intended for passive recreational and outdoor learning/environmental educational opportunities. Recreational components of this alternative would include extensive multi-use trails, a nature/interpretive kiosk, as well as a series of interpretive points/outdoor learning stations along the perimeter pedestrian promenade, some extending over the water via a boardwalk. The basin itself would be dominated by a series of wildlife islands, marsh areas, and other vegetative and water-related features. Non-motorized boating would be permitted within the Harbor Basin and an enhanced 0.75-mile long loop trail would be created within the

⁷ http://www.bcdc.ca.gov/pdf/planning/WT_Plan_20070907.pdf

harbor.⁸ The Nature Park would be a place for visitors to engage with the water and wildlife and serve as a foil to the more urbanized shoreline surroundings.

The Nature Park Alternative would provide educational and passive recreational opportunities, such as walking, bird watching and photography. While it would likely appeal to a given segment of the population, it would offer less overall range in terms of number and types of activities that would be available at the harbor as compared to the other alternatives. Most recreational uses would be aquatic-related, since the focus of the nature park would be on the wetland areas. Furthermore, the creation of the water trail would encourage activities on the water that would complement the proposed San Francisco Bay Water Trail. The San Leandro Marina is identified in the Draft San Francisco Bay Water Trail as a High Opportunity Backbone Site.⁹ This designation indicates that little more than educational signage would be required to meet the criteria for inclusion in the Water Trail Project. The poll conducted in the City in 2007 indicates that trails are widely used by residents. Thus, the trail network, with the “over water” boardwalk enhancements, would be considered in demand at the harbor. It is unknown whether the educational elements are also in demand and, should the City choose to pursue this option, this should be investigated further.

**TABLE 4-1
SUMMARY OF RECREATIONAL USES UNDER EACH ALTERNATIVE**

	Marina Park Alternative	Aquatic Park Alternative	Nature Park Alternative
Recreational Uses Considered	A partial Marina, consisting of approximately 185 slips, a multi-use perimeter promenade along the interior edge of the Harbor Basin, a small, publicly accessible beach area with stepped shoreline seating and a stage area.	Non-motorized boating facilities (provided as part of landside development), a multi-use perimeter promenade along the interior edge of the Harbor Basin, a small, publicly accessible beach area with stepped shoreline seating and a stage area, and several boardwalks/vista points overlooking the water	A multi-use trail, a nature/interpretive kiosk, a series of interpretive points/outdoor learning stations along the perimeter pedestrian promenade, some extending over the water via a boardwalk, a water trail for non-motorized craft.
Variety of Activities	High	High	Moderate
Level of Public Accessibility	Moderate access due to public inaccessibility to berths.	High	High
Aquatic Features	Motorized boating, water contact.	Non-motorized boating, water contact.	Education focused on wetland habitat.
Perceived Demand	High demand for boating from a select group; moderate to high demand for other uses.	Unknown demand for non-motorized boating; moderate to high demand for other uses.	Unknown demand for educational uses; moderate to high demand for hiking trails/passive recreational uses.

⁸ The Nature Park Alternative would have a pedestrian bridge that would complete the loop, whereas The Aquatic Park Alternative would not.

⁹ http://www.bcdc.ca.gov/pdf/planning/WT_Plan_20070907.pdf

4.2 Consistency with Cal-Coast Discussion Plan

This section describes the proposed alternatives' consistency with Cal-Coast's discussion plan and considers whether the proposed Harbor Basin uses would be complementary with proposed landside planning. Although this section does not analyze any specific redevelopment options for the landside areas, it qualitatively evaluates the interface between the proposed Harbor Basin alternatives and the types of uses envisioned in the immediate vicinity based on Cal Coast's Discussion Plan, provided in **Figure 4-1**.

Description of Proposed Landside Development

Although redevelopment plans for the landside areas (areas immediately surrounding the Harbor Basin) are subject to further refinement, Cal-Coast has prepared a "Discussion Plan" that conceptually illustrates the types of uses being envisioned along the surrounding shoreline areas. The Discussion Plan is provided in Figure 4-1, on the following page. As shown in this figure, the Cal Coast development would surround the Harbor Basin on all four sides and may also extend further east into the adjacent Marina Golf Course and parcels at the corner of Fairway and Aurora Drives. The preliminary landside plans envision the following mix of uses:

- A 200-room hotel with conference facilities, pool and spa;
- Full-service restaurants (one 6,000 sf and one 4,000 sf);
- A library/community building;
- An office complex (250,000 sf) with a central parking structure);
- Approximately 188 residential units, including live-work units, townhomes, flats, and detached single-family homes;
- A yacht club;
- A mixed-use office/retail building (40,000-sf);
- A café/boat rental facility (8,000-sf);
- Surface parking areas;
- Pedestrian seating and promenade along the waterfront edge; and
- Community parks, one containing bocce ball courts.

Compatibility with Proposed Alternatives

Marina Park Alternative

The uses proposed under this alternative, namely the partial Marina, a multi-use perimeter promenade, and a small, a publicly accessible beach area with stepped shoreline seating and a stage area, would complement the landside development well. The Marina would provide pleasant views of the bay to the hotel patrons, residents and office workers and rows of docked boats would maintain and reinforce the maritime character of the area, while the beach would serve as a value-added amenity for the hotel and residents. The promenade would likely appeal to a wide range of users, including current users of Marina Park, office workers, residents, hotel



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Figure 4-1
Cal Coast's Preliminary Development Plan

SOURCE: Withee Malcom Architects, LLP

guests and conference attendees. The Marina Park Alternative would create a good transition from urban to harbor- and wildlife-related uses, since it would incorporate a wide range of features into its use mix.

The uses proposed within the Harbor Basin and those in the upland areas would, in combination, reinforce and elevate the status of the San Leandro Marina as a local attraction. A problem posed by the wetland enhancement could be an influx of gulls to the harbor areas to forage for food.

Aquatic Park Alternative

As described in Section 2, this alternative would include non-motorized boating uses, a multi-use perimeter promenade along the interior edge of the Harbor Basin, and a small, publicly accessible beach area with stepped shoreline seating and a stage area, and several boardwalks/vista points overlooking the water. Much of the Harbor Basin would be converted into a series of wildlife refugia, marsh areas with a water trail surrounding the islands.

These types of facilities would offer less variety in terms of uses, but would nevertheless relate well to the proposed landside mix. As with the Marina Park Alternative, the boating areas, walking trails, and the beach/stage would offer recreational opportunities to the hotel patrons and residents since they would attract visitors and encourage them to explore the project vicinity. The wildlife refugia in the Harbor Basin would provide visual interest to the surrounding areas and would offer ample opportunities for activities such as bird-watching and photography.

The Aquatic Park Alternative would differ from Marina Park Alternative in that it would not be Marina-oriented and might appear less active as a result. However, it would nevertheless be aesthetically pleasing to the public and would fit in well with the planned surrounding shoreline area uses.

Nature Park Alternative

The Nature Park Alternative would establish a diverse wetland environment at the Harbor Basin focusing on outdoor learning and passive recreational uses. The basin itself would be dominated by a series of wildlife refugia while the perimeter promenade would emphasize outdoor learning. Other than a boardwalk-type structure above certain portions of the Harbor Basin, the basin would appear largely natural and, as such, would constitute a departure from the urbanized look of the structures nearby. Non-motorized boating would be permitted within the Harbor Basin and a 0.75-mile long loop promenade would be created around the harbor perimeter. This alternative could be perceived as less compatible from a boating perspective than what is proposed under the first two alternatives although it would also enhance the overall look and feel of the harbor area.

Because the uses proposed under this alternative would focus on outdoor learning, they would offer a respite from the bustling hotel and office areas nearby. However, the interface between the urban shoreline and the natural Harbor Basin may present some challenges, since the noise from incoming/outgoing traffic and visitors could potentially displace wildlife from the harbor. As with other alternatives, an influx of sea gulls and other disturbance-tolerant bird species could

occur. The boating experience could also be compromised by the urbanized look and feel of the surrounding uses, as kayakers and canoers often prefer to partake in such activities in more scenic and quieter areas and the surface lots and hotel may seem distracting and loud. South Basin may be more appropriate for kayaking and canoeing as it could offer boaters a more direct interface with nature, more removed from the urbanized areas.

From a visual perspective, the interface between the educational perimeter loop (i.e., trails, interpretive signs and kiosks) and the surface parking areas that front the harbor along its northern and western edges may seem discordant. Landscaping and other architectural amenities could be used to address this potential issue.

The Nature Park Alternative with its circular promenade around the perimeter of the basin could become a place where hotel guests, the community, and visitors could engage with the water and wildlife and take a respite from their urban living. The Harbor Basin could also serve as an educational destination for school groups, youth groups, wildlife enthusiasts, photographers, and others. As such, it would be considered a beneficial end use of the Harbor Basin, although, as stated above, before implementing this option, the City may need to address several potential challenges.

Conclusion

In summary, uses proposed under any of the alternatives would likely help to revitalize the San Leandro Harbor Basin. None of the alternatives analyzed would be entirely incompatible with the proposed mix of landside uses, although the Marina Park Alternative would emphasize boat-related uses at the Marina, while the other two alternatives would focus on natural and pedestrian improvements. Additional design work and coordination between the City and the landside developer would be required under each alternative to ensure that Marina-side and landside developments are appropriately transitioned.

4.3 Sedimentation Patterns, Hydrodynamics

This section describes the sedimentation, dredging, and hydrology of the San Leandro Marina Harbor Basin Alternatives. The information provided herein is based on professional opinion and the analysis presented in the Report on Dredging Maintenance Needs by Moffatt & Nichol, prepared for John O'Driscoll, City of San Leandro and dated January 6, 2008.

The City of San Leandro has long dealt with a problem of high sedimentation in their Marina and the approach and entrance Channel. The entrance Channel extends over shallow mudflats to reach the Marina, which includes a public launch ramp, fuel dock, and sewage pump out. The Marina is one of the few in this part of the East Bay and, until recently, had been aided by the United States Army Corps of Engineers with its dredging. The City of San Leandro is now considering alternative uses for the Harbor Basin due to the high sedimentation and associated cost of dredging and off-hauling to maintain the Marina.

As described in Section 2, the three alternatives being considered in this report are a Marina Park, Aquatic Park, and Nature Park. The Marina Park Alternative would include a continued partial

use of the existing Marina, the Aquatic Park Alternative would include a water trail between the islands created in place of the Marina, and the Nature Park Alternative would include a diverse wetland area in place of the Marina.

Dredging

As mentioned above, sedimentation is a major problem for the existing Marina and has resulted in an expensive maintenance dredging program. The potential amount of dredging for future uses of the Marina provide an understanding of the potential maintenance associated with each concept.

The historic dredging practice has been to dredge the 200 foot wide federal Channel and Marina berthing area to -7 feet¹⁰ MLLW. This maintenance activity was completed by the US Army Corps of Engineers on a typical 4-year schedule for the Channel, dredging an estimated 160,000 CY, and by the City on a typical 8-year schedule for the Marina berthing area, dredging an estimated 20,000 CY. The Channel was partially dredged in December of 2009 (by the Corps) to -5 feet MLLW, and the berthing area was last dredged in 1997 to -7 feet MLLW. **Figure 4-2** provides a summary graphic of Channel designations and maintenance dredge depths.

Marina Park Alternative

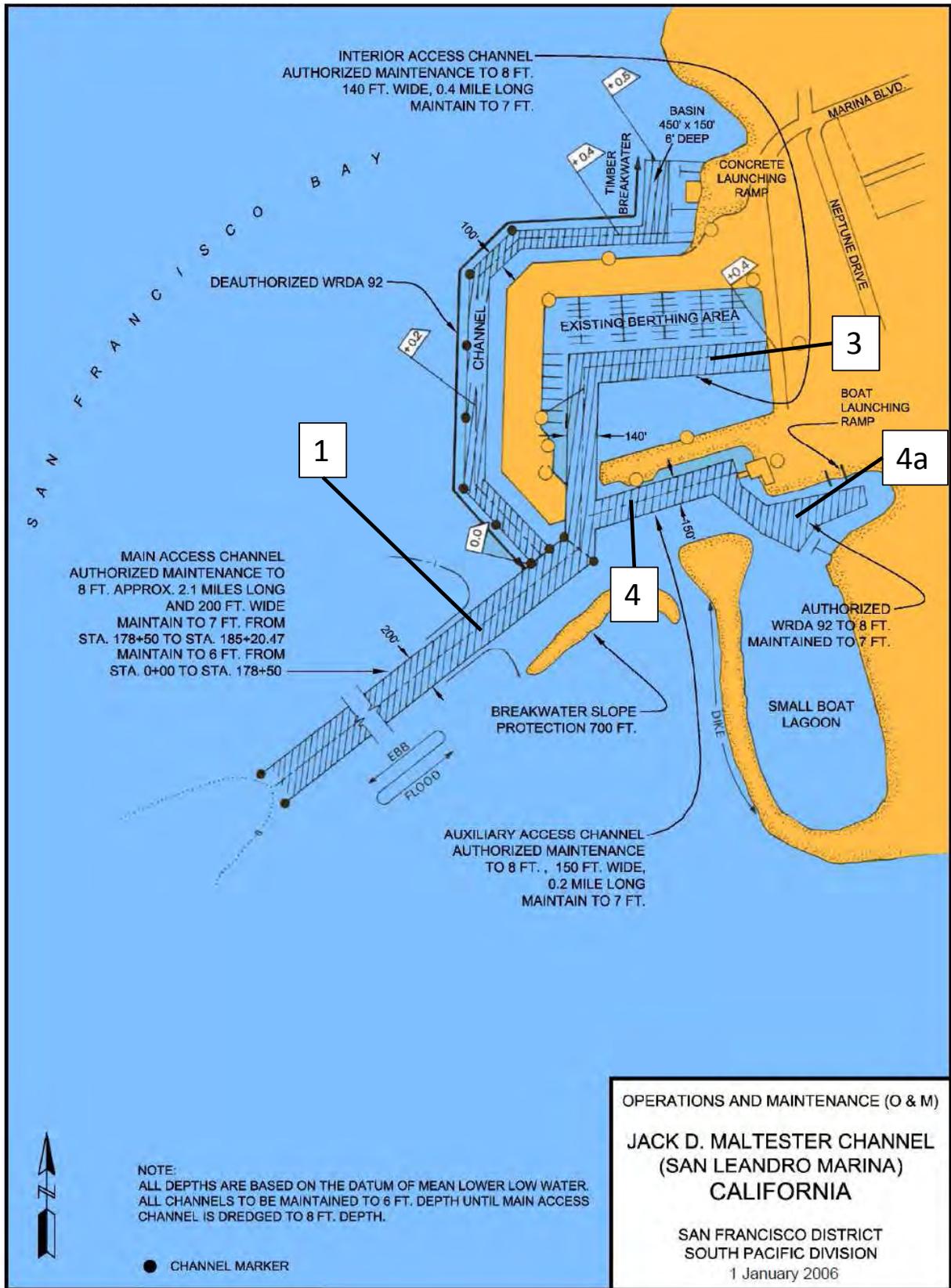
The Marina Park Alternative assumes a reduced maintenance dredging scenario. The reduced maintenance would be to dredge the Channels (1, 3, 4, and 4a) (see Figure 4-2 for locations of dredge Channels) and the Marina berthing area to -5 feet MLLW and reduce the Channel 1 width to 120 feet, from the present 200 feet. Although this will not restore the authorized depth of 7 ft at MLLW, it allows continued use of a portion of the harbor for navigation.

Based on historic surveys the Channel would likely need to be dredged on a 4-year dredging cycle to maintain access to the berthing area. This results in a dredging volume of 105,000 CY per 4-year cycle in the Channel. The Marina berthing area, reduced to the eastern portion only, would be dredged on an 8-year cycle, as sedimentation patterns indicate that lower shoaling rates persist in the berthing areas. This would result in an estimated dredge volume of 10,000 CY per 8-year cycle in the berthing area. These values assume that only half of the Marina basin, which includes a portion of the federal Channel and the Marina berthing area, is being dredged.

Aquatic Park Alternative

After the initial work to create high marsh or island areas, no on-going maintenance dredging would occur under this option.

¹⁰ All dredged areas require “overdredging” to compensate for the inaccuracies in dredging in tidally varying water. All depths in this report are reported as required depths. Add 1 foot overdredge to all depths for volume computations.



SOURCE: U.S. Army Corps of Engineers

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Figure 4-2
 Locations of Dredge Channels

Nature Park Alternative

After the initial work to create high marsh or island areas no on-going maintenance dredging would occur under this option.

Dredge Materials Disposal Concept

The Dredge Materials Disposal Concept is described and illustrated in detail in Section 3. Required dredging for the concept was evaluated assuming the current maintenance depth and a reduced maintenance depth. The usual practice is to dredge the federal Channel to -7 feet¹¹ MLLW while the berthing area within the Marina is dredged to -7 feet MLLW (both include 1 foot of over-dredge). This maintenance activity has historically been completed on a 4-year schedule for the Channel and an 8-year schedule for the Marina berthing area¹².

The reduced maintenance scenario would be to dredge the Channel and the Marina berthing area to -5 feet MLLW (+1 foot overdredge) and reduce the approach Channel from the present width of 200 to 120 feet. For comparison purposes, the same dredge cycles are assumed for the reduced depth scenario. The volume of dredge material for 4-year and 8-year dredge cycles is presented in **Table 4-2** for current and reduced maintenance depths.

**TABLE 4-2
DREDGE VOLUME COMPARISONS**

	4-year	8-year
Historic	160,000 CY	180,000 CY
Reduced (Proposed Concept)	105,000 CY	115,000 CY

These values assume that only half of the Marina basin, which includes a portion of the federal Channel and the Marina berthing area, would be dredged. By reducing the depth that would need to be maintained, the volume of material dredged would reduce by approximately 27%.

As stated in Section 3, the dredge material could be used to create high marsh refugia in the South Basin and western portion of the Harbor Basin. The assumed area, depths, heights, consolidation, and volume for each refugia is presented in **Table 4-3**.

Assuming that the Channel is dredged on a 4-year cycle while the Marina berthing area is dredged on an 8-year cycle, the dredging concept can provide additional time for Marina operation, during which time other long-term alternatives could be developed. Based on the 4- and 8- year cycles the concept could provide an additional 12 years of Marina operation.

¹¹ The most recent dredging was a partial operation to 5 + 1.

¹² Please note that a partial dredge of federal channel was performed in 2009 and previous to that in 1997. Chamfers were dredged by the City in 2001 and berths in 1997.

**TABLE 4-3
CONCEPTUAL REFUGIA AREA DIMENSIONS AND VOLUME**

Dimension	Approximate Acreage	
	South Basin	Harbor Basin
Existing depth (feet below MLLW)	1.5	4.0
Area (Acres)	14	4.5
Final top elevation (feet MLLW)	6.8 (MHW)	6.8 (MHW)
Material consolidation (CY)	31,250	10,900
Total Volume (CY)	204,250	89,500

Hydrology and Sedimentation

Circulation in the vicinity of the Marina is driven by tidal and wind wave induced currents. The orientation of the Channel and Marina impacts circulation within the basin. The orientation of the Marina basin lends itself to good flushing within Channels 1, 4, and 4A, tidal currents providing exchange of tidal waters due to the relatively straight path of the Channels. Winds from the WSW result in wave driven circulation that helps with flushing.

No Action Alternative

The basin areas, which are protected by the breakwaters to reduce wave energy, would see reduced exchange and longer residence times as the entrance of the interior Channel shoals. Due to the sedimentation patterns, reduced flushing and longer residence time will occur, but should not reduce enough to produce water quality problems. If maintenance dredging ceases, some exchange will still continue within the basin limiting potential water quality problems.

Natural sedimentation patterns will likely result in portions of the basin shoaling up to low tide elevations, resulting in complete entrance blockage at monthly extreme low tides. The areas of high sedimentation will eventually reach a depth at which wave and tidal energy is in dynamic equilibrium with the water depths. Dynamic equilibrium is where cyclic deposition and erosion occurs, in response to the amount of tidal and wave activity, but in the long-term there is essentially little to no change in depths.

It is difficult to estimate the time to equilibrium because of the number of factors that influence sediment deposition and erodibility. Moffatt and Nichol estimated the entrance area of Channel 1 would likely shoal up to approximately 0 to 1 feet MLLW and would likely be the shallowest portion. The presence of the breakwaters and resultant creation of a tidal circulation system between the bay and marina basin will likely result in an equilibrium condition that may prevent the formation of large areas of emergent tidal marsh. The most likely condition is that of a mudflat with varying elevations within the basin.

Marina Park Alternative

With the continued use of the Marina in this alternative, sedimentation plays a significant role in maintaining vessel access to the Marina and boat launch (Channels 1, 3, 4, and 4a). The recommended dredge cycle for this alternative is based on the amount of shoaling which occurs over 4 years and what size vessels have limited access as a result. Considering the reduced maintenance dredge depth of -5 feet MLLW, the entrance will shoal to an estimated -3 feet MLLW or shallower in approximately 4 years. According to Moffatt and Nichol (2008)¹³, this would limit access at low tide for all sailboats and powerboats greater than 28 feet in length. An additional year would reduce depths in the entrance by another 0.5 to 1.0 feet.

Changes in the circulation patterns and basin depths are expected to occur due to the creation of the refugia area and realignment of the entrance Channel (Channel 3). These changes are expected to reduce exchange and increase residence time, but should not produce water quality problems. The refugia area will be maintained by natural sedimentation patterns and likely expand toward the deeper entrance Channel. This portion of the Harbor Basin is expected to reach dynamic equilibrium within five to 10 years where cyclic deposition and erosion occurs, in response to the amount of tidal and wave activity, but in the long-term there would essentially be little to no change in depths.

Aquatic Park Alternative and Nature Park Alternative

With the creation of island refugia, the Harbor Basin will eventually reach a depth at which wave and tidal energy is in dynamic equilibrium with the water depths. The presence of the breakwaters and resultant creation of a tidal circulation system between the bay and Harbor Basin will likely result in an equilibrium condition that may prevent the formation of large areas of emergent tidal marsh, naturally. The most likely condition is that of a mud flat between the refugia areas. The slopes of the refugia areas would be designed and constructed to encourage high marsh vegetation. However, over time there would be a period where mud flats may form between the refugia areas prior to their natural transitioning to high marsh habitats.

The creation of the refugia areas with dredge material would depend on availability of material. Once the necessary volume of material has been obtained it would likely be several years before vegetation such as pickleweed and cordgrass colonize the island, unless they are seeded (or planted). Due to changes in the circulation patterns and basin depths, for these two alternatives, reduced exchange and increased residence time will occur, but should not produce water quality problems. It is likely that the entrance Channels (1 and 4) will shoal to an equilibrium depth similar to the elevation of the mudflats on either side of the Marina. The natural sedimentation patterns will likely result in portions of the Channels (1 and 4) shoaling up to low tide elevations, resulting in complete entrance blockage at monthly extreme low tides.

¹³ Moffatt & Nichol. 2008. Report on Maintenance Dredging Needs, San Leandro Marina. Prepared for John O'Driscoll. January 6, 2008.

4.4 Technical and Regulatory Opportunities and Constraints

This section summarizes the permitting and regulatory authorization opportunities and constraints related to the three alternatives currently proposed for the San Leandro Harbor Basin project. The structure of this section includes a description of each alternative and its permitting requirements, permitting constraints for each alternative and a ranking of each alternative based on permitting constraints only.

Permitting Requirements for All Alternatives

Implementing any of the three alternatives for the San Leandro Harbor Basin would require some level of regulatory permitting. **Table 4-4** lists the permits required, issuing resource agency, and the specific alternative details that would require permits. The details on the constraints are provided below.

**TABLE 4-4
AGENCIES AND REQUIRED AUTHORIZATIONS**

USACE	BCDC	RWQCB	CDFG	NMFS	USFWS
No Action Alternative					
No construction	No construction	No construction	No construction	No construction	No construction
Marina Park Alternative					
404 and 10: Placement of fill for high marsh and riprap. Removal of piers/pilings	Coastal Development Permit: Backfilling, pier removal, relocation of Marina office, and fill related to high marsh creation	401 Water Quality Certification: Placement of fill for high marsh and riprap. Removal of piers/pilings	2081 or 2080.1: During construction for protection of state listed species	Biological Opinion. During construction for protection of federal listed fish	Biological Opinion: During construction for protection of Federal listed terrestrial species and fish
Aquatic Park Alternative					
404 and 10: Placement of fill for high marsh and riprap. Removal of piers/pilings	Coastal Development Permit: Backfilling, pier removal, and fill related to high marsh creation	401 Water Quality Certification: Placement of fill for high marsh and riprap. Removal of piers/piling	2081 or 2080.1: During construction for protection of state listed species	Biological Opinion. During construction for protection of federal listed fish	Biological Opinion: During construction for protection of Federal listed terrestrial species and fish
Nature Park Alternative					
404 and 10: Placement of fill for high marsh and riprap. Removal of piers/pilings, if applicable	Coastal Development Permit: Backfilling, pier removal, and fill related to high marsh creation	401 Water Quality Certification: Placement of fill for high marsh and riprap. Removal of piers/piling	2081 or 2080.1: During construction for protection of state listed species	Biological Opinion. During construction for protection of federal listed fish	Biological Opinion: During construction for protection of Federal listed terrestrial species and fish

No Action Alternative

The No Action Alternative assumes that the Marina would be abandoned in place and therefore might not entail any permitting or regulatory authorizations. As such, it is not discussed in detail in this section. However, as a custodial action, demolition and decommissioning may be required and these actions may require permits. As such, it is not discussed in detail in this section, nor is any permit action considered in Table 4-4, above.

Marina Park Alternative

This alternative would require authorizations for both construction and operation. Construction includes backfilling of the riprap currently located along the western shoreline of the basin and construction of a beach along the northwestern shoreline and construction of a high marsh within the western Marina. Placement of fill within the riprap areas and construction of the beach will require permits for the placement of dredged or fill material within waters of the U.S. If the riprap is removed and replaced with more natural features it's possible the agencies may view this as a restoration depending upon the final use. The reduced Marina would include removal of some piers and pilings and would require authorizations from all resource agencies. If upgrades to the Marina include new piers, these activities would require permits as well. Dredging would be required during construction and it is assumed that maintenance dredging would continue with deposition at the South Basin or at the City's Dredged Materials Management Site (DMMS) site. Construction of this Marina Park Alternative would require authorizations from California Department of Fish and Game (CDFG), National Marine Fisheries Service (NMFS), and U.S. Fish and Wildlife Service (USFWS) for protection of state and federal listed species during construction. It is assumed that operation of this Alternative would also require authorizations from these agencies through programmatic agreements through the Long Term Management Strategy (LTMS) for dredging projects within the San Francisco Bay.

Aquatic Park Alternative

This alternative would require authorizations for construction only for removal of piers and pilings, placement of backfill within the riprap areas, and construction of the beach and high marsh islands. Construction of the pedestrian boardwalks and vista point would require fill permits from BCDC for fill within bay waters most likely under a Coastal Development Permit. As with the Marina Park Alternative, construction of the beach and marsh habitat would require authorizations from USACE, BCDC, and RWQCB for fill within bay waters and within the 100 foot shoreline band. Removal of the piers and piles would be subject to Section 10 of the Rivers and Harbors Act and require a permit from the USACE. USFWS, NMFS and CDFG would require authorization for construction for the protection of state and federal listed species. Dredging would be required for construction of this alternative but it is assumed that no maintenance dredging would be required as the system would be designed to be self-sustaining. The resource agencies may require long-term monitoring¹⁴

¹⁴ Such monitoring could involve a simple tidal gauge which would measure changes in MHW relative to the height of the sediment at several locations.

to ensure that the project is self-sustaining and to ensure that there would not be a need for future maintenance dredging.

Nature Park Alternative

The Nature Park alternative will require authorizations similar to those required under the Aquatic Park Alternative for the dredging and placement of the high marsh islands and the installation of the boardwalk, vista point and interpretive centers. The pedestrian bridges and boardwalks would also require authorization from BCDC most likely under a Coastal Development Permit. This Alternative is anticipated to only require permits for construction. And similar to the Aquatic Park Alternative, it is possible that the resource agencies may require monitoring to ensure the Marina Park is self-sustaining.

Issues and Constraints

Each alternative has its own constraints based on activity. The rating of constraints indicates that there are no significant differences between the three alternatives. However, this should be tempered depending upon which agency presents the greatest permitting constraint. For example, BCDC may pose the greatest constraint in terms of approval process because of the Design Review Board requirement. But USFWS (and possibly CDFG) may present the greatest constraint related to competing policies regarding restoration and public access. If the site is expected to provide suitable habitat for federally listed species such as California clapper rail or salt marsh harvest mouse, USFWS approval may be contingent on reducing or eliminating public access.

The rating of the alternatives based on permitting constraints would yield the Marina Park Alternative as the alternative with the fewest regulatory constraints, because the site currently dredges and operates under agreements through the LTMS and this approval process should be fairly straightforward. Removing the piers and pilings would require permits from all of the state and federal resource agencies during construction, and the implementation of this alternative would be permitted through the LTMS for maintenance dredging similar to current conditions at the Marina. The Marina Park Alternative provides for the continuation of the Marina operations and includes the slightest change in use compared with the other alternatives. Overall, it appears that this Alternative would have the shortest approval time compared with the other alternatives based on the assumption that agency concerns would likely be minor.

The constraints rating of the Aquatic Park and Nature Park Alternatives yield approximately the same level of constraints because of the amount of in-bay fill associated with these alternatives. It is assumed that the amount of fill to construct the beaches and high marsh (Aquatic Park Alternative) and the high marsh (Nature Park Alternative) would be greater than the existing fill of the Marina itself. While this would likely be viewed as an improvement, increased bay fill will be a constraint for all agencies. It should also be anticipated that the agencies will require assurances that these Alternatives will be self-sustaining ecosystems and that maintenance dredging will not be necessary. It should be anticipated that, prior to authorization, the agencies may require additional information, such as sediment modeling, or post-construction monitoring or both.

Another constraint for these two Alternatives would be potentially competing policies between BCDC and the other resource agencies. Because of BCDC's focus on public access, habitat restoration requirements from USFWS, NMFS, and CDFG can conflict with its public access policy because typically restoration attempts to preclude public access. Authorizations from BCDC and USFWS would likely yield the greatest constraints. BCDC's permit approval may include presentation to the Design Review Board prior to authorization and as such, the timeline required for approval from this agency will yield some constraints. Additionally, BCDC's policies can result in internal conflicts between departments which can add additional time in securing the authorization. And because BCDC requires that all other authorizations be approved prior to issuing its permit, this agency typically has the greatest timeline for authorization.

Securing the biological opinion from USFWS may yield constraints because of staff workload and depending on the goals of restoration. USFWS staff is traditionally extremely short staffed and overworked which can add additional time in securing the authorization if not managed well. If restoration of the high marsh habitats is expected to result in habitat suitable for listed species, a conflict with BCDC's policy of increased public access could result. This potential conflict doesn't appear to be insurmountable, but should be considered when determining an alternative. Additionally, USFWS, NMFS, and CDFG may require post-construction monitoring of any of the alternatives (although most likely only for the Aquatic Park and Nature Park Alternatives) to ensure restoration goals are being met and to ensure that the ecological systems are functioning as proposed.

Overall Ranking

Please see **Table 4-5**, below. It does not appear that any of the currently proposed alternatives are unpermissible although each alternative has constraints depending upon the activity. The Marina Park Alternative is the least constrained alternative from the regulatory perspective. Permits would only be required for construction of this alternative and because it could be viewed as a restoration project, it would likely be viewed as favorable to the state and federal resource agencies. The Aquatic Park Alternative is viewed as the second least-constrained alternative. This alternative will require permits for the construction and operation but it is assumed that the existing permit terms and conditions for dredging of the Marina would be implemented and would not result in increased costs or regulatory constraints beyond what has been previously authorized.

**TABLE 4-5
ALTERNATIVE RANKING**

Alternative	Rank	Ranking Justification
Marina Park Alternative	1	Fewest permitting constraints.
Aquatic Park Alternative	2	Some permitting constraints. Development of habitat may conflict with Marina use. Agencies may require long term monitoring
Nature Park Alternative	3	Most permitting constraints. May conflict with public access. However, agencies could require long term monitoring

While it scores close to the Aquatic Park Alternative, the Nature Park Alternative appears to be the most constrained alternative. While this alternative would only require permits for construction, the amount of in-bay fill would pose problems for the resource agencies, specifically BCDC. As previously mentioned, if this Alternative produces habitat for listed species, the public access features, such as the pedestrian boardwalks may result in a policy conflict between BCDC and USFWS and CDFG, although the chances of suitable habitat developing can be diminished by restricting the height of the high marsh islands.

In conclusion, each of the three alternatives have constraints related to obtaining the necessary authorizations from the state and federal resource agencies. There is not a significant difference in constraints between each alternative, however, each alternative has somewhat separate and distinct constraints depending upon activity. At the conceptual level, permitting itself would not pose the greatest constraint as each alternative is permissible. However, when agency approval timelines are included, costs for securing permits increases and ultimately, cost would become a greater constraint in regard to obtaining state and federal authorizations.

4.5 Relative Initial and Long-term Maintenance Costs

Notes on Information in Tables

This section provides order-of-magnitude projections of probable costs and potential revenues for the alternatives described in Section 2 and considered throughout this report. Also included are costs associated with the “No Action” alternative. The projections are one of the components intended to help the City compare and contrast the relative costs and benefits of various options for the future of the San Leandro Harbor Basin.

The following items have been excluded from the analysis:

- Escalation costs;
- Life cycle replacement costs for new features that may be constructed;
- Removal of hazardous material, if any;
- Work outside the study area boundary. The study area is defined by the existing walkway around the perimeter of the Harbor Basin. Park and public amenity proposals identified in the Discussion Plan by Cal-Coast, or any other redevelopment options outside the perimeter walk, are not included; and
- Major infrastructure upgrades (these costs are assumed to be integrated into the overall San Leandro Shoreline area redevelopment plan).

The information contained in this document, including the quantity takeoffs on which many costs are based, is intended to show how the probable cost is derived. Costs and revenues indicated are conceptual and for planning purposes only. It should also be noted:

- All costs and revenues are presented in February, 2011 dollar values.

- All projections are based on the measurement and pricing of quantities where possible. Where measurement was not possible, reasonable allowances have been made to cover the probable scope of work. It is recommended that the City examine any allowances in order to confirm that the assumed scope is appropriate. Items with a lump sum (LS) are generally allowances.
- While the information contained herein is based on professional judgment made by team members familiar with the construction industry working closely with the staff of the City of San Leandro, a myriad of outside factors may affect any construction cost projections. These include, but are not limited to: fluctuating materials costs; the status of the economy; number of bidders; and permitting and monitoring complexities. Should the City pursue any of these alternatives in whole or in part, there is no guarantee that the amounts indicated, should the City pursue any of the alternatives in whole or in part, will not vary from that specified in this opinion of probable costs.

Dredging Costs Applicable to the Marina Park Alternative

Table 4-6 presents approximate costs for dredging the Harbor Basin and the Channel from the Wes McClure Boat Launch to the 1-mile point from the harbor.

Dredging costs shown are, typically, given on a per cycle basis including initial costs and recurring costs are every 4 years.

**TABLE 4-6
DREDGING ALTERNATIVES AND COSTS**

Year	Volume (CY)	Disposal Location & Quantity (CY)				Costs Per Episode
		DMMS	So Basin ^c	No Basin ^d	Other In-Bay	
0 ^{a,c}	125,000	60,000		65,000		\$ 3,764,640
4	105,000		105,000			\$ 3,373,425
8 ^b	115,000		91,000	24,000		\$ 2,249,170
12	105,000				105,000	\$ 2,985,675
16	115,000				115,000	\$ 3,270,025
20	105,000				105,000	\$ 2,985,675
Annualized Dredging Costs Over 20 Years						\$ 931,431

Notes and Assumptions:

^a Close-out DMMS site and restore to marsh at end of Year 0

^b Close-out both refugia islands at end of Year 8

^c The Marina berthing area has not been dredged since 1997, this area will require additional dredging over that which would be required in future 8-year cycles, for a total of 125,000 CY.

^d So Basin and No Basin costs include an allowance for containment dikes to make the basin capable of holding dredged material.

Capital Improvement Costs

Table 4-7 presents a range (30 percent variance) of capital improvement costs associated with each of the three alternatives. These costs include demolition of existing structures as appropriate. Attachments A-E present a detailed breakdown of how these costs were determined.

**TABLE 4-7
CAPITAL COSTS BY ALTERNATIVE^a**

Alternative	Cost Range	
	Low	High
No Action Alternative	\$ 4,448,000.00	\$ 5,782,400.00
Alternative #1: Marina Park ^a	\$ 25,086,000.00	\$ 32,612,000.00
Alternative #2: Aquatic Park	\$ 14,058,000.00	\$ 18,275,400.00
Alternative #3: Nature Park	\$ 17,079,000.00	\$ 22,202,700.00

^a Includes all dredging and permitting costs.

SOURCE: 2M Associates

Work identified is for improvements that might be considered interior to the existing perimeter Harbor Basin walkway and the walkway itself. Park and public amenity proposals identified in landside developer's Discussion Plan are not included. No major infrastructure upgrades are included in the cost analysis and are assumed to be integrated into overall Harbor Basin redevelopment costs.

It should be noted that many features in the different alternatives are interchangeable. For example, a pedestrian bridge across the mouth of the Harbor Basin as illustrated in the Nature Park Alternative could be added to the Aquatic Park Alternative. Additionally, costs for some features, such as a Nature Center as represented in the Nature Park Alternative, could vary widely depending on the scale, style, types of materials and exhibitory used in the structure. Therefore many costs that enter into the calculations should be viewed as "reasonable" costs.

Operational Costs

Table 4-8 presents current annual operational costs for the Harbor Basin area and a projection of annual operations costs (excluding dredging costs, which are included in **Table 4-9**, below) that may be anticipated by the City for each alternative. Common to all alternatives, including the No Action Alternative, is the maintenance of the perimeter promenade and associated landscaping. These features are already accommodated in existing City staffing plans. Additional operational assumptions for each are described below.

- Marina Park:** The Marina would operate essentially at the same levels as existed in 2010. Additional staffing would be needed to maintain the beach and program the event space. This is assumed to be approximately a 0.25 full-time equivalent (FTE) maintenance position. The Lagoon Paddle Rental is assumed to be a concession operation associated with the proposed Hotel / Conference Center and would not require City involvement.

**TABLE 4-8
ANNUAL OPERATING COSTS (CITY ONLY) BY ALTERNATIVE**

Alternative	Existing (2010)	No Action Alternative	Marina Park	Aquatic Park	Nature Park
Salaries & Benefits	\$ 288,000.00	\$ 72,000	\$ 288,000.00	\$ 144,000	\$ 72,000
Overhead	\$ 107,000.00	\$ 26,750	\$ 107,000.00	\$ 53,500	\$ 26,750
Utilities	\$ 75,000.00	\$ 10,000	\$ 75,000	\$ 60,750	\$ 10,000
Repairs & Maintenance	\$ 62,000.00	\$ –	\$ 62,000	\$ –	\$ –
Supplies	\$ 31,000.00	\$ 7,500	\$ 31,000	\$ 7,500	\$ 7,500
Total	\$ 563,000.00	\$ 116,250	\$ 563,000	\$ 265,750	\$ 116,250

^a Based on 2010 actual costs recorded by the City of San Leandro with the Marina Park Alternative assuming the current occupancy. Ongoing dredging costs not included in the Marina Park Alternative.

SOURCE: 2M Associates

**TABLE 4-9
EXPENDITURES BY ALTERNATIVE IN FIVE-YEAR INCREMENTS**

Alternative (rounded for report)	Cost Range							
	Years: 0-5		Years: 6-10		Years: 11-15		Total: 0-15 Years	
	Low	High	Low	High	Low	High	Low	High
Marina Park	\$15,326,000	\$19,923,800	\$12,404,000	\$16,125,200	\$5,801,000	\$7,541,300	\$33,531,000	\$43,590,300
Aquatic Park	\$9,910,000	\$12,883,000	\$4,400,000	\$5,720,000	\$1,400,000	\$1,820,000	\$15,710,000	\$20,423,000
Nature Park	\$12,791,000	\$16,628,300	\$2,819,000	\$3,664,700	\$2,997,000	\$3,896,100	\$18,607,000	\$24,189,100
No Action	\$5,029,000	\$6,537,700	\$581,000	\$755,300	\$581,000	\$755,300	\$6,191,000	\$8,048,300

SOURCE: 2M Associates

- **No Action Alternative (Custodial Care):** Minimal maintenance would be required. As in the Nature Park Alternative, this would be for the maintenance of the shoreline perimeter trail, associated landscaping, and boardwalks.
- **Aquatic Park:** An overall reduction in staff would result with the removal of the boating berths, the fueling station, the Marina office, and one set of restrooms. As in the Marina Park Alternative, staff would be needed to maintain the beach and program the event space. This alternative assumes that 0.5 FTE would be sufficient. The Lagoon Kayak/Canoe/Paddle Rentals and Day Use Dock is assumed to be a concession operation or operated by the landside developer or a non-profit organization and would only be developed and operated if there were no significant annual costs incurred by the City.
- **Nature Park:** This alternative assumes that 0.25 FTE would be sufficient for the maintenance of the shoreline perimeter trail, associated landscaping, and boardwalks. It is assumed that the operations of the Interpretive Center and associated boardwalk system would be through a lease agreement with a non-profit organization or other institution with no significant annual operational costs incurred by the City.

- **Table 4-9** above presents a range of costs (30 percent variance) that could be anticipated by the City for capital improvements and operational expenses for each alternative. Reasonable assumptions about the phasing of capital improvements for each alternative are included. Attachments A - E provide greater detail for each alternative for how these amounts were generated.

Revenue

Unless there are very specific entertainment or recreational features, public parks and open space areas that are “open” do not have the advantage of a singular entry gate for access control and fee collections, and thus do not generate sufficient revenues to match or exceed operational costs. For all alternatives, the true revenue potential of the Harbor Basin is as a value-added amenity for surrounding development. This value is not easily quantifiable but generally buttresses occupancy rates of hotels, attendance at restaurants, and real estate values of businesses and residences.

Excluding dredging costs, the Marina Park Alternative would essentially pay for its operational costs. However, when including dredging costs, the proposed Marina would remain a subsidized facility. None of the other alternatives, when weighted against the operational costs, would generate a positive cash flow.

- **No Action Alternative:** No direct revenues to the City would be anticipated.
- **Marina Park:** Current revenues for the Harbor are presented in **Table 4-10**. These revenues represent an occupancy rate of approximately 38 percent or 173 berths. **Table 4-11** presents revenues that could be expected under this Alternative. The existing occupancy rate and revenue is assumed to be maintained under this alternative with relatively minor additional revenue expected through the rental of the beach stage for special events.
- **Aquatic Park:** As in the Marina Park Alternative, potential rentals of the beach event area could be anticipated to generate a modest amount (\$7,500) annually. The degree to which marketing and programming of the space occurs would affect that value. The non-motorized craft rental facility is assumed to be concession-operated. Revenues would be generated through day-use boat rentals for school trips, boating classes, or general public day-use outings that explore the Harbor Basin water trail (potentially including the South Basin should it be developed as a wetland area). Over time as the greater Bay Water Trail becomes a reality, some kayakers and other non-powered watercraft could be expected to pay for docking overnight at the rental area and stay at one of the nearby hotels within walking distance. Such a concession could generate approximately \$10,000 to \$30,000 through a lease, through a percentage of gross revenues, or both. However, the revenues generated would not offset overall operational costs of the Harbor Basin area by the City.
- **Nature Park:** The Nature Park would have no features that in and of themselves would generate income.

**TABLE 4-10
HARBOR REVENUES 2009/10**

Source	Potential Revenue
Berthing Fees (185 berths; assumes existing occupancy rate remains)	\$ 543,000
Finance Charges	\$ 33,000
Fuel Sales	\$ 23,490
Utility Charges	\$ 29,000
Boat Launch	\$ 17,000
Keys	\$ 1,000
Total	\$ 646,490

SOURCE: City of San Leandro

**TABLE 4-11
MARINA PARK ALTERNATIVE REVENUES^a**

Source	Potential Revenue
Berthing Fees (185 berths; assumes existing occupancy rate remains)	\$ 543,000
Finance Charges	\$ 33,000
Fuel Sales	\$ 23,490
Utility Charges	\$ 29,000
Boat Launch	\$ 17,000
Keys	\$ 1,000
Beach Events	\$ 7,500*
Total	\$ 653,990

* Assumes 30 space rentals annually at \$250/rental

SOURCE: 2M Associates

SECTION 5

Alternatives for Future Use of the DMMS

Three Harbor Basin alternatives are being considered in this study, along with the No Action alternative. All Harbor Basin alternatives propose to eventually discontinue use of the City's Dredged Material Management Site (DMMS) for temporary drying and storage of dredged materials from the San Leandro Harbor because of the high cost of this disposal method.

This section provides options specific to future use of the DMMS. Initial alternatives for the DMMS were discussed at meetings with City staff on 21 October and 17 November, 2010. The information provided herein is based on professional opinion and the following sources:

Alameda County Flood Control and Water Conservation (ACFCWCD). 2007. Estudillo Canal Flood Damage Reduction Study: Hydrology Report. Engineering and Construction Department, Alameda County Public Works Agency. October 2006, revised January 2007.

California Regional Water Quality Control Board San Francisco Bay Region. 1990. Waste Discharge Requirements for City of San Leandro, Citation Builders, San Leandro Dredge Disposal Site, Alameda County.

City of San Leandro. 2004. DMMS Sediment Removal Project Grading Plan.

Coastal and Ocean Working Group of the California Climate Action Team (CO-CAT). 2010. Sea Level Rise Task Force, with science support provided by the Ocean Protection Council's Science Advisory Team and the California Ocean Science Trust.

ESA. 2007. San Leandro Marina Opportunities and Constraints Analysis. Prepared for City of San Leandro Community Development Department. Vermeer, M. and S. Rahmstorf. 2009. Global sea level linked to global temperature. Proceedings of the National Academy of Sciences.

Vermeer M, and S Rahmstorf. 2009. *Global sea level linked to global temperature*. Proceedings of the National Academy of Sciences of the United States of America. 106:21527–21532. Available at: www.pnas.org/cgi/doi/10.1073/pnas.0907765106

Habitat enhancement or restoration of the DMMS could be considered part of a preferred Harbor Basin alternative – which would be viewed as a benefit during permitting – or provide a source of mitigation credits (separate from the Harbor Basin alternatives). Proposed DMMS alternatives are:

1. Operate as DMMS for other, non-City dredge disposers
2. Shorebird habitat enhancement
3. Tidal marsh restoration

4. Seasonal wetland restoration

These alternatives, along with the No Action alternative are described below.

5.1 Existing Conditions

Land Use. The DMMS is a 112 acre former baylands (salt marsh) site bordered by the Estudillo Channel to the north, by the recently restored San Leandro Shoreline Marshlands (SLSM, also known as the Robert Landing area) to the south and southeast, by residential development to the east, and by the Monarch Bay Golf Course to the west (see Figure 1-1). Perimeter levees surround the DMMS and a cross levee separates the site into two basins – the West Basin and East Basin.

Since 1973, the site has been used for temporary drying and storage for sediment dredged from the federal Channel and Harbor Basin. Material from maintenance dredging is deposited in the DMMS, where it is dried and later trucked offsite. Upon removal of the material, the site is graded to slope gently from +3 ft NGVD at the south end to +1 ft at the north end, with several bird habitat islands graded to +4 ft (Attachment F).¹⁵ The site is disced periodically to prevent significant vegetation from establishing. Approximately 90,000 cubic yards of dredged material were placed on the DMMS in late 2009, 33,000 CY in the west basin and 57,000 CY in the western half of the east basin. No material removal or grading has occurred since this time (D. Pollart, pers. comm.).

Hydrology. Tidal waters flow into the site from the SLSM, through tide gates, and discharge through six decant weirs to Estudillo Canal. The site also ponds direct rainfall. Tidal inflow to the site is limited to the highest tides during the winter and spring, when Bay waters are elevated due to “spring” high tides and high freshwater runoff (T. Roberts, pers. comm.). The SLSM marshes to the south of the DMMS are muted tidal, with culverts limiting tidal exchange. Estudillo Canal immediately north of the DMMS is also not fully tidal. A tidegate structure across the mouth of Estudillo Canal keeps bay water from entering the canal during high tides (ACFCWCD 2007). The canal is managed for flood protection by Alameda County Flood Control and Conservation District. No water level monitoring data were available for the site and adjacent areas (SLSM and Estudillo Canal) for this study.

Biology. The site is required by RWQCB permit (1990) to maximize wetland habitat values for shorebird usage between dredging events. Little or no biological monitoring data exists for the site. Based on anecdotal observations during monitoring of the adjacent SLSM marshes, the site provides habitat for migratory and wintering shorebirds, though habitat quality is likely low. Periodic disturbance of the site for dredged material placement limits development of the invertebrate community and therefore limits the quality of shorebird foraging.

¹⁵ Elevations in the 2004 grading plan are referenced to “NGVD (1973 adjustment),” treated as equal to NGVD29 for this study. All elevations in this memo are referenced to the NGVD29 datum.

5.2 Assumptions

- Muted tidal (not fully tidal) flows are available to the site. Estudillo Channel is not fully tidal and must remain managed with flap-gated culverts for flood protection. The SLSM marshes are muted tidal.
- No topographic information is available for the DMMS. For the purposes of this study, we assume DMMS grades prior to the 2009 material placement were as shown in Attachment F and that approximately 0.6 ft were placed in all but the highest areas of the west basin (33,000 CY over nearly 40% of the site), resulting in a gentle slope from +3 to +1.6 ft and that 1.5 ft were placed in all but the highest areas of the western half of the east basin (57,000 CY over nearly 30% of the site), resulting in a gentle slope from +3 to +2.5 ft. These estimates are approximate, for planning purposes only.
- Sediment quality in the DMMS is suitable for establishing wetland habitat.
- Invasive *Spartina alterniflora* and its hybrids will need to be controlled/eradicated regionally prior to any restoration of the DMMS.
- Perimeter levees of the DMMS are sufficiently high for placement of fill material to design grades, or can be raised if needed.
- Flood management requirements for Estudillo Channel do not impose DMMS grading or land use constraints.

These assumptions should be confirmed and revised as necessary, during later alternative refinement.

5.3 Alternative Descriptions

The DMMS alternatives are described below. **Table 5-1** summarizes fill volume and relative cost by alternative.

**TABLE 5-1
COMPARISON OF DMMS ALTERNATIVES**

DMMS Alternative	Potential Fill Volume (Approx.)	Construction Cost	O&M Cost
No action	0 CY	None	Low
Operate as DMMS for other harbors	Current: 0 CY Future: potentially high	None	Low-moderate
Shorebird habitat	0 to 60,000 CY	High	High
Tidal marsh	0 to 90,000 CY	Moderate	Low
Seasonal wetland	210,000 CY	Moderate	High

No Action

In the absence of a Harbor Basin project, use of the DMMS for dredged material handling would be discontinued. Inflow and outflow infrastructure would gradually deteriorate, likely leading to somewhat increased frequency of inundation of the site. In the absence of ongoing operations

(periodic material placement, grading, and discing), marsh and upland vegetation would colonize the higher areas of the site, converting unvegetated mudflat areas to vegetated marsh. Higher areas than these would likely be colonized with a mix of native and non-native emergent marsh and upland plant species. In the shallowly flooded areas, a more abundant and permanent invertebrate community could establish and serve as a food source for shorebirds and waterfowl. Overall, habitat quality may increase.

The Waste Discharge Requirements (WDR) permit the site for management of dredged material from the San Leandro Harbor “in perpetuity.” No abandonment plan has been articulated and it is not known what, if any, requirements the permitting agencies would impose.

Operate DMMS for other Harbor Dredging Operations

This alternative provides for minimal operations and maintenance (O&M) to preserve the DMMS for potential future use. Although there is currently no known demand to use the DMMS for dredged material handling, demand may increase over time for adaptation to sea level rise (e.g., levee construction and fill along the shoreline as proposed for the Hayward Area Shoreline project¹⁶). The cost of trucking material from the DMMS could be paid for by others, in which case the City could resume dredging the harbor or allow others to deposit dredged materials at the DMMS. This alternative protects a City asset (the DMMS) that is of low value now, but may become valuable in the future.

Under this alternative, the City would continue to disc the site periodically to remove vegetation. The City would maintain the levees and hydraulic structures as needed to preserve the existing site hydrology. The purpose of these O&M activities would be to maintain the site in its current condition. If no O&M were conducted, habitat would develop at the site; regulations protecting this habitat could preclude future use of the site for dredge material storage.

Shorebird Habitat Enhancement

The Shorebird Habitat Enhancement alternative would create shallow open water and island areas at the site for shorebird foraging, roosting and nesting. Shorebird habitat is considered valuable in San Francisco Bay and is the focus of several large restoration efforts. Shorebird habitat is expected to become scarcer with sea level rise. The concept presented here is based on ESA PWA’s designs for similar habitat for the South Bay Salt Pond Restoration Project and the Hamilton Wetland Restoration Project, which both include significant areas of created shorebird habitat.

The site could be restored at approximately existing grades or raised to include as much as 60,000 CY of new dredged material. The 60,000 CY fill volume assumes that the site is filled to 2.5 ft (average of 1 ft of fill over most of the site). The design elevation and amount of fill would depend on tide levels at the adjacent SLSM marshes and Estudillo Channel. The site must be low enough to flood on most high tides. Mean high water (MHW) at the San Leandro Marina is 3.4 ft,

¹⁶ See <http://www.hayward-ca.gov/departments/ced/documents/planning/2010/HASPA%20Report%20v15A%20-%20with%20acknowledgements.pdf>

with an approximate high tide range of 2.7 to 4.0 ft over the spring-neap cycle. High water levels at the SLSM intake are an unknown amount lower than Bay tides.

Existing culverts and weirs would be supplemented or replaced with additional hydraulic structures to allow greater flows and management flexibility. O&M would consist primarily of water management, vegetation management (less than current level of vegetation management), and periodic levee maintenance and replacement of hydraulic structures.

Implementation of the Shorebird Habitat Enhancement would require up-front funding for construction and ongoing funding for O&M. This alternative would have a relatively high cost and would most likely be pursued only in partnership with a public or private entity, such as the California Department of Fish and Game, who could help bring grant funding for construction and assume responsibility for ongoing management.

Tidal Marsh Restoration

The tidal marsh restoration alternative would create a predominantly pickleweed marshplain with channels and small areas of upland refugia. The extent of channels would depend on habitat objectives and funding availability. The DMMS would function similarly to the adjacent SLSM marshes, which provide suitable habitat for salt marsh harvest mouse (SMHM) and California clapper rail (CCR).

The site would be raised using up to 90,000 CY of dredged material to create the marshplain. The 90,000 CY fill volume assumes the site is filled to 2.7 ft. The design elevation and amount of fill would depend on tide levels at the adjacent SLSM marshes and Estudillo Channel. Channels would be excavated (or avoided during material placement) to provide drainage to and from the marshplain. Additional channels (more than the minimum required for drainage) would provide additional channel habitat for the CCR, as well as improved drainage, and would be constructed if funds permit. The existing weirs and culverts at the site would be removed or abandoned in place. O&M costs would be minimal, consisting primarily of vegetation management (much less intensive than current levels of vegetation management).

Seasonal Wetland Restoration

The seasonal wetland alternative would fill the site above tidal elevations to create fresh to brackish seasonally-ponded areas. The site would pond direct rainfall during the winter and spring and be dry during the summer and fall. The site would be raised using approximately 210,000 CY or more of dredged material.

Limited monitoring of seasonal wetlands created on dredged material around San Francisco Bay indicates that these areas provide shallow open water habitat used by shorebirds initially, then – in the absence of vegetation management or an ongoing source of saline bay water – vegetate with upland native and invasive plants over several years to a decade (e.g., seasonal wetlands at Bair Island in San Mateo County and Corte Madera Ecological Reserve in Marin County). O&M

would consist primarily of relatively intensive vegetation management (e.g., frequent discing, spraying of saline water onto the site) and mosquito control measures.¹⁷

Compatibility with Harbor Basin Alternatives

The Harbor Basin alternatives, as presented Section 2 of this report, are:

- No Action
- Marina Park
- Aquatic Park
- Nature Park

In addition, a dredged materials disposal concept, discussed in Section 3, is also being considered. This concept is a phasing plan that starts with the Marina Park Alternative, using only cost-effective disposal areas, then allows transition to a long-term plan in the future. The long-term plan could be continuation of the Marina Park Alternative harbor configuration, if a cost-effective means of dredge material disposal becomes available. Or it could be a transition to the Aquatic Park or Nature Park Alternatives. Placement of fill at the DMMS site is considered cost-effective so long as no material removal is required or the cost of any material removal is not paid by the City.

Table 5-2 illustrates the compatibility of the Harbor Basin alternatives with the DMMS alternatives. A “yes” entry identifies compatible combinations where the Harbor Basin alternatives and DMMS alternatives are independent of each other. “No” identifies incompatible combinations. Harbor Basin alternatives that do not generate excess dredged material are not compatible with the seasonal wetland DMMS alternative, since construction of the seasonal wetland requires fill. “Yes, benefit” identifies combinations for which the DMMS alternative provides a benefit to a Harbor Basin alternative by providing for economical dredged material placement. The combination of the “Dredged Material Disposal Concept” and “Operate as DMMS for other harbors” is noted as “possibly” compatible, if demand for fill material were to materialize quickly (e.g., entities wanted to pay for material dredged from the San Leandro harbor).

**TABLE 5-2
COMPATIBILITY OF HARBOR BASIN ALTERNATIVES WITH THE DMMS ALTERNATIVES**

DMMS Alternatives Harbor Basin Alternatives	No Action	Operate as DMMS for other harbors	Shorebird Habitat	Tidal Marsh	Seasonal wetland
No Action	Yes	Yes	Yes ^a	Yes ^a	No
Marina Park	Yes	Yes	Yes, benefit	Yes, benefit	Yes, benefit
Aquatic Park	Yes	Yes	Yes ^a	Yes ^a	No
Nature Park	Yes	Yes	Yes ^a	Yes ^a	No
Dredged Material Disposal Concept	No	Possibly	Yes, benefit	Yes, benefit	Yes, benefit

^a The DMMS alternative would be constructed without using fill from the Harbor Basin.

¹⁷ Although all the DMMS concepts considered for this study may require some level of mosquito control, seasonal wetlands will require the highest level. Mosquito control for this area is provided by Alameda County.

To maintain a reduced size marina under the Marina Park alternative requires dredging approximately 105,000 CY (Channel only) to 115,000 CY (Channel and Marina) every four years. Based on the rough numbers prepared for this study, the shorebird habitat DMMS alternative may be able to accept material from 50-60% of one dredge event and the tidal marsh DMMS alternative may be able to accept material from 75-85% of one dredge event. The ranges reflect with and without Marina dredging. These numbers assume maximum fill placement, which would need to be confirmed based on existing ground elevations and tides. The seasonal wetland alternative could accept material from roughly two dredge events.

Landscape Change with Sea Level Rise

Sea level rise is expected to change the future economic and physical landscape in the site vicinity. Though the exact rate of sea level rise is not known, it is generally anticipated to be 10 to 17 inches by 2050. As sea levels rise, there will be increased risk of overtopping of the existing outboard (bay) levee. Investment will be required to maintain the existing outboard levee or to retreat to a new inboard levee.

Operating the site as a DMMS for other harbors could become more valuable with future sea level rise, as fill is increasingly needed for new levee creation and for raising low-lying areas around the margin of the bay. Operating the DMMS would require ongoing O&M to protect site uses with sea level rise.

The tidal marsh and seasonal wetland habitat types would be resilient to sea level rise and set-back of the protected shoreline. Tidal marsh sedimentation would build the marsh surface vertically as sea level rose. Seasonal wetland would gradually convert to high intertidal marsh habitat and, because it is high in elevation, provide good shoreline protection in the form of absorbing wave energy. While the shorebird habitat alternative would become increasingly difficult to manage to meet habitat goals, preservation of this type of habitat could take on additional importance as mudflat habitat around the bay decreases.

SECTION 6

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ATTACHMENTS A THROUGH E

Projection of Probable Costs

ATTACHMENT A
 San Leandro Harbor Basin Alternatives Study
 PROJECTION OF PROBABLE CAPITAL COSTS (note #1)

PROJECT:	SAN LEANDRO HARBOR BASIN	DATE:	2/23/11		
LOCATION:	SAN LEANDRO, CA	Phase:	CONCEPTUAL PLANNING		
	Description	MARINA PARK	AQUATIC PARK	NATURE PARK	NO ACTION
Dredging Costs (note #2)					
Harbor dredging (inclusive of sediment testing, permitting, engineering and construction management)					
		\$ 12,372,910.00	\$ -	\$ -	\$ -
TOTAL HARBOR DREDGING		\$ 12,372,910.00			

Regulatory Compliance (note #3)	Quantity	Unit	Unit Cost	Cost
Sediment Testing/Permitting/CEQA	1	Allow	\$ 250,000.00	\$ 250,000.00
Other Regulatory Permits for Harbor Renovation (USACE/BCDC/RWQCB/COAST GUARD)	1	Allow	\$ 100,000.00	\$ 100,000.00
TOTAL REGULATORY COMPLIANCE			\$ 350,000.00	\$ 350,000.00

Capital Improvement Costs	Quantity	Unit	Unit Cost	Cost
Demolition / Site Preparation				
Fueling Dock Removal	1	Allow	\$ 250,000.00	\$ 250,000.00
Harbor Office	1	Allow	\$ 150,000.00	\$ 150,000.00
Concrete Dock Removal (Docks A, B, C, D)	4	EA	\$ 150,000.00	\$ 600,000.00
Wood Dock Removal (Docks N, O, P, Q)	4	EA	\$ 100,000.00	\$ 400,000.00
Remaining Concrete Dock Removal (Docks E, F, G, H)	4	EA	\$ 100,000.00	\$ 400,000.00
Remaining Wood Dock Removal (J, K, L, M)	4	EA	\$ 100,000.00	\$ 400,000.00
Restrooms (perched restrooms only)	2	Allow	\$ 75,000.00	\$ 150,000.00
Blue Dolphin Restaurant platform	1	Allow	\$ 150,000.00	\$ 150,000.00
Existing trail / pavement removal	3950	LF	\$ 25.00	\$ 98,750.00
Misc. removal	1	Allow	\$ 10,000.00	\$ 10,000.00

Upgrade / Replace Existing Facilities	Quantity	Unit	Unit Cost	Cost
Docks (J, K, L, M)	4	EA	\$ 800,000.00	\$ 3,200,000.00
Restrooms (perched restrooms only)	1	EA	\$ 500,000.00	\$ 500,000.00

Earthwork	Quantity	Unit	Unit Cost	Cost
Dredging to create wetlands	182,000	CY	\$ 14.00	\$ 2,548,000.00
Clear and grub shoreline	1.5	A	\$ 11,000.00	\$ 16,500.00
Backfill Rip/rap (1' top soil above dredge materials)	5,000	CY	\$ 50.00	\$ 250,000.00
Fine grading	3.2	A	\$ 25,000.00	\$ 80,000.00
Beach / Sand	6,000	TON	\$ 100.00	\$ 600,000.00
Silt Fencing / Straw Rolls	2,200	LF	\$ 6.00	\$ 13,200.00

Structures	Quantity	Unit	Unit Cost	Cost
Marina Office (with restroom)	1	Allow	\$ 400,000.00	\$ 400,000.00
Visitor / Interpretive Center w/ restroom (note #4)	1	Allow	\$ 500,000.00	\$ 500,000.00
Pedestrian Bridge	1	Allow	\$ 300,000.00	\$ 300,000.00
Pedestrian Piers	600	LF	\$ 1,200.00	\$ 720,000.00
Pedestrian Boardwalks (water level w/ railings)	1,400	LF	\$ 600.00	\$ 840,000.00
Interpretive Station / Vista Point w/ Interpretive Signs	9	EA	\$ 75,000.00	\$ 675,000.00
Boat Rental Building w/ restroom	1	Allow	\$ 600,000.00	\$ 600,000.00

note #2	note #2	note #2	note #2	note #2
\$ 250,000.00	\$ 250,000.00	\$ 250,000.00	\$ 250,000.00	\$ 250,000.00
\$ 150,000.00	\$ 150,000.00	\$ 150,000.00	\$ 150,000.00	\$ 150,000.00
\$ 600,000.00	\$ 600,000.00	\$ 600,000.00	\$ 600,000.00	\$ 600,000.00
\$ 400,000.00	\$ 400,000.00	\$ 400,000.00	\$ 400,000.00	\$ 400,000.00
\$ 600,000.00	\$ 600,000.00	\$ 600,000.00	\$ 600,000.00	\$ 600,000.00
\$ 400,000.00	\$ 400,000.00	\$ 400,000.00	\$ 400,000.00	\$ 400,000.00
\$ 150,000.00	\$ 150,000.00	\$ 150,000.00	\$ 150,000.00	\$ 150,000.00
\$ 150,000.00	\$ 150,000.00	\$ 150,000.00	\$ 150,000.00	\$ 150,000.00
\$ 98,750.00	\$ 98,750.00	\$ 98,750.00	\$ 98,750.00	\$ 98,750.00
\$ 10,000.00	\$ 10,000.00	\$ 10,000.00	\$ 10,000.00	\$ 10,000.00
\$ 3,200,000.00				
\$ 500,000.00				
note #2	\$ 2,038,400.00	\$ 2,548,000.00		
\$ 16,500.00	\$ 16,500.00	\$ 16,500.00	\$ 16,500.00	
\$ 62,500.00	\$ 125,000.00	\$ 250,000.00	\$ 250,000.00	
\$ 20,000.00	\$ 40,000.00	\$ 80,000.00	\$ 80,000.00	
\$ 600,000.00	\$ 600,000.00	\$ 600,000.00	\$ 600,000.00	
\$ 3,300.00	\$ 6,600.00	\$ 13,200.00	\$ 13,200.00	
\$ 400,000.00				
		\$ 500,000.00	\$ 500,000.00	
		\$ 300,000.00	\$ 300,000.00	
	\$ 720,000.00	\$ 720,000.00	\$ 720,000.00	
	\$ 840,000.00	\$ 840,000.00	\$ 840,000.00	
	\$ 150,000.00	\$ 675,000.00	\$ 675,000.00	
	\$ 600,000.00	\$ 600,000.00	\$ 600,000.00	

ALTERNATIVE 1 ALTERNATIVE 2 ALTERNATIVE 3 CUSTODIAL
Marina Park Aquatic Park Nature Park ALTERNATIVE

\$	474,000.00	\$	474,000.00	\$	474,000.00		
\$	520,000.00	\$	520,000.00	\$	520,000.00		
\$	5,000.00	\$	5,000.00	\$	5,000.00		
\$	25,000.00	\$	25,000.00	\$	25,000.00		
\$	100,000.00	\$	100,000.00	\$	100,000.00		
\$	15,000.00	\$	15,000.00	\$	15,000.00		
\$		\$	2,000.00	\$	2,000.00		
\$		\$	6,000.00	\$	6,000.00		
\$	6,250.00	\$	12,500.00	\$	25,000.00		
\$	80,000.00	\$	160,000.00	\$	320,000.00		
\$	36,000.00	\$	36,000.00	\$	36,000.00		
\$	32,000.00	\$	64,000.00	\$	128,000.00		
\$	20,000.00	\$	20,000.00	\$	20,000.00		
\$	7,924,300.00	\$	8,544,750.00	\$	10,427,450.00	\$	2,710,000.00
\$	792,430.00	\$	854,475.00	\$	1,042,745.00	\$	271,000.00
\$	792,430.00	\$	854,475.00	\$	1,042,745.00	\$	271,000.00
\$	118,864.50	\$	128,171.25	\$	156,411.75	\$	40,650.00
\$	792,430.00	\$	854,475.00	\$	1,042,745.00	\$	271,000.00
\$	10,420,454.50	\$	11,236,346.25	\$	13,712,096.75	\$	3,563,650.00
\$	1,042,045.45	\$	1,123,634.63	\$	1,371,209.68	\$	356,365.00
\$	1,250,454.54	\$	1,348,361.55	\$	1,645,451.61	\$	427,638.00
\$	12,712,954.49	\$	13,708,342.43	\$	16,728,758.04	\$	4,347,653.00
\$	25,085,864.49	\$	14,058,342.43	\$	17,078,758.04	\$	4,447,653.00

Quantity Unit Unit Cost Cost

Paving and Surfacing						
Pedestrian Promenade / Multi-use Trail (10' architectural concrete)	3950	LF	\$	120.00	\$	474,000.00
Misc. Improvements						
Promenade / Area Lighting	80	EA	\$	6,500.00	\$	520,000.00
Signs	20	EA	\$	250.00	\$	5,000.00
Trash / Recycling Receptacle Seis	25	EA	\$	1,000.00	\$	25,000.00
Benches	20	EA	\$	5,000.00	\$	100,000.00
Drinking Fountains	5	EA	\$	3,000.00	\$	15,000.00
Bicycle Racks	1	EA	\$	2,000.00	\$	2,000.00
Trash / Recycling Receptacles	6	EA	\$	1,000.00	\$	6,000.00
Vegetation / Irrigation						
Shoreline Plantings						
Willow cuttings	1.0	A	\$	25,000.00	\$	25,000.00
Grasses / ground cover (1 gal)	3.2	A	\$	100,000.00	\$	320,000.00
Trees and shrubs (24" box)	80	EA	\$	450.00	\$	36,000.00
Irrigation						
Tree/Shrub Shoreline Plant Establishment	3.2	A	\$	40,000.00	\$	128,000.00
Trees along Perimeter Walk	80	EA	\$	250.00	\$	20,000.00
SUB-TOTAL: DIRECT CONSTRUCTION COST						
General Conditions @ 10%						
GC Overhead and Profit @ 10%						
Bonds @ 1.5%						
Contingency @ 10%						
SUB-TOTAL: PROBABLE CONSTRUCTION COST						
Design Fees and Expenses @ 10%						
Const. Admin./ Inspection /Monitoring @ 12%						
TOTAL PROJECTED CONSTRUCTION COST						
TOTAL PROJECTED DREDGING, PERMITTING, AND CONSTRUCTION COST						

n/a = not applicable
 SY = Square Yard
 A = Acre
 EA = Each
 Allow. = Allowance
 LF = Linear Foot
 CY = Cubic Yard

Source: 2M Associates, Landscape Architects (2/14/11)
 Notes

1 February 2011 costs. This projection is preliminary, for planning purposes only, and is subject to change. This projection uses normal park construction costs based on industry standards suitable for a conceptual plan document level of detail. Costs shown assume all work being performed by licensed contractors for area of expertise and include prevailing wages for the San Francisco Bay area. Work identified is for changes interior to the existing walk around the perimeter of the Harbor Basin. Park and public amenity proposals identified in Discussion Plan Option #6 by Cal Coast Companies, LLC, or any other redevelopment options outside the perimeter walk, are not included. Major infrastructure upgrade costs are assumed to be integrated into the overall San Leandro Marina redevelopment plan for the area. No debt service costs are included.

2 Dredging cost projections by McFatt & Nichol. Dredging costs indicated for Alternative 1 are all inclusive of sediment testing, environmental documentation, and permitting costs. Assumed is a sequence of wetland creation/enhancement at: (1) DNMS site; (2) North Basin; and (3) South Basin.

3 Costs associated with Alternative #1 included in dredging costs.

4 Facility capital costs could potentially be funded by other public agency or private partner.

Description	Quantity	Unit	Unit Cost	Cost	ALTERNATIVE 1		
					5 YEARS	10 YEARS	15 YEARS
Paving and Surfacing							
Pedestrian Promenade / Multi-use Trail (10' architectural concrete)	3950	LF	\$ 120.00	\$ 474,000.00	\$ 474,000.00		
Misc. Improvements							
Promenade / Area Lighting	80	EA	\$ 6,500.00	\$ 520,000.00	\$ 520,000.00		
Signs	20	EA	\$ 250.00	\$ 5,000.00	\$ 5,000.00		
Trash / Recycling Receptacle Sets	25	EA	\$ 1,000.00	\$ 25,000.00	\$ 25,000.00		
Benches	20	EA	\$ 5,000.00	\$ 100,000.00	\$ 100,000.00		
Drinking Fountains	5	EA	\$ 3,000.00	\$ 15,000.00	\$ 15,000.00		
Bicycle Racks	0	EA	\$ 2,000.00	\$ -			
Trash / Recycling Receptacles	0	EA	\$ 1,000.00	\$ -			
Vegetation / Irrigation							
Shoreline Plantings							
Willow cuttings	1.0	A	\$ 25,000.00	\$ 25,000.00	\$ 6,250.00		
Grasses / ground cover (1 gal)	3.2	A	\$ 100,000.00	\$ 320,000.00	\$ 80,000.00		
Trees and shrubs (24" box)	80	EA	\$ 450.00	\$ 36,000.00	\$ 36,000.00		
Irrigation							
Tree/Shrub Shoreline Plant Establishment	0.8	A	\$ 40,000.00	\$ 32,000.00	\$ 32,000.00		
Trees along Perimeter Walk	80	EA	\$ 250.00	\$ 20,000.00	\$ 20,000.00		
SUB-TOTAL: DIRECT CAPITAL IMPROVEMENT COST				\$ 7,924,300.00	\$ 4,575,000.00	\$ -	
General Conditions @ 10%				\$ 792,430.00	\$ 457,500.00	\$ -	
GC Overhead and Profit @ 10%				\$ 792,430.00	\$ 457,500.00	\$ -	
Bonds @ 1.5%				\$ 118,864.50	\$ 68,625.00	\$ -	
Contingency @ 10%				\$ 792,430.00	\$ 457,500.00	\$ -	
SUB-TOTAL: PROBABLE CONSTRUCTION COST				\$ 10,420,454.50	\$ 6,016,125.00	\$ -	
Design Fees and Expenses @ 10%				\$ 1,042,045.45	\$ 601,612.50	\$ -	
Const. Admin./ Inspection / Monitoring @ 12%				\$ 1,260,454.54	\$ 721,935.00	\$ -	
TOTAL PROBABLE CONSTRUCTION COST				\$ 12,712,954.49	\$ 7,339,672.50	\$ -	
PROJECTED OPERATIONS COSTS					\$ 2,815,000.00	\$ 2,815,000.00	\$ 2,815,000.00
TOTAL INCLUSIVE COSTS (3)					\$ 15,326,346.99	\$ 12,403,842.50	\$ 5,800,675.00

n/a = not applicable
 SY = Square Yard
 EA = Each
 LF = Linear Foot
 Allow. = Allowance
 CY = Cubic Yard

Source: 2M Associates, Landscape Architects (2/14/11)

Notes

- 1 February 2011 costs. This projection is preliminary, for planning purposes only, and is subject to change. This projection uses normal park construction costs based on industry standards suitable for a conceptual plan document level of detail. Costs shown assume all work being performed by licensed contractors for area of expertise and include prevailing wages for the San Francisco Bay area. Work identified is for changes interior to the existing walk around the perimeter of the Harbor Basin. Park and public amenity proposals identified in Discussion Plan Option #6 by Cal Coast Companies, LLC, or any other redevelopment options outside the perimeter walk, are not included. Major infrastructure upgrade costs are assumed to be integrated into the overall San Leandro Marina redevelopment plan for the area. No debt service costs are included.
- 2 Dredging cost projections by Moffatt & Nichol. Dredging costs indicated for Alternative 1 are all inclusive of sediment testing, environmental documentation, and permitting costs. Assumed is a sequence of wetland creation/enhancement at: (1) DMMS site; (2) North Basin; and (3) South Basin. Dredging occurs presented in Table 4-6 have been prorated from 4 year cycle costs to 5 year phasing costs as necessary.
- 3 Costs associated with Alternative #1 included in dredging costs.
- 4 Facility capital costs could potentially be funded by other public agency or private partner.

Description	Quantity	Unit	Unit Cost	Cost	ALTERNATIVE 2			
					5 YEARS	10 YEARS	15 YEARS	
Paving and Surfacing								
Pedestrian Promenade / Multi-use Trail (10' architectural concrete)	3950	LF	\$ 120.00	\$ 474,000.00	\$ 474,000.00			
Misc. Improvements								
Promenade / Area Lighting	80	EA	\$ 6,500.00	\$ 520,000.00				
Signs	20	EA	\$ 250.00	\$ 5,000.00	\$ 520,000.00			
Trash / Recycling Receptacle Sets	25	EA	\$ 1,000.00	\$ 25,000.00	\$ 5,000.00			
Benches	20	EA	\$ 5,000.00	\$ 100,000.00	\$ 25,000.00			
Drinking Fountains	5	EA	\$ 3,000.00	\$ 15,000.00	\$ 100,000.00			
Bicycle Racks	1	EA	\$ 2,000.00	\$ 2,000.00	\$ 15,000.00			
Trash / Recycling Receptacles	6	EA	\$ 1,000.00	\$ 6,000.00	\$ 2,000.00			
Vegetation / Irrigation								
Shoreline Plantings								
Willow cuttings	0.5	A	\$ 25,000.00	\$ 12,500.00				
Grasses / ground cover (1 gal)	1.6	A	\$ 100,000.00	\$ 160,000.00	\$ 12,500.00			
Trees and shrubs (24" box)	80	EA	\$ 450.00	\$ 36,000.00	\$ 160,000.00			
Irrigation					\$ 36,000.00			
Tree/Shrub Shoreline Plant Establishment	1.6	A	\$ 40,000.00	\$ 64,000.00	\$ 64,000.00			
Trees along Perimeter Walk	80	EA	\$ 250.00	\$ 20,000.00	\$ 20,000.00			
SUB-TOTAL: DIRECT CAPITAL IMPROVEMENT COST					\$ 8,544,750.00	\$ 1,870,000.00	\$ 1,870,000.00	\$ -
General Conditions @ 10%					\$ 854,475.00	\$ 187,000.00	\$ 187,000.00	\$ -
GC Overhead and Profit @ 10%					\$ 854,475.00	\$ 187,000.00	\$ 187,000.00	\$ -
Bonds @ 1.5%					\$ 128,171.25	\$ 76,295.25	\$ 28,050.00	\$ -
Contingency @ 10%					\$ 854,475.00	\$ 508,635.00	\$ 187,000.00	\$ -
SUB-TOTAL: PROBABLE CONSTRUCTION COST					\$ 11,236,346.25	\$ 2,459,050.25	\$ 2,459,050.00	\$ -
Design Fees and Expenses @ 10%					\$ 1,123,634.63	\$ 688,855.03	\$ 245,905.00	\$ -
Const. Admin./ Inspection / Monitoring @ 12%					\$ 1,348,361.55	\$ 802,626.03	\$ 295,086.00	\$ -
TOTAL PROBABLE CONSTRUCTION COST					\$ 13,708,342.43	\$ 8,160,031.31	\$ 3,000,041.00	\$ -
PROJECTED OPERATIONS COSTS								
					\$ 1,400,000.00	\$ 1,400,000.00	\$ 1,400,000.00	\$ 1,400,000.00
TOTAL INCLUSIVE COSTS								
					\$ 9,910,031.31	\$ 4,400,041.00	\$ 4,400,041.00	\$ 1,400,000.00

n/a = not applicable
 SY = Square Yard
 EA = Each
 LF = Linear Foot
 SF = Square Foot
 A = Acre
 Allow. = Allowance
 CY = Cubic Yard

Source: 2M Associates, Landscape Architects (2/14/11)

Notes

- February 2011 costs. This projection is preliminary, for planning purposes only, and is subject to change. This projection uses normal park construction costs based on industry standards suitable for a conceptual plan document. level of detail. Costs shown assume all work being performed by licensed contractors for area of expertise and include prevailing wages for the San Francisco Bay area. Work identified is for changes interior to the existing walk around the perimeter of the Harbor Basin. Park and public amenity proposals identified in Discussion Plan Option #6 by Cal Coast Companies, LLC, or any other redevelopment options outside the perimeter walk, are not included. Major infrastructure upgrade costs are assumed to be integrated into the overall San Leandro Marina redevelopment plan for the area. No debt service costs are included.
- Facility capital costs could potentially be funded by other public agency; Assumes private third-party operations at no cost to City.

ATTACHMENT D - NATURE PARK
San Leandro Harbor Basin Alternatives Study
PROJECTION OF PROBABLE CAPITAL AND OPERATIONAL COSTS OVER A 15 YEAR PERIOD (note #1)

PROJECT: SAN LEANDRO HARBOR BASIN	DATE: 2/23/11
LOCATION: SAN LEANDRO , CA	Phase: CONCEPTUAL PLANNING
	0-5 YEARS
	6-10 YEARS
	11-15 YEARS

ALTERNATIVE 3
Nature Park

Description	Quantity	Unit	Unit Cost	Cost
-------------	----------	------	-----------	------

Dredging Costs				
Harbor dredging (inclusive of sediment testing, permitting, engineering and construction management)				
TOTAL HARBOR DREDGING				

Regulatory Compliance				
Sediment Testing/Permitting/CEQA	1	Allow	\$ 250,000.00	\$ 250,000.00
Other Regulatory Permits for Harbor Renovation (USACE/BCDC/RWQCB/COAST GUARD)	1	Allow	\$ 100,000.00	\$ 100,000.00
TOTAL REGULATORY COMPLIANCE				\$ 350,000.00

CAPITAL IMPROVEMENT COSTS				
Demolition / Site Preparation				
Fueling Dock Removal	1	Allow	\$ 250,000.00	\$ 250,000.00
Harbor Office	1	Allow	\$ 150,000.00	\$ 150,000.00
Concrete Dock Removal (Docks A, B, C, D)	4	EA	\$ 150,000.00	\$ 600,000.00
Wood Dock Removal (Docks N, O, P, Q)	4	EA	\$ 100,000.00	\$ 400,000.00
Remaining Concrete Dock Removal (Docks E,F,G, H)	4	EA	\$ 150,000.00	\$ 600,000.00
Remaining Wood Dock Removal (J,K,L,M)	4	EA	\$ 100,000.00	\$ 400,000.00
Restrooms (perched restrooms only)	2	Allow	\$ 75,000.00	\$ 150,000.00
Blue Dolphin Restaurant platform	1	Allow	\$ 150,000.00	\$ 150,000.00
Existing trail / pavement removal	3950	LF	\$ 25.00	\$ 98,750.00
Misc. removal	1	Allow	\$ 10,000.00	\$ 10,000.00
Upgrade / Replace Existing Facilities				
Docks (J,K,L,M)	4	EA	\$ 800,000.00	\$ 3,200,000.00

Earthwork				
Dredging to create wetlands	182,000	CY	\$ 14.00	\$ 2,548,000.00
Clear and grub shoreline	1.5	A	\$ 11,000.00	\$ 16,500.00
Backfill Rip/rap (1' top soil above dredge materials)	5,000	CY	\$ 50.00	\$ 250,000.00
Fine grading	3.2	A	\$ 25,000.00	\$ 80,000.00
Beach / Sand	0	TON	\$ 100.00	\$ -
Silt Fencing / Straw Rolls	2,200	LF	\$ 6.00	\$ 13,200.00

Structures				
Marina Office (with restroom)		Allow	\$ 400,000.00	\$ -
Visitor / Interpretive Center w/ restroom	1	Allow	\$ 500,000.00	\$ 500,000.00
Pedestrian Bridge	1	Allow	\$ 300,000.00	\$ 300,000.00
Pedestrian Piers	600	LF	\$ 1,200.00	\$ 720,000.00
Pedestrian Boardwalks (water level w/ railings)	1,400	LF	\$ 600.00	\$ 840,000.00
Interpretive Station / Vista Point w/ Interpretive Signs	9	EA	\$ 75,000.00	\$ 675,000.00
Boat Rental Building w/ restroom		Allow	\$ 600,000.00	\$ -

\$ 250,000.00	
\$ 100,000.00	
\$ 350,000.00	\$ - \$

\$ 250,000.00	
\$ 150,000.00	
\$ 600,000.00	
\$ 400,000.00	
\$ 600,000.00	
\$ 400,000.00	
\$ 150,000.00	
\$ 150,000.00	
\$ 98,750.00	
\$ 10,000.00	

\$ 2,548,000.00	
\$ 16,500.00	
\$ 250,000.00	
\$ 80,000.00	
\$ 13,200.00	

\$ -	
\$ 500,000.00	\$ 500,000.00
\$ 300,000.00	\$ 300,000.00
\$ 720,000.00	\$ 720,000.00
\$ 840,000.00	\$ 840,000.00
\$ 675,000.00	\$ 675,000.00

Description	Quantity	Unit	Unit Cost	Cost	ALTERNATIVE 3 Nature Park		
					5 YEARS	10 YEARS	15 YEARS
Paving and Surfacing							
Pedestrian Promenade / Multi-use Trail (10' architectural concrete)	3950	LF	\$ 120.00	\$ 474,000.00	\$ 474,000.00		
Misc. Improvements							
Promenade / Area Lighting	80	EA	\$ 6,500.00	\$ 520,000.00	\$ 520,000.00		
Signs	20	EA	\$ 250.00	\$ 5,000.00	\$ 5,000.00		
Trash / Recycling Receptacle Sets	25	EA	\$ 1,000.00	\$ 25,000.00	\$ 25,000.00		
Benches	20	EA	\$ 5,000.00	\$ 100,000.00	\$ 100,000.00		
Drinking Fountains	5	EA	\$ 3,000.00	\$ 15,000.00	\$ 15,000.00		
Bicycle Racks	1	EA	\$ 2,000.00	\$ 2,000.00	\$ 2,000.00		
Trash / Recycling Receptacles	6	EA	\$ 1,000.00	\$ 6,000.00	\$ 6,000.00		
Vegetation / Irrigation							
Shoreline Plantings							
Willow cuttings	1.0	A	\$ 25,000.00	\$ 25,000.00	\$ 25,000.00		
Grasses / ground cover (1 gal)	3.2	A	\$ 100,000.00	\$ 320,000.00	\$ 320,000.00		
Trees and shrubs (24" box)	80	EA	\$ 450.00	\$ 36,000.00	\$ 36,000.00		
Irrigation							
Tree/Shrub Shoreline Plant Establishment	3.2	A	\$ 40,000.00	\$ 128,000.00	\$ 128,000.00		
Trees along Perimeter Walk	80	EA	\$ 250.00	\$ 20,000.00	\$ 20,000.00		
SUB-TOTAL: DIRECT CAPITAL IMPROVEMENT COST				\$ 10,427,450.00	\$ 7,392,450.00	\$ 1,395,000.00	\$ 1,640,000.00
General Conditions @ 10%				\$ 1,042,745.00	\$ 739,245.00	\$ 139,500.00	\$ 164,000.00
GC Overhead and Profit @ 10%				\$ 1,042,745.00	\$ 739,245.00	\$ 139,500.00	\$ 164,000.00
Bonds @ 1.5%				\$ 156,411.75	\$ 110,886.75	\$ 20,925.00	\$ 24,600.00
Contingency @ 10%				\$ 1,042,745.00	\$ 739,245.00	\$ 139,500.00	\$ 164,000.00
SUB-TOTAL: PROBABLE CONSTRUCTION COST				\$ 13,712,096.75	\$ 9,721,071.75	\$ 1,834,425.00	\$ 2,156,600.00
Design Fees and Expenses @ 10%				\$ 1,371,209.68	\$ 972,107.18	\$ 183,442.50	\$ -
Const. Admin./ Inspection / Monitoring @ 12%				\$ 1,645,451.61	\$ 1,166,528.61	\$ 220,131.00	\$ 258,792.00
TOTAL PROBABLE CONSTRUCTION COST				\$ 16,728,758.04	\$ 11,859,707.54	\$ 2,237,998.50	\$ 2,415,392.00
PROJECTED OPERATIONS COSTS							
					\$ 581,250.00	\$ 581,250.00	\$ 581,250.00
TOTAL INCLUSIVE COSTS					\$ 12,790,957.54	\$ 2,819,248.50	\$ 2,996,642.00

* January, 2011 costs. This projection is preliminary, for planning purposes only, and is subject to change. This projection uses normal park construction costs based on industry standards suitable for a conceptual plan document level of detail.

Costs shown assume all work being performed by licensed contractors for area of expertise and include prevailing n/a = not applicable
 A = Acre
 Allow. = Allowance
 CY = Cubic Yard
 SY = Square Yard
 EA = Each
 LF = Linear Foot
 SF = Square Foot

Source: 2MA Associates, Landscape Architects (1/24/11)

Notes

1 February 2011 costs. This projection is preliminary, for planning purposes only, and is subject to change. This projection uses normal park construction costs based on industry standards suitable for a conceptual plan document level of detail. Costs shown assume all work being performed by licensed contractors for area of expertise and include prevailing wages for the San Francisco Bay area. Work identified is for changes interior to the existing walk around the perimeter of the Harbor Basin. Park and public amenity proposals identified in Discussion Plan Option #6 by Cal Coast Companies, LLC, or any other redevelopment options outside the perimeter walk, are not included. Major infrastructure upgrade costs are assumed to be integrated into the overall San Leandro Marina redevelopment plan for the area. No debt service costs are included.

ATTACHMENT E - NO ACTION
San Leandro Harbor Basin Alternatives Study
PROJECTION OF PROBABLE CAPITAL AND OPERATIONAL COSTS OVER A 15 YEAR PERIOD (note #1)

PROJECT: SAN LEANDRO HARBOR BASIN	DATE: 2/23/10
LOCATION: SAN LEANDRO, CA	Phase: CONCEPTUAL PLANNING
	0-5 YEARS
	6-10 YEARS
	11-15 YEARS

Description	Quantity	Unit	Unit Cost	Cost	CUSTODIAL ALTERNATIVE		
					0-5 YEARS	6-10 YEARS	11-15 YEARS
Dredging Costs (note #2)							
Harbor dredging (inclusive of sediment testing, permitting, engineering and construction management)							
TOTAL HARBOR DREDGING							

Description	Quantity	Unit	Unit Cost	Cost	CUSTODIAL ALTERNATIVE		
					0-5 YEARS	6-10 YEARS	11-15 YEARS
Regulatory Compliance (note #3)							
Sediment Testing/Permitting/CEQA	0	Allow	\$ 250,000.00	\$ -			
Other Regulatory Permits for Harbor Renovation (USACE/BCDC/RWQCB/COAST GUARD)	1	Allow	\$ 100,000.00	\$ 100,000.00			
TOTAL REGULATORY COMPLIANCE					\$ 100,000.00	\$ -	\$ -

Description	Quantity	Unit	Unit Cost	Cost	CUSTODIAL ALTERNATIVE		
					0-5 YEARS	6-10 YEARS	11-15 YEARS
CAPITAL IMPROVEMENT COSTS							
Demolition / Site Preparation							
Fueling Dock Removal	1	Allow	\$ 250,000.00	\$ 250,000.00			
Harbor Office	1	Allow	\$ 150,000.00	\$ 150,000.00			
Concrete Dock Removal (Docks A, B, C, D)	4	EA	\$ 150,000.00	\$ 600,000.00			
Wood Dock Removal (Docks N, O, P, Q)	4	EA	\$ 100,000.00	\$ 400,000.00			
Remaining Concrete Dock Removal (Docks E,F,G, H)	4	EA	\$ 150,000.00	\$ 600,000.00			
Remaining Wood Dock Removal (J,K,L,M)	4	EA	\$ 100,000.00	\$ 400,000.00			
Restrooms (perched restrooms only)	2	Allow	\$ 75,000.00	\$ 150,000.00			
Blue Dolphin Restaurant platform	1	Allow	\$ 150,000.00	\$ 150,000.00			
Existing trail / pavement removal	0	LF	\$ 25.00	\$ -			
Misc. removal	1	Allow	\$ 10,000.00	\$ 10,000.00			

Description	Quantity	Unit	Unit Cost	Cost	CUSTODIAL ALTERNATIVE		
					0-5 YEARS	6-10 YEARS	11-15 YEARS
Upgrade / Replace Existing Facilities							
Docks (J,K,L,M)	0	EA	\$ 800,000.00	\$ -			

Description	Quantity	Unit	Unit Cost	Cost	CUSTODIAL ALTERNATIVE		
					0-5 YEARS	6-10 YEARS	11-15 YEARS
Earthwork							
Dredging to create wetlands	182,000	CY	\$ 14.00	\$ 2,548,000.00			
Clear and grub shoreline	0	A	\$ 11,000.00	\$ -			
Backfill Riprap (1' top soil above dredge materials)	0	CY	\$ 50.00	\$ -			
Fine grading	0	A	\$ 25,000.00	\$ -			
Beach / Sand	0	TON	\$ 100.00	\$ -			
Silt Fencing / Straw Rolls	0	LF	\$ 6.00	\$ -			

Description	Quantity	Unit	Unit Cost	Cost	CUSTODIAL ALTERNATIVE		
					0-5 YEARS	6-10 YEARS	11-15 YEARS
Structures							
Marina Office (with restroom)	0	Allow	\$ 400,000.00	\$ -			
Visitor / Interpretive Center w/ restroom (4)	0	Allow	\$ 500,000.00	\$ -			
Pedestrian Bridge	0	Allow	\$ 300,000.00	\$ -			
Pedestrian Piers	0	LF	\$ 1,200.00	\$ -			
Pedestrian Boardwalks (water level w/ railings)	0	LF	\$ 600.00	\$ -			
Interpretive Station / Vista Point w/ Interpretive Signs	0	EA	\$ 75,000.00	\$ -			
Boat Rental Building w/ restroom	0	Allow	\$ 600,000.00	\$ -			

Description	Quantity	Unit	Unit Cost	Cost	CUSTODIAL ALTERNATIVE			
					5 YEARS	10 YEARS	15 YEARS	
Paving and Surfacing								
Pedestrian Promenade / Multi-use Trail (10' architectural concrete)	0	LF	\$ 120.00	\$ -	\$ -	\$ -	\$ -	\$ -
Misc. Improvements								
Promenade / Area Lighting	0	EA	\$ 6,500.00	\$ -	\$ -	\$ -	\$ -	\$ -
Signs	0	EA	\$ 250.00	\$ -	\$ -	\$ -	\$ -	\$ -
Trash / Recycling Receptacle Sets	0	EA	\$ 1,000.00	\$ -	\$ -	\$ -	\$ -	\$ -
Benches	0	EA	\$ 5,000.00	\$ -	\$ -	\$ -	\$ -	\$ -
Drinking Fountains	0	EA	\$ 3,000.00	\$ -	\$ -	\$ -	\$ -	\$ -
Bicycle Racks	0	EA	\$ 2,000.00	\$ -	\$ -	\$ -	\$ -	\$ -
Trash / Recycling Receptacles	0	EA	\$ 1,000.00	\$ -	\$ -	\$ -	\$ -	\$ -
Vegetation / Irrigation								
Shoreline Plantings								
Willow cuttings	0	A	\$ 25,000.00	\$ -	\$ -	\$ -	\$ -	\$ -
Grasses / ground cover (1 gal)	0	A	\$ 100,000.00	\$ -	\$ -	\$ -	\$ -	\$ -
Trees and shrubs (24" box)	0	EA	\$ 450.00	\$ -	\$ -	\$ -	\$ -	\$ -
Irrigation								
Tree/Shrub Shoreline Plant Establishment	0	A	\$ 40,000.00	\$ -	\$ -	\$ -	\$ -	\$ -
Trees along Perimeter Walk	0	EA	\$ 250.00	\$ -	\$ -	\$ -	\$ -	\$ -
SUB-TOTAL: DIRECT CAPITAL IMPROVEMENT COST					\$ 2,710,000.00	\$ -	\$ -	\$ -
General Conditions @ 10%					\$ 271,000.00	\$ -	\$ -	\$ -
GC Overhead and Profit @ 10%					\$ 271,000.00	\$ -	\$ -	\$ -
Bonds @ 1.5%					\$ 40,650.00	\$ -	\$ -	\$ -
Contingency @ 10%					\$ 271,000.00	\$ -	\$ -	\$ -
SUB-TOTAL: PROBABLE CONSTRUCTION COST					\$ 3,563,650.00	\$ -	\$ -	\$ -
Design Fees and Expenses @ 10%					\$ 356,365.00	\$ -	\$ -	\$ -
Const. Admin./ Inspection / Monitoring @ 12%					\$ 427,638.00	\$ -	\$ -	\$ -
TOTAL PROBABLE CONSTRUCTION COST					\$ 4,347,653.00	\$ -	\$ -	\$ -
PROJECTED OPERATIONS COSTS					\$ 581,250.00	\$ 581,250.00	\$ 581,250.00	\$ 581,250.00
TOTAL INCLUSIVE COSTS (3)					\$ 5,028,903.00	\$ 581,250.00	\$ 581,250.00	\$ 581,250.00

* January, 2011 costs. This projection is preliminary, for planning purposes only, and is subject to change. This projection uses normal park construction costs based on industry standards suitable for a conceptual plan document level of detail.

Costs shown assume all work being performed by licensed contractors for area of expertise and include prevailing n/a = not applicable
 SY = Square Yard
 EA = Each
 LF = Linear Foot
 SF = Square Foot

Source: 2M Associates, Landscape Architects (1/24/11)

Notes

- 1 Work identified is for changes interior to the existing walk around the perimeter of the Harbor Basin. Park and public amenity proposals identified in Discussion Plan Option #6 by Cal Coast Companies, LLC, or any other redevelopment options outside the perimeter walk, are not included. Major infrastructure upgrades. These costs are assumed to be integrated into the overall San Leandro Marina redevelopment plan for the area.
- 2 February 2011 costs. This projection is preliminary, for planning purposes only, and is subject to change. This projection uses normal park construction costs based on industry standards suitable for a conceptual plan document level of detail. Costs shown assume all work being performed by licensed contractors for area of expertise and include prevailing wages for the San Francisco Bay area. Work identified is for changes interior to the existing walk around the perimeter of the Harbor Basin. Park and public amenity proposals identified in Discussion Plan Option #6 by Cal Coast Companies, LLC, or any other redevelopment options outside the perimeter walk, are not included. Major infrastructure upgrade costs are assumed to be integrated into the overall San Leandro Marina redevelopment plan for the area. No debt service costs are included.
- 3 Not including any debt service.
- 4 Facility capital costs could potentially be funded by other public agency; Assumes private third-party operations at no cost to City.

ATTACHMENT F

DMMS Sediment Removal Project Grading Plan

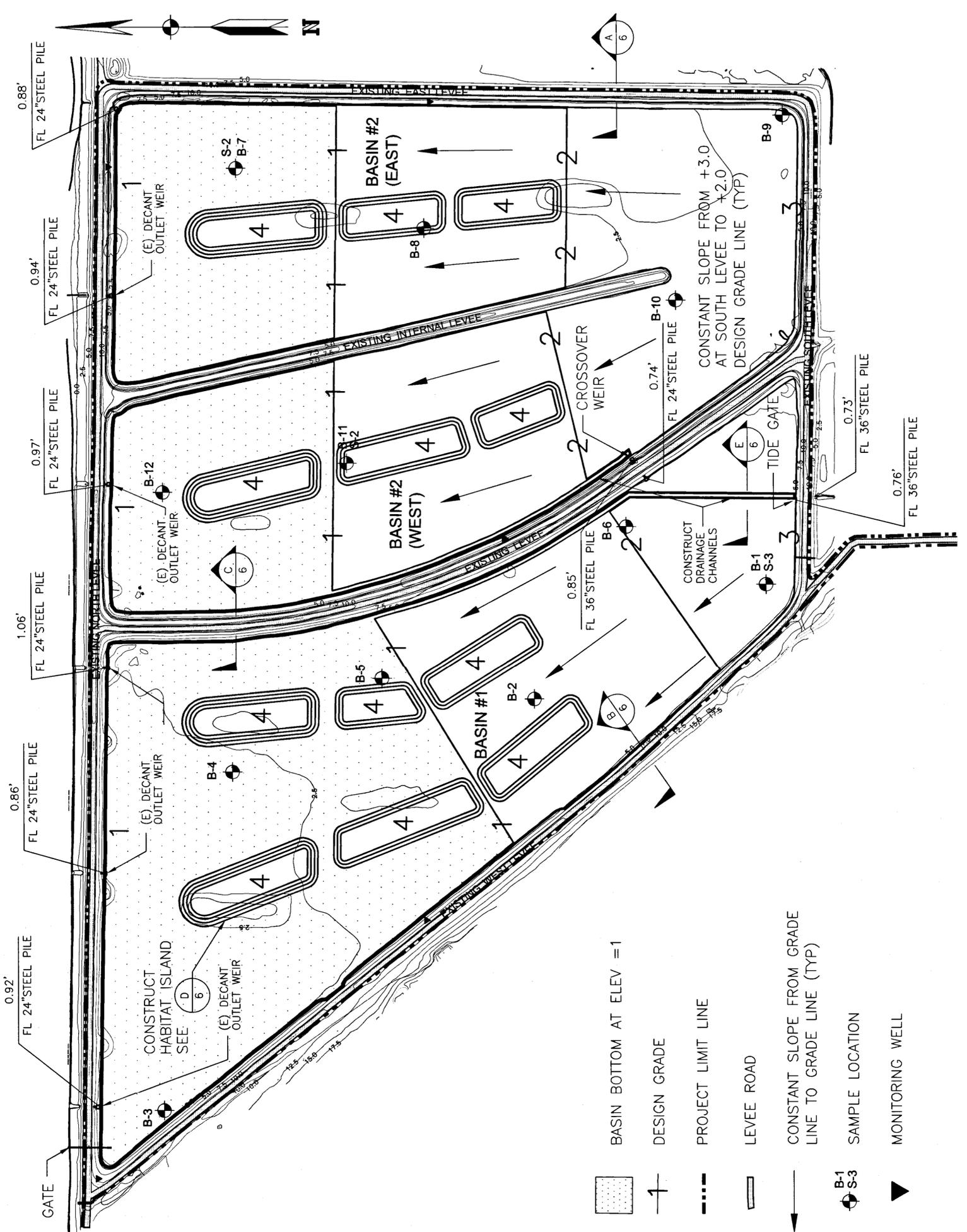
NOTES

- 1) ALL ELEVATIONS ARE SHOWN IN FEET IN REFERENCE TO NGVD (1973 ADJUSTMENT). TOPOGRAPHIC MAP WAS PHOTOGRAMMETRICALLY PREPARED BY HJW GEOSPATIAL, INC. OAKLAND, CA. USING AERIAL PHOTOGRAPHY DATED 06-23-2003. GROUND CONTROL WAS ESTABLISHED BY KIER & WRIGHT, PLEASANTON, CA.
- 2) BENCHMARKS:
 BM-1: CHISELLED SQUARE IN CONCRETE FOOTING AT SOUTHWEST CORNER OF PG&E TRANSMISSION TOWER ON NORTH SIDE OF ESTUDDILLO CANAL DIRECTLY WEST OF RAILROAD TRACKS. ELEV. = +4.85 FT. (NGVD, 1973).
 BM-2: CHISELLED SQUARE IN SOUTHWEST CORNER OF HEADWALL FOR CULVERT AND BRIDGE CROSSING ESTUDDILLO CANAL APPROXIMATELY 1,120 FT. WEST OF THE ENTRANCE GATE AT THE NORTHWEST CORNER OF THE SITE. ELEV. = +9.92 FT. (NGVD, 1973).
- 3) CONTRACTOR SHALL NOT ALLOW ANY OPERATIONS OUTSIDE THE LIMITS OF WORK. CITY WILL STAKE LIMITS OF WORK IN THE FIELD PRIOR TO THE START OF CONSTRUCTION OPERATIONS. CITY SHALL ALSO PROVIDE CONSTRUCTION STAKING UPON CONTRACTOR'S WRITTEN REQUEST (SEE SECTION 2-9.2 OF THE SPECIAL PROVISIONS).
- 4) CONTRACTOR SHALL STRIP EXISTING VEGETATION AND STOCKPILE ON-SITE. STOCKPILED MATERIAL SHALL BE SPREAD OVER THE GRADED SURFACES OF THE NEW CONSTRUCTED HABITAT ISLANDS.
- 5) CONTRACTOR'S WORK HOURS SHALL BE LIMITED TO 7AM TO 6PM, MONDAY THROUGH FRIDAY. NO LOADED HAUL TRUCKS MAY LEAVE THE DMMS BEFORE 8 AM AND AFTER 4PM.
- 6) EXCESSIVELY WET MATERIAL (>50% MOISTURE CONTENT) OR COARSE GRAINED MATERIAL SHALL BE MIXED WITH DRY MATERIAL OR FINED GRAINED MATERIAL, RESPECTIVELY, PRIOR TO OFF-HAUL. CONTRACTOR MAY ELECT TO STOCKPILE THESE MATERIALS ON-SITE FOR FINAL GRADING OPERATIONS.
- 7) CONTRACTOR MAY CONSTRUCT TEMPORARY RAMPS TO ALLOW TRUCKS TO ENTER/EXIT THE PONDS. CONTRACTOR IS ADVISED TO NOT OVEREXCAVATE THE DMMS DUE TO THE PRESENCE OF SOFT BAY MUD UNDERLYING THE POND BOTTOMS. CONTRACTOR SHALL RESTORE SITE TO EXISTING OR BETTER CONDITIONS.

GEOTECHNICAL LABORATORY TEST RESULTS

Boring/Bulk Sample Number	Sample Depth (feet bgs)	Moisture Content (percent)	Dry Density (pcf)	Fines Content (percent less than No. 200 sieve)
S-1	0.0 to 0.5	-	-	78.9
S-2	0.0 to 0.5	-	-	89.1
S-3	0.0 to 1.0	-	-	86.7
B-1	0.0	36.1	-	-
B-1	2.5	47.3	65	-
B-2	0.0	26.6	87	-
B-2	2.0	50.3	66	-
B-5	0.0	41.0	-	-
B-6	0.0	38.2	81	-
B-6	1.5	39.7	-	-
B-7	0.5	35.0	81	-
B-8	1.0	47.0	-	-
B-9	1.0	31.1	75	-
B-10	0.0	28.5	-	-
B-10	1.5	34.0	83	-
B-11	0.0	40.8	79	-
B-11	3.0	47.0	74	-
B-12	0.0	30.5	87	-
B-12	0.5	28.8	75	-

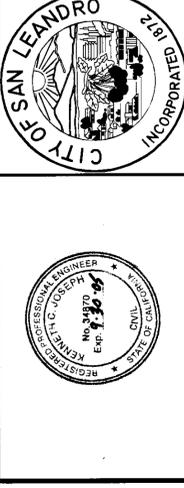
SAMPLING WAS PERFORMED ON 08-06-2003 BY TREADWELL AND ROLLO ("ANALYTICAL AND GEOTECHNICAL EVALUATION OF DREDGE MATERIAL, SAN LEANDRO DREDGE DISPOSAL SITE", REPORT DATED 09-22-2003).



- BASIN BOTTOM AT ELEV = 1
- DESIGN GRADE
- PROJECT LIMIT LINE
- LEVEE ROAD
- CONSTANT SLOPE FROM GRADE LINE TO GRADE LINE (TYP)
- SAMPLE LOCATION
- MONITORING WELL

GRADING PLAN

SCALE: 1" = 150'-0"



NO.	DATE	REVISION

BEFORE YOU DIG, CALL UNDERGROUND SERVICES (800) 487-3379. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO DETERMINE THE LOCATION AND DEPTH OF ALL UNDERGROUND UTILITIES. BEST PRACTICES INFORMATION AVAILABLE TO THE CITY OF SAN LEANDRO WILL BE USED IN THE DEVELOPMENT OF THESE PLANS. NO GUARANTEE IS MADE AS TO THE ACCURACY OF THIS INFORMATION.

CITY OF SAN LEANDRO

DMMS SEDIMENT REMOVAL PROJECT
GRADING PLAN

DESIGNED BY: R. SCHURMAN DATE: 3/21/03
 DRAWN BY: N. WALKER DATE: 3/24/04
 PROJECT MGR: R. SCHURMAN DATE: 03/27/04
 TRANS. ADMIN.: R. CHEN DATE: 5/4/04
 SENIOR ENGR.: A. OSKARWICZ DATE: 5/17/04
 APPROVED BY: [Signature] DATE: 5/20/04
 OFF. ENGINEER, R.C.E. No. 34879

SHEET 4 OF 4
 JOB NO. 04-597-57-004
 SCALE AS SHOWN
 DWG. 1504 CASE 1002