

CHAPTER 4.0

COMPARISON OF ALTERNATIVES

4.1 INTRODUCTION

This chapter compares the alternatives described in Chapter 2 and evaluated in Sections 3.1 through 3.15. CEQA requires analysis of a reasonable range of alternatives. Accordingly, this draft EIR analyzes three enhancement alternatives that feasibly meet the objectives of the Enhancement Project, along with the No Project Alternative. Each alternative is analyzed in equal level of detail. This level of analysis is included to provide sufficient information and meaningful detail about the environmental effects of each alternative so that informed decision-making can occur.

As described in Chapter 2, the Enhancement Project has two components: (1) enhancement of Buena Vista Lagoon and (2) materials disposal/reuse of dredged materials from the lagoon. These project components were analyzed independently from one another throughout the EIR, where appropriate. The lagoon enhancement alternatives include:

- Freshwater Alternative
- Saltwater Alternative
- Hybrid Alternative – Options A and B
- No Project Alternative

The materials disposal/reuse scenarios are described in Chapter 2, Table 2-8. They include options for materials placement onshore, nearshore, or offshore and are dependent on the volume and suitability of material for use in the littoral cell.

Other alternatives that were considered but eliminated during the alternatives screening process are summarized in Section 2.3.

4.2 EVALUATION OF ALTERNATIVES

The CEQA Guidelines (14 CCR Section 15126.6) require that an EIR present a range of reasonable alternatives to the project, or to the location of the project, that would feasibly attain most of the basic project objectives but would avoid or substantially lessen any significant effects of the project. Section 15126.6 of the CEQA Guidelines also requires an evaluation of the

comparative merits of the alternatives. An EIR is not required to consider alternatives that are infeasible.

Table 4-1 summarizes the results of the impact analysis for each resource area.

**Table 4-1
Significance Conclusions by Alternative**

Environmental Resource Area	Freshwater		Saltwater		Hybrid		No Project	
	LE	MP	LE	MP	LE	MP	LE	MP
Land Use and Recreation	L	M	M	M	M	M	L	N
Hydrology	L	L	L	L	L	L	S _p	N
Oceanography/Coastal Processes	L	L	L	L	L	L	N	N
Water and Aquatic Sediment Quality	M	L	M	L	M	L	S _p	N
Biological Resources	S _T	L	S _T	L	S _T	L	S _p	N
Geology and Soils	L	L	L	L	L	L	N	N
Cultural Resources	M	L	M	L	M	L	N	N
Paleontological Resources	M	N	M	N	M	N	N	N
Visual Resources	S _T	L	S _T , S _p	M	S _T , S _p	M	L	N
Traffic and Circulation	L	L	S _T	L	S _T	L	N	N
Air Quality	S _T	-	S _T	-	S _T	-	N	-
Global Climate Change, Greenhouse Gas Emissions, and Sea Level Rise	L	-	L	-	L	-	N	-
Noise	S _T	S _T	S _T	S _T	S _T	S _T	N	N
Public Services and Utilities	L	N	L	L	L	L	N	N
Public Health and Safety	L	L	S _p	L	S _p	L	S _p	N

LE = Lagoon Enhancement

MP = Materials Placement

S_T = Significant temporary unavoidable impact

S_p = Significant permanent unavoidable impact

M = Significant but mitigable to less than significant impact

L = Less than significant impact

N = No impact

- = Lagoon enhancement and materials disposal/reuse analyzed together

4.3 ANALYSIS OF IMPACTS OF ALTERNATIVES

Overall, less than significant impacts or impacts that can be mitigated to less than significant for all enhancement alternatives include land use and recreation, hydrology; coastal processes; water and aquatic sediment quality; geology and soils; cultural resources; global climate change, greenhouse gas emissions, and sea level rise; paleontological resources; and public services and utilities. Exceptions include the significant and unavoidable impacts that would occur for biological resources; traffic and circulation; air quality; noise; visual resources; and public health and safety as detailed in Section 4.3.1 below. Where feasible, mitigation is proposed for all significant impacts that would occur. The No Project Alternative would result in significant and

unavoidable impacts to hydrology; water and aquatic sediment quality; biological resources; and public health and safety, with all other topics having no impact or a less than significant impact.

4.3.1 RESOURCES WITH SIGNIFICANT UNAVOIDABLE IMPACTS

Hydrology

Under the No Project Alternative, tidal flows would continue to be restricted due to the existing weir and narrow channels under I-5, and Carlsbad Boulevard would continue to constrict flows with no vegetation or sediment removal to minimize constrictions at crossings to create better flow throughout the basins. Stormflows would continue to be constricted by these features under the No Project Alternative and likely worsen as the lagoon continues to experience sedimentation and expansion of vegetation. In addition, as open water in the lagoon continues to decrease, existing flood water elevations would continue to rise compared to existing conditions. Decreased flood water elevations that would be provided under the various Enhancement Project alternatives would not occur under the No Project Alternative. Flooding performance would worsen under the No Project Alternative and is considered a significant and unavoidable impact

Water and Aquatic Sediment Quality

Under the No Project Alternative, the restricted circulation in the lagoon would continue due to the hydraulically inefficient channel system. Tidal flows would continue to be restricted due to the existing weir at the ocean outlet and narrow channels with no vegetation or sediment removal and no improvements to infrastructure to minimize constrictions at crossings to create better flow throughout the basins. As a result, poor lagoon circulation (i.e., tidal exchange) and surface water drainage, and long residence times would continue if no Enhancement Project alternative is implemented. As vegetation expands into currently open water areas of the lagoon, it is anticipated that water circulation would further decrease, leading to increased residence times and additional water quality issues within the lagoon. This continued degradation of water quality as a result of the No Project Alternative is considered a significant and unavoidable impact.

Biological Resources

Enhancement construction would result in greater than 50 percent temporal loss of sensitive habitats that would be significantly impacted by construction activities, including sensitive riparian habitat (coastal and valley freshwater marsh, open water vegetation types) and sensitive upland habitat (coastal scrub and Diegan coastal sage scrub: *Baccharis*-dominated) and is considered a short-term significant and adverse direct impact to these types of habitats. Because

the temporal loss of these habitats may threaten local populations of sensitive resident species, this short-term direct impact is considered significant. Additionally, significant short-term impacts were identified for all enhancement alternatives to light-footed Ridgway's rail, due to the temporary loss of greater than 50 percent of their nesting habitat and the potential for noise. While no feasible mitigation is available to reduce these impacts to less than significant, the overall ecological benefits from lagoon enhancement would provide long-term improved habitat quality.

Significant and unavoidable short-term impacts to sensitive bird species, both direct and indirect, would occur as a result of construction activities under all enhancement alternatives. When in proximity to wildlife, the effects of dredge and other construction noise may disrupt sensitive birds foraging or breeding behavior. The dredge is slow and would be operating in one basin at a time; as such, most birds could relocate to quieter habitat. However, relocation during the breeding season is not feasible for nesting birds and, even with the numerous project design features to reduce noise levels, this is considered a significant and unavoidable impact.

The No Project Alternative would result in a significant permanent impact to biological resources because the quality of habitat for light-footed Ridgway's rail (low-marsh), Belding's savannah sparrow (high-marsh) and other migratory birds that use the lagoon for foraging habitat, would continue to decline. This decline would be due in part to the continued poor conditions of the lagoon resulting from poor tidal flushing and sediment accumulation. Additionally, anticipated habitat conversion of existing southern coastal salt marsh would result in a net loss of nesting habitat.

Traffic and Circulation

A temporary significant impact associated with the decrease in performance and/or safety of bicycle facilities would occur during replacement of the proposed Carlsbad Boulevard bridge under the Saltwater Alternative and Hybrid Alternatives. Improvements to the Carlsbad Boulevard Bridge would result in closure of the existing multi-use pathway located on the west side of Carlsbad Boulevard and prohibition of pedestrian travel, which would shift to the proposed Boardwalk during construction. The multi-use pathway closure would also affect recreational and commuter bicyclists as bicycle traffic would be allowed in a shared travel lane, rather than having a separate bicycle lane during construction. It is estimated that this closure related to construction would last for a period of 9 months. Feasible mitigation is included but would not reduce the impact to less than significant. Thus, this traffic impact related to bicycle safety and access under the Saltwater and Hybrid Alternatives would remain significant and unavoidable.

Air Quality

A significant and unavoidable temporary construction-related air quality impact would result during construction associated with the Enhancement Project. Construction-related emissions would exceed the recommended NO_x levels of significance for all enhancement alternatives, and construction activities could lead to a violation of an applicable air quality standard. Feasible mitigation is included but would not reduce the impact to less than significant and it would remain significant and unavoidable.

Additionally, because residential land uses would be located adjacent to the Railroad Basin staging area, and off-road equipment and on-road vehicles would operate in that area for the entire construction period, the Enhancement Project could expose sensitive receptors to substantial construction pollutant concentrations. No additional feasible mitigation is available to reduce this impact. Therefore, impacts associated with exposure of sensitive receptors to substantial pollutant concentrations would remain significant and unavoidable.

Noise

Due to nighttime dredging and materials placement activities, significant temporary impacts have been identified for each of the enhancement alternatives. Nighttime placement of material at onshore beach locations could expose nearby residential receptors (within 100 feet) to noise levels that could be sleep disturbing.

With the implementation of Mitigation Measures Noise-1 and Noise-2, construction noise would be minimized at nearby residences. At materials placement sites, construction would be limited to 3 consecutive nights within a distance that could disturb sleep at a given residence (100 feet). Even with implementation of these measures, nighttime construction outside of allowed hours would result in significant impacts. Mitigation such as noise walls and limiting dredging and materials placement activities to daytime hours was considered to reduce this impact but was found infeasible. Therefore, impacts associated with temporary nighttime noise during construction would remain significant and unavoidable.

Visual Resources

Due to the cluttered and disruptive views of construction equipment that would be located throughout the lagoon during enhancement activities, a significant temporary impact has been identified for each of the enhancement alternatives. To reduce the temporary visual impact, measure Visual-1 would be required as mitigation and require screened fencing around construction staging locations to reduce the views of cluttered construction equipment with care

taken not to completely eliminate views of the ocean or lagoon. To eliminate the short-term impact to below a level of significance, the construction duration would need to be reduced, ideally to less than one year, or the staging areas located well away from sensitive viewers (beach and trail users at the Weir, Railroad and Coast Highway Basins). Because this is not possible, it is not feasible to fully mitigate this short-term impact to below a level of significance.

Additionally, Mitigation Measure Land Use-1 (Saltwater and Hybrid Alternatives only) requires that a pedestrian bridge be constructed to span the proposed tidal inlet at a height above the calculated high tidal and flood flows to provide north-south lateral access for beach users to avoid a potential access impact. However, because of the height and mass of the bridge structure near the lagoon and beach, a long-term, significant, unmitigable visual impact would result. There is no feasible mitigation to reduce the visual impact of the proposed pedestrian bridge and the impact would remain significant and unavoidable.

Public Health and Safety

Significant impacts to public recreational safety would result from operation of the Saltwater and Hybrid Alternatives. The new inlet crossing of the beach could create a safety threat to beach users during certain tidal conditions of high water volume and velocities that would render it not safe for beachgoers or recreationalists to cross. Mitigation Measure Land Use-1 requires that a pedestrian bridge be constructed to span the proposed tidal inlet to provide north-south lateral access for beach users. While this measure would substantially improve public safety associated with the new inlet as it would provide a way for beach users to safely cross the inlet during times of high water levels and velocities, the overall inherent danger of the new inlet during certain conditions would remain for those uninformed persons or those tempted to cross even during unsafe situations. Thus, public safety impacts associated with operation of the new tidal inlet under the Saltwater and Hybrid Alternatives would remain significant and unavoidable.

Under the No Project Alternative, the conditions at the lagoon associated with vectors would continue to worsen as no improvements to circulation or strategic vegetation removal would occur. As sedimentation continues and vegetation encroaches into remaining open water areas within the lagoon, increased breeding habitat and more conducive life cycle conditions for vectors would develop. Decreases in vector breeding habitat areas that would be provided under the various Enhancement Project alternatives would not occur under the No Project Alternative. With increases in vector breeding area and improved life cycle conditions, potential for exposure to vectorborne disease in the nearby communities would increase under the No Project Alternative and this impact would remain significant and unavoidable.

4.3.2 BENEFITS OF ALTERNATIVES

The Enhancement Project alternatives would result in various beneficial/adverse tradeoffs for different resources. As discussed above in Section 4.3.1, significant unmitigable impacts to some resources would occur through implementation of the Enhancement Project. In other cases, beneficial effects on resources would occur with implementation of the Enhancement Project, including land use and recreation, hydrology, water and aquatic sediment quality, biological resources, global climate change, greenhouse gas emissions, and sea level rise, and public health and safety. Similar to impacts, these benefits would sometimes occur to different degrees under different alternatives. There are also situations where both significant adverse impacts and benefits occur under the same resource category (e.g., biological resources and public health and safety). To provide a balanced comparison of alternatives, it is important to note benefits associated with the various alternatives, i.e., identify and consider the tradeoff of an adverse effect necessary to create a positive benefit. Potential benefits associated with each of the alternatives are discussed below, then a comparison of alternatives is provided below in Section 4.3.3. None of the benefits described under the enhancement alternatives would occur with implementation of the No Project Alternative.

Land Use and Recreation Benefits

Each of the alternatives evaluated for the Enhancement Project would provide new public access to the lagoon through the construction of a Boardwalk parallel to Carlsbad Boulevard, which would increase pedestrian access to and through the lagoon, advancing the City of Carlsbad and City of Oceanside's goals of providing enhanced public access to the lagoon.

Additionally, maintaining and potentially enhancing recreational fishing opportunities is an important component of each alternative. The Freshwater Alternative would result in the creation of 4.5 acres of deep, open-water fish habitat, enhancing existing freshwater recreational fishing opportunities. Under the Saltwater Alternative, the lagoon would transform from a freshwater to marine fishery and would likely attract targeted recreational marine species, providing new fishing opportunities to recreational anglers. The Saltwater Alternative would create approximately 4 acres of deep water fish habitat, which would encourage saltwater fish presence in the lagoon. Under the Hybrid Alternative options, a saltwater system would be created west of I-5 and the freshwater system east of I-5 would be maintained, offering anglers both freshwater and saltwater fisheries. Three deep-water habitat areas would be created, totaling approximately 5 acres. In addition, a new trail would be constructed to provide access to the proposed fishing area in the northern Railroad Basin under each of the alternatives.

Hydrology Benefits

Each of the Enhancement Project alternatives would reduce water elevations compared to existing conditions, thereby reducing flooding impacts. These benefits would occur to different extents, as shown by the reduced 100-year storm event floodplain acreage in Table 4-2.

**Table 4-2
Benefits to Flooding Risk per Alternative**

	Existing Condition	Freshwater Alternative	Saltwater Alternative	Hybrid Alternatives
Range of reduction in water elevations (feet)	N/A	2.4-0.4	7.6-4.4	6.0-5.0
100-year storm event floodplain (acres)	318	303	263	285

Under the Saltwater Alternative, water elevations would be reduced more than under the Freshwater Alternative in all basins during all storm events (i.e., 2-, 5-, 10-, 50-, and 100-year), thereby reducing flooding impacts. The 100-year storm event floodplain would be reduced the greatest of all the alternatives under the Saltwater Alternative. Although water elevations would also be lower and the floodplain reduced under the Freshwater Alternative, the extent of that improvement would be reduced compared to the Saltwater Alternative or Hybrid Alternative. Under the Hybrid Alternative options, water elevations would be reduced in all basins except the I-5 Basin to a greater extent than either the Saltwater or the Freshwater Alternatives, and the 100-year storm event floodplain would also be reduced.

Benefits of circulation and drainage pattern improvements are likely to persist due to increased tidal flow and enhanced circulation from the open tidal channel proposed under the Saltwater and Hybrid Alternatives. The new tidal inlet would also enable the lagoon to drain incoming freshwater more efficiently. Increased circulation would also result from the Freshwater Alternative, but on a localized basis and not to the extent of the Saltwater Alternative or Hybrid Alternative. Long-term circulation and drainage improvements may not persist because there is no long-term sediment removal, and only some continued vegetation removal is planned.

Water and Aquatic Sediment Quality Benefits

Beneficial impacts to water and sediment quality would occur under each of the Enhancement Project alternatives. Benefits under the Freshwater Alternative would be limited because circulation improvements would be localized and overall circulation would not be improved, as shown by increased water residence times in Table 4-3. Beneficial impacts to water and sediment quality would result with implementation of the Saltwater Alternative as it would improve lagoon-wide circulation, provide tidal exchange, and existing sedimentation and vegetation

would be reduced. Water residence times would be improved substantially over existing conditions, as indicated by decreased residence days in Table 4-3. Bacteria exceedances would decrease from existing conditions. Long-term circulation and tidal flushing would be expected to persist with long-term sediment removal from the inlet. Beneficial impacts to water and sediment quality would also occur under the Hybrid Alternative as circulation and tidal exchange would be improved and existing sedimentation and vegetation would be reduced. Residence times would greatly improve over existing conditions in the Weir, Railroad, and Coast Highway Basins, and bacteria exceedances would decrease from existing conditions, except in the I-5 Basin.

**Table 4-3
Changes in Residence Time**

Alternatives	Basins	Residence Time (Days)	
		Dry Weather	Wet Weather
Existing Conditions	I-5	8	1
	Coast Highway	36	3
	Railroad	75	4
	Weir	82	5
Alternatives	Basins	Change in Residence Time (Days) from Existing Conditions	
		Dry Weather	Wet Weather
Freshwater	I-5	+25	+1
	Coast Highway	+46	+2
	Railroad	+41	+5
	Weir	+36	+4
Saltwater	I-5	-5	0
	Coast Highway	-33	-2
	Railroad	-74	-3
	Weir	-81	-4
Hybrid Option A	I-5	+15	+1
	Coast Highway	-18	0
	Railroad	-74	-3
	Weir	-80	-3
Hybrid Option B	I-5	+14	+1
	Coast Highway	-19	0
	Railroad	-74	-3
	Weir	-81	-4

Biological Resources Benefits

Each of the Enhancement Project alternatives would provide benefits to biological resources, but to different degrees. Each alternative would halt the current conversion of the lagoon to a more monotypic freshwater marsh habitat, and would provide open water and maintenance in remaining freshwater marsh areas. The Saltwater Alternative would have the largest benefit, and would convert the lagoon to a marine system open to tidal action. This alternative would not only increase water quality and circulation, resulting in a healthier benthic community and more foraging opportunities for birds, but would also support native salt marsh habitats and species.

Threatened and endangered species would have the largest nesting area under the Saltwater Alternative compared to existing conditions, with an increase from 101.5 to 163 acres. Native saltwater fish species would have access to the lagoon system through the open inlet, and would also benefit from the creation of deep water habitat areas through improved spawning and rearing habitat, resulting in long-term beneficial effects on the stability and sustainability of fish populations.

The Freshwater Alternative would provide some benefits to biological resources, although they would be relatively modest. Overall acreage suitable for threatened and endangered species nesting would decrease from existing conditions (from 101.5 to 65.2 acres), but remaining freshwater marsh be maintained through the creation of channels in dense stands of marsh vegetation, which would enhance habitat quality for nesting birds such as Ridgway's rail. These channels would provide open water foraging opportunities as well as increase localized water quality and circulation through the freshwater marsh areas. Removal and management of freshwater marsh vegetation would increase open water habitat for freshwater fish currently in the lagoon, as would the creation of deep open water areas. These deeper open water areas would experience longer residence times than existing conditions, but could still provide additional habitat for fish, depending on water quality conditions.

Under the Hybrid Alternatives, available nesting habitat for threatened and endangered species would decrease compared to existing conditions (from 101.5 to 90-91 acres), although the quality of remaining habitat is anticipated to increase as the portion of the lagoon west of I-5 is converted to a marine system and vegetated with native salt marsh habitats. Remaining freshwater areas east of I-5 would be maintained through the creation of channels that increase proximity to foraging habitat and increase localized water quality, similar to the Freshwater Alternative. Fish species, particularly saltwater species west of I-5, would benefit from improved water quality and from the creation of deep water habitat areas.

Global Climate Change, Greenhouse Gas Emissions, and Sea Level Rise Benefits

With the exception of the No Project Alternative, each of the Enhancement Project Alternatives would improve the ability of the project area to respond to long-term climate impacts, such as increased sea level rise at varying degrees per alternative. Hydrology throughout the lagoon would be improved through the enhanced circulation within the lagoon. The new tidal inlet under the Saltwater and Hybrid Alternatives would most effectively enable the lagoon to drain incoming freshwater more efficiently and improve flood control during large storm events, leading to less potential in general for flooding hazards. As shown in Table 3.12-4, maximum water elevations in 2050 and 2100 would generally be best minimized by the Hybrid Alternative (with the exception of the I-5 basin).

Public Health and Safety Benefits

Each of the Enhancement Project alternatives would provide benefits related to vector control through increasing circulation at the water's surface and reducing quality breeding conditions, as well as removing areas of dense vegetation to enhance ongoing aerial vector treatment that is currently hindered by the dense stands of vegetation. The Freshwater Alternative would provide vector control by turning vegetation into open water areas, thus decreasing favorable vector habitat. Because this alternative would remove the least amount of vector habitat, it would provide the smallest health and safety benefit of the three alternatives. The Saltwater Alternative would provide public health and safety benefits through increased vector control from the conversion of the hydraulic regime to saltwater and tidal influence. The post-project conditions would not be conducive to vector breeding and lifecycle requirements, thus minimizing the ability of the vectors to survive in the lagoon as they currently do. Vegetation removal and elimination of freshwater marsh would be highly beneficial, as the existing vector control methods currently used on the lagoon are rendered less effective by the large expanses of dense cattail vegetation. Although the Hybrid Alternative would include similar actions, the Saltwater Alternative would implement such actions over a greater portion of the lagoon, creating the highest degree of benefit. For these reasons, the Saltwater Alternative would result in the greatest benefit in terms of vector control. The adaptive management plan that would be implemented for each of the alternatives would also specify actions that would provide ongoing reduction of breeding and lifecycle opportunities for vectors, resulting in a perpetual public health and safety benefit.

4.3.3 COMPARISON OF ALTERNATIVES

The Freshwater Alternative would retain the freshwater conditions of the lagoon in a manner most similar to existing conditions of all the alternatives. Because this alternative does not include the introduction of saltwater to the lagoon hydrological system, a new tidal inlet, or reconstruction of the Carlsbad Boulevard bridge, it avoids several potentially significant impacts that would result from the other two enhancement alternatives. Without a new tidal inlet, this alternative would not create potential safety issues leading to restricted access associated with high water volume and velocity conditions as do the other two enhancement alternatives. Additionally, the significant and unavoidable visual impact that would result from the new pedestrian bridge over the new inlet as required by Mitigation Measure Land Use -1 (Saltwater and Hybrid Alternatives only) would not occur under the Freshwater Alternative. The Freshwater Alternative would not reconstruct the Carlsbad Boulevard bridge as proposed in the other two enhancement alternatives; thus, the existing bridge and multi-use pathway would continue to be available and no impact related to the safety or access of bicycles across the bridge would result. Flood water elevations would decrease under the Freshwater Alternative, although not to the

extent of the Saltwater or Hybrid Alternatives, with the exception of the I-5 Basin under the Hybrid Alternative. The Freshwater Alternative includes approximately 562,000 cy of dredged material, which is less dredging than the Saltwater Alternative and Hybrid Alternative. This reduces the amount and degree of severity of impacts that result from the Freshwater Alternative, relative to the other two alternatives for both lagoon enhancement and materials disposal/reuse. Additionally, the removal of sediment provides a beneficial impact to water and sediment quality, though to a lesser degree than the other two alternatives that would increase circulation more through the connection of the lagoon to tidal influence. The range of habitats within the lagoon under the Freshwater Alternative would remain similar to the existing habitats. Although the overall area of suitable nesting habitat for threatened and endangered species would decrease, habitat quality for those species would increase due to the maintenance of remaining freshwater marsh areas. Open water habitat for freshwater fish currently in the lagoon would also increase, and although they would experience longer residence times than existing conditions, they could still provide additional habitat for fish, depending on water quality conditions. Vector concerns would decrease under the Freshwater Alternative, with the removal of much of the freshwater marsh area within the lagoon. Remaining freshwater marsh areas would be managed for vectors with the creation of channels into dense stands of vegetation, increasing localized circulation and enhancing the effectiveness of aerial vector treatments.

The conversion of the lagoon to a marine system under the Saltwater Alternative would result in an overall increase in the amount of open water, as well as increases in circulation and water quality within the lagoon. This alternative but would support native salt marsh habitats and species, including threatened and endangered species and native saltwater fish species that are currently excluded from the lagoon due to the weir. Flood water elevations would decrease, reducing flood risk adjacent to the lagoon. Cattails would decrease in the lagoon through removal or conversion, providing a positive health and safety benefit by allowing for more effective vector control treatments and decreased potential for vector breeding. The new tidal saltwater system would lead to a dynamic hydrologic cycle of tides that would interrupt the mosquito reproduction process and lead to increased mortality of eggs, larvae, and pupae; increased salinity that reduces the ability of mosquitos to reproduce; quick draw-down, which prevents establishment of stagnant ponds on the lagoon edges; habitat transition resulting in less dense stands of cattails that cannot survive the saline waters creating better circulation of water and improved effectiveness of vector control measures; and cooler water temperatures that create a poor environment for larvae survival. The combination of all these changes in the lagoon system would create beneficial vector reduction results relative to the existing conditions.

The Hybrid Alternative typically has similar impacts and benefits as the Saltwater Alternative, as many of the enhancement elements are similar, with the exception of the continuation of freshwater east of I-5. The Saltwater Alternative and Hybrid Alternative both propose higher

volumes of dredging than the Freshwater Alternative and the reconstruction of the Carlsbad Boulevard bridge, as well as additional work to open the tidal inlet. These additional activities result in derivative effects such as a higher volume of truck trips, increased areas of disturbance, longer construction durations, and higher noise levels, among others, as compared to the Freshwater Alternative. Thus, the degree of adverse impact for the Saltwater and Hybrid Alternatives, relative to the other Freshwater Alternative, which does not include these additional elements, is typically higher for almost all issue areas. The tradeoff, however, is the generation of a higher degree of positive benefits such as better water and sediment quality, improved lagoon hydrologic function and biological conditions, and improved vector control that are anticipated to persist into the long term. The Hybrid Alternative proposes removal of 833,000 cy of material as compared to the Saltwater Alternative, which proposes 781,000 cy; thus, impacts associated with dredging operations and materials placement are fairly similar for these two alternatives.

The No Project Alternative would not modify existing conditions and no actions would take place. The lagoon would continue to deteriorate in habitat quality and hydrologic conditions if the Enhancement Project is not completed. The current conversion of open water areas within the lagoon would lead to a monotypic meadow type of habitat with minimal open water and circulation, potentially leading to increased vector and flood concerns and decreases to current recreational opportunities. The continued deterioration of lagoon conditions would cause significant impacts to hydrology; water and aquatic sediment quality; biological resources; and public health and safety. Additionally, none of the beneficial or positive impacts that occur with implementation of one of the enhancement alternatives would result under the No Project Alternative.

The project is an enhancement effort and has many proactive design features specifically included to minimize or reduce the potential for adverse effects to result from project implementation. In addition, mitigation has been proposed for impacts that were identified as significant. In some cases, the proposed mitigation was found to be adequate to reduce the adverse effect and result in less than significant impacts. However, for the resource areas biological resources; traffic and circulation (Saltwater and Hybrid Alternatives only); air quality; noise; visual resources; and public health and safety (Saltwater and Hybrid Alternatives only), the proposed mitigation would provide for some reduction of impact but would not fully reduce the impact to a level considered less than significant. It is important to note that while some of these impacts have been identified as significant with no feasible mitigation, some of the impacts are short term and would occur only during construction operations and cease once construction is complete (i.e., noise, visual, traffic). Additionally, some impacts, such as the loss of a certain habitat type may be counteracted by the creation of a different habitat type that would provide improved long-term biological benefits for the lagoon system. The No Project Alternative would

result in significant and unavoidable impacts to the resource areas of hydrology; water and aquatic sediment quality; biological resources; and public health and safety

4.4 ENVIRONMENTALLY SUPERIOR ALTERNATIVE

CEQA requires disclosure of the environmentally superior alternative and, if the No Project Alternative is environmentally superior, identification of a superior alternative among the other alternatives (Section 15126.6[e][2]).

The No Project Alternative would result in the fewest number of significant environmental impacts and could be considered environmentally superior for this reason. However, implementation of the No Project Alternative would result in the continued deterioration of the lagoon and the resulting impacts to biological resources, hydrology, water quality, and public health and safety would render the No Project Alternative inconsistent with the overall purpose of the project and this alternative would not achieve any of the project objectives (Section 1.2). Thus, the following discussion provides identification of an environmentally superior alternative among the three enhancement alternatives.

Among the enhancement alternatives (Freshwater Alternative, Saltwater Alternative, and Hybrid Alternative), the Freshwater Alternative would result in the least significant environmental impacts as shown in Table 4-1. The Freshwater Alternative would not result in the significant and unavoidable public health and safety impact that would result from the new inlet associated with the other two alternatives. The significant unavoidable traffic and circulation impact related to unsafe or unavailable bicycle facilities across the Carlsbad Boulevard bridge during reconstruction would also not occur. Additionally, the significant and unavoidable visual impact that would result from the new pedestrian bridge over the new inlet as required by Mitigation Measure Land Use-1 (Saltwater and Hybrid Alternatives only) would not occur under the Freshwater Alternative. Additionally, the Freshwater Alternative would avoid those significant impacts related to flooding, continued degradation of water quality, and vectors that would result from the No Project Alternative. Because of reduced dredging activity, reduced construction time, and the least amount of disturbance to the lagoon setting relative to the other alternatives, many of the impacts that would result from the Freshwater Alternative would also occur to a lesser degree and extent than those resulting from the Saltwater Alternative and Hybrid Alternative. However, the beneficial environmental impacts from the Freshwater Alternative would also be less than for the other alternatives, such as reduced improvements to lagoon hydrologic function and drainage patterns, and fewer enhanced habitat and biological benefits. While not to the extent of the other two enhancement alternatives, the Freshwater Alternative would have a variety of beneficial effects relative to the No Project Alternative, such as

improved vector conditions, better flooding control, and improved hydrologic function. As an enhancement project, project benefits are an important consideration in comparing alternatives.

The Freshwater Alternative results in lesser impacts than the Saltwater and Hybrid Alternatives, but does not have the same level of benefits or achieve the CEQA project objectives, as listed in Section 1.2, to the fullest extent or to the same level as the other action alternatives. Most specifically, the Freshwater Alternative does not fully achieve the following objectives to the same extent as the other action alternatives: (1) create conditions that curtail the growth and expansion of cattails, bulrushes, and invasive species, (2) protect, improve, and maintain water quality (e.g., reduce eutrophication) to meet water quality standards and address the 303(d) listed water quality impairments, and (3) reduce vector concerns (e.g., potential for mosquito-borne disease) by minimizing potential mosquito breeding habitat. While the No Project Alternative would result in the fewest number of significant environmental impacts, it would be inconsistent with the overall purpose of the project and this alternative would not achieve any of the project objectives. Therefore, no alternative is clearly environmentally superior to another.

4.5 SELECTION OF THE PREFERRED ALTERNATIVE

In addition to the CEQA impact analysis summarized in Section 4.2, additional evaluation was conducted to determine the degree to which each alternative meets the project objectives. This alternatives assessment incorporates metrics to quantify each alternative's ability to meet project objectives compared to the other alternatives. Metrics were identified to provide a quantitative comparison that reflects the project objectives identified by SANDAG, but that comparison does not explicitly tie to the CEQA thresholds in the EIR. This comparative alternatives assessment can be found in Appendix K. The breakdown of the objectives allows for more complete analysis and consideration of each facet of the project's broad and sometimes complex goals. There is no clear Enhancement Project alternative that represents an environmentally superior alternative, as described above. Rather, the alternatives represent a series of tradeoffs that could be made (e.g., freshwater habitat over saltwater habitat), based on the decision-makers' judgement. Once the metrics are quantified for each alternative, the data can be used to compare the tradeoffs associated with each alternative. It is anticipated that this quantified comparison will be used by SANDAG, in conjunction with public input during the CEQA review of this Draft EIR, to identify the Preferred Alternative.

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