

1 **EXECUTIVE SUMMARY**

2
3 **PROJECT OBJECTIVES, PURPOSE AND NEED**

4 The California State Lands Commission (CSLC) has prepared this Environmental
5 Impact Report (EIR) for the proposed San Francisco Bay and Delta Sand Mining Project
6 (Project) in accordance with the California Environmental Quality Act (CEQA; Pub.
7 Resources Code, § 21000 et seq.) and the State CEQA Guidelines (Cal. Code Regs.,
8 tit. 14, § 15000 et seq.). The CSLC holds title to and manages tidelands and submerged
9 lands and beds of navigable waterways for the benefit of all people of the State for
10 statewide Public Trust purposes, which include waterborne commerce, navigation,
11 fisheries, water-related recreation, habitat preservation, and open space. The CSLC
12 may grant leases on these State lands for such purposes as, but not limited to, ports,
13 marinas, docks and wharves, and dredging.

14 The CSLC has received an application from Hanson Marine Operations (Hanson) and
15 Jerico Products/Morris Tug and Barge (Jerico) for proposed new 10-year mineral
16 extraction leases to enable the continuation of dredge mining of construction-grade sand
17 from certain delineated areas of Central San Francisco Bay (Central Bay), Suisun Bay
18 (the easternmost of the four main basins that comprise San Francisco Bay), and the
19 western Sacramento-San Joaquin River Delta area (Delta). The proposed new CSLC
20 leases involve the same lease parcels currently mined by Hanson and Jerico, although
21 the boundaries of some of the Central Bay parcels were adjusted in 2011 to avoid
22 overlapping Federal lands (see discussion below). The CSLC previously granted these
23 leases for a 10-year period that expired on June 30, 2008, with an option to apply for new
24 leases for an additional 10 years; pending completion of the environmental review and
25 permitting processes, the CSLC is allowing the continuation of sand mining on a month-
26 to-month basis. The current leaseholders are Hanson, Jerico, and Suisun Associates, a
27 joint venture between Hanson and Jerico.

28 Hanson is proposing to lease the following Central Bay parcels, all of which are sovereign
29 lands under the CSLC's jurisdiction: PRC 709 (Presidio, Alcatraz North, and Point Knox
30 North Shoals); PRC 2036 (Point Knox South); PRC 7779 (Point Knox Shoal); PRC 7780
31 (Alcatraz South Shoal). On behalf of Suisun Associates, Hanson also proposes to lease
32 PRC 7781 (Suisun Bay/Delta), which is sovereign land under the CSLC's jurisdiction and
33 which is located in Suisun Bay and the western Delta in the San Joaquin and Sacramento

1 River channels upstream of Suisun Bay.¹ (See Figures 1-1, 2-1a and 2-1b in Sections
2 1.0, Introduction, and 2.0, Project Description, for the lease locations.) In addition,
3 Hanson and Jerico propose to continue sand mining at TLS 39 in Middle Ground Shoal,
4 Suisun Bay, a private parcel owned by the Grossi family, which is not under the CSLC's
5 jurisdiction.

6 This EIR examines the potential environmental effects of the proposed new leases and
7 continuing sand mining for an additional 10-year period. For the purposes of this EIR,
8 the new leases and the issuance of other permits and entitlements necessary to
9 continue sand mining are considered the "Project" and Hanson (acting on its own behalf
10 and on behalf of Suisun Associates) and Jerico are, collectively, the Applicants. State
11 CEQA Guidelines section 15126.6(a) requires that an EIR describe and analyze a range
12 of reasonable alternatives to the proposed Project that would feasibly attain most of the
13 basic objectives of the Project but avoid or substantially lessen any of the project's
14 significant effects. The Applicants identified the following Project objective:

- 15 • To obtain renewal of all necessary permits and approvals to continue mining
16 sand at an economically viable level in San Francisco Bay for the next 10 years.

17 **SUMMARY OF REVISIONS TO THE 2010 DRAFT EIR**

18 This document replaces a Draft EIR for this Project that the CSLC released for public
19 review and comment in July 2010. The CSLC staff determined that the following
20 changes constitute significant new information and that recirculation of a full Revised
21 Draft EIR (RDEIR) addressing the changes as appropriate is necessary.

- 22 • The CSLC staff, in consultation with the National Park Service and U.S. Coast
23 Guard, recently completed a review of historical data relevant to the Central Bay
24 mining lease boundaries and determined that several lease boundaries must be
25 revised to avoid encroaching on federally-held lands at Angel Island and Alcatraz
26 Island. The area reduced by these boundary adjustments is roughly 5 percent of
27 PRC 709 (about 42 of 873 acres were removed) and 1 percent of PRC 7779
28 (about 20 of 1,357 acres were removed). The land area removed from the
29 parcels is near the two islands and not where sand mining occurs. The revised
30 boundaries are shown in Figure 2-1a in Section 2.0, Project Description.

¹ The numbering of the CSLC lease parcels sometimes includes a decimal designation, such as "PRC 709.1." Throughout this EIR, no decimal is used, unless the reference is to the lease document itself.

- 1 • As noted in Section 1.1.6, Definition of Baseline and Future Conditions, the
2 CSLC staff re-evaluated the baseline used in the 2010 Draft EIR.² Because sand
3 mining activity levels can fluctuate substantially from year to year depending on
4 market demand and other factors, the CSLC staff concluded that a baseline that
5 accounts for mining levels over several years provides a more accurate measure
6 of the current level of mining activity against which to evaluate Project impacts.
7 Therefore, the baseline for the analysis in this RDEIR is the average annual
8 volume of sand mined in the proposed Project area per year from 2002 to 2007
9 (i.e., the average of the five years of mining that occurred prior to Notice of
10 Preparation (NOP) issuance). Additionally, sand mined from Central Bay lease
11 PRC 5871 was added to the baseline volume because the lease was mined
12 during the baseline period and thus contributed to physical conditions existing
13 when the NOP was issued. The California Supreme Court confirmed that, while
14 conditions at the time of the NOP “normally” constitute the baseline for the
15 environmental analysis under CEQA, the lead agency has flexibility in defining
16 the appropriate baseline (*Communities for a Better Environment v. South Coast*
17 *Air Quality Mgmt. Dist.* (2010) 48 Cal.4th 310, 328).
- 18 • The RDEIR evaluates a revised Reduced Project Alternative than that
19 considered in the 2010 Draft EIR alternatives analysis (see discussion of
20 alternatives in Section 3.0, Alternatives and Cumulative Projects).
- 21 • The RDEIR considers other new information that has come to light since
22 publication of the 2010 Draft EIR, including information on sediment transport
23 and deposition in San Francisco Bay and the regulatory status of threatened and
24 endangered species that could be affected by sand mining.

25 DESCRIPTION OF PROPOSED PROJECT

26 The mining of sand for use as a construction material has occurred within the Central
27 Bay and Delta for more than seven decades. Channel and harbor dredging to remove
28 sand and other sediment deposits from the Bay began in the 1800s, and construction
29 sand mining within the Bay-Delta estuary began in the 1930s.

30 The CSLC is considering granting new 10-year leases to continue mining sand within the
31 lease areas; if granted, the leases may allow the Applicants to mine up to the annual
32 volumes shown in Table ES-1. Issuance of these leases requires discretionary approval
33 of the CSLC. The Applicants also need discretionary approvals to mine sand, both
34 within the lease areas and the privately-owned TLC 39 site, from other State agencies,
35

² The Notice of Preparation (NOP) for this EIR was issued on July 10, 2007, at which time the initial 10-year leases were still in effect, and 2007 mining volumes were selected as a part of the Project baseline.

1 **Table ES-1. Currently Permitted, Baseline, and Proposed Annual Sand Mining**
 2 **Volumes (in cubic yards per year)**

	Applicants' Current Permit Limits	Baseline Volume (2002-2007 Average) ¹	Proposed	Difference (Proposed vs. Baseline Volume)	Proposed Increase as Percentage of Baseline Volume
State Lands Commission Central Bay Lease Areas (and Current Leaseholder)					
PRC 709: Presidio, Alcatraz, and Point Knox Shoals (Hanson)	540,000	290,331	340,000	49,669	+ 17%
PRC 2036: Point Knox South (Hanson)	300,000	252,637	450,000	197,363	+ 78%
PRC 7779: Point Knox Shoal (Hanson)	400,000	390,440	550,000	159,560	+ 41%
PRC 7780: Alcatraz South Shoal (Hanson)	150,000	127,248	200,000	72,752	+ 57%
PRC 5871 (CEMEX) ²	NA	80,383	NA	NA	(- 100%)
Subtotal: State Lands Central Bay Leases³	1,390,000	1,141,039	1,540,000	398,961⁴	+ 35%
State Lands Commission Suisun Bay/Delta Lease Area (and Current Leaseholder)					
PRC 7781: Suisun Bay/Western Delta (Suisun Associates)	100,000	85,746	300,000	214,254	+ 250%
State Lands Lease Totals: Central Bay & Suisun Bay/Delta³	1,490,000	1,226,785	1,840,000	613,215	+ 50%
Private Suisun Bay Parcel and Current Leaseholder					
Grossi Middle Ground: BCDC Permit 10-90 (Hanson)	500,000	0	50,000	50,000	NA
Grossi Middle Ground: BCDC Permit 16-78 (M) (Jerico)	250,000	199,866	150,000	-49,866	- 25%
Private Lease Totals: Middle Ground³	750,000	199,866	200,000	134	0%
All Lease Totals³	2,240,000	1,426,650	2,040,000	613,349⁴	+ 43%

Notes: NA = Not Applicable

¹ Refer to Table 1-1 for mining volumes by year at each parcel.

² A new lease is not proposed at this parcel, which therefore is not part of the proposed Project.

³ Cells may not total exactly due to rounding.

⁴ This figure takes into account the 80,383 cubic yards of material mined from PRC 5871 during the baseline period.

Source: CSLC 1998, 2008, 2011; BCDC 2008, 2009a, 2009b

1 including the San Francisco Bay Conservation and Development Commission (BCDC),
2 San Francisco Bay Regional Water Quality Control Board (SFBRWQCB), State Mining
3 and Geology Board (SMGB), and California Department of Fish and Game (CDFG), as
4 well as the U.S. Army Corps of Engineers (ACOE), in consultation with the National
5 Marine Fisheries Service (NMFS)³ and U.S. Fish and Wildlife Service (USFWS).

6 In comparison with the permitted annual mining volume during the previous lease period,
7 the Applicants propose a 350,000 cubic yard per year (cy/yr) increase in volume from the
8 CSLC lease areas and a 550,000 cy/yr decrease in volume from the private lease area,
9 resulting in a net decrease of 200,000 cy/yr in allowed mining volume from all lease areas
10 (CSLC and private). Table ES-1 shows the Applicant-proposed volumes compared with
11 the annual average volume of sand mined from the Project lease areas from 2002 to
12 2007 (see also Table 1-2 in Section 1.0, Introduction)

13 Hanson and Jerico use similar equipment for sand mining, including a trailing arm
14 hydraulic suction dredge and barge, and propose to continue mining sand within the
15 lease areas shown in Table ES-1 using similar methods and equipment to those currently
16 employed. Mining occurs within the Central Bay, Middle Ground Shoal in Suisun Bay,
17 and areas north of the Federal navigation channels of Suisun Bay and western Delta.
18 Sand mining does not occur uniformly within the region, but rather is clustered in
19 specific areas, typically characterized by high river or tidal velocities and sand deposits
20 that contain a low percentage of fine material (silts, clay, and mud). Mining events
21 typically last approximately 3.0 to 4.5 hours, during which time approximately 1,500 to
22 2,500 cubic yards of sand are excavated. During mining, water is entrained into the
23 suction head, creating a water and sand slurry that mobilizes the sand and allows it to
24 be pumped into the barge. Hydraulic pump capacity varies among individual sand
25 mining barges from approximately 5,000 to 15,000 gallons per minute.

26 Sand mining within the Central Bay typically occurs at water depths ranging from 30 to
27 90 feet (individual sand mining barges have a maximum operating depth of either 80 or
28 90 feet). Mining within the navigation channels of Middle Ground Shoal and the Suisun
29 Bay/Delta parcel typically occurs in waters that are 15 to 45 feet deep.

³ Subsequently renamed National Oceanic and Atmospheric Administration (NOAA) Fisheries Service, the agency continues to be referred to as NMFS or NOAA Fisheries; it is referred to herein as NMFS.

1 **ALTERNATIVES TO THE PROPOSED PROJECT**

2 Table ES-2 summarizes the evaluation and selection of potential alternatives addressed
 3 in the EIR. Those listed in the first column have been eliminated from further
 4 consideration (see rationale in Section 3.2, Alternatives Eliminated From Full Evaluation,
 5 in Section 3.0, Alternatives and Cumulative Projects), and those in the second column
 6 are evaluated in detail in Section 4.0, Environmental Analysis, of this EIR.

Table ES-2. Summary of Alternative Screening Results

Alternatives Eliminated from Consideration	Alternatives Evaluated in this EIR
Mining of Shipping Channels Alternative	No Project Alternative
Import of Sand Alternative	Long-term Management Strategy Conformance Alternative
Central Bay Only Alternative	Clamshell Dredge Mining Alternative
Suisun Bay and Delta Only Alternative	Reduced Project Alternative ¹

¹ This is a new Reduced Project Alternative, which replaces the Reduced Project Alternative evaluated in the 2010 Draft EIR (see Section 3.3.4 for details).

7 **No Project Alternative**

8 State CEQA Guidelines section 15126.6(e) requires evaluation of a No Project Alternative
 9 to allow decision-makers to compare the impacts of approving a proposed project with
 10 the impact of not approving the project. Under the No Project Alternative, the CSLC
 11 would not issue proposed new mining leases. Mining would therefore cease within the
 12 areas under the jurisdiction of CSLC. In addition, other regulatory agencies would not
 13 renew permits to allow sand mining to continue at Middle Ground Shoal, which is
 14 privately held, after the expiration of current permits (e.g., the BCDC permits expire in
 15 July 2012). Under this alternative, the EIR analysis assumes that the demand for sand
 16 for the Bay Area construction industry would be met either by other local sources, (such
 17 as local quarries and aggregate materials recycling facilities), or that sand would be
 18 imported from more distant sources, such as British Columbia or Mexico.

19 **Long-term Management Strategy (LTMS) Management Plan Conformance Alternative**

20 This alternative would require sand mining to comply with temporal and spatial restrictions
 21 on dredging contained in the *Long-Term Management Strategy for the Placement of*
 22 *Dredged Material in the San Francisco Bay Region Management Plan 2001* (LTMS
 23 Management Plan). The LTMS Management Plan is an interagency strategy and plan for
 24 maintenance dredging of federally designated navigation channels in San Francisco,
 25 San Pablo, and Suisun Bays, and the disposal of dredged materials in San Francisco

1 Bay, the Pacific Ocean, and upland disposal sites for beneficial use. This alternative
2 would place time and location restrictions on sand mining in conformance with the
3 environmental “work windows” contained in the LTMS, which indicate when dredging
4 may occur in different parts of the Bay (see Figure 3-1 in Section 3.0, Alternatives and
5 Cumulative Projects). All other aspects of this alternative, including Project applicants
6 (Hanson and Jerico), mining locations, off-loading locations, and mining volumes, would
7 be the same as for the proposed Project (see Section 2.0, Project Description).

8 **Clamshell Dredge Mining Alternative**

9 The Clamshell Dredge Mining Alternative would employ a method other than suction
10 dredge mining for recovery of sand from the floor of the Bay and Delta. The method
11 employed would use a clamshell bucket and crane. Clamshell dredging is accomplished
12 by using a barge-mounted crane to lower a clamshell bucket to the sea floor until it sinks
13 into the sediment. A bucket load of sediment is scooped up and brought back to the
14 barge and deposited on it. Clamshell dredging does not require the creation of a slurry,
15 and does not therefore use a large volume of seawater. The potential for entrainment of
16 fish associated with suction dredge mining is consequently substantially reduced.
17 Accidental capture or injury to fish is unlikely, as fish can avoid the bucket. This mining
18 method may result in creation of a more extensive or severe turbidity plume and the
19 mobilization into the water column of sediment, compared to suction dredge mining.
20 Clamshell dredge mining is typically much less efficient than suction dredge mining, in
21 terms of the volume of material that can be mined per unit of time. Typically, clamshell
22 dredge mining takes about five times longer than suction dredge mining to mine the same
23 amount of material. The applicants do not own or currently operate any clamshell dredge
24 mining equipment and would be required to purchase or rent this equipment to mine sand
25 at the same volume as suction dredging. Clamshell dredge mining would require two
26 barges, one to operate the clamshell crane and one to receive, store, and transport the
27 mined sand. Mining could occur only in areas where surrounding currents are minimal or
28 with the assistance of a tug to keep the crane barge stable and on station; Central Bay
29 currents would make clamshell dredge mining difficult to complete as an alternative. All
30 other aspects of this alternative, including Project applicants, mining locations, off-
31 loading locations, and mining volumes, would be the same as for the proposed Project.

32 **Reduced Project Alternative**

33 This alternative would reduce permitted annual mining volumes in all of the lease areas
34 to a level equivalent to the baseline mining volumes (i.e., the 2002 to 2007 average

1 mined at each Project parcel). Mining methods and off-loading would be the same as
2 proposed, and mining would be conducted both by Hanson and Jerico.

3 **ENVIRONMENTAL IMPACTS AND MITIGATION**

4 The environmental impact analysis in Section 4.0, Environmental Analysis, concludes
5 that the Project would have the potential for several significant impacts, including
6 impacts on Biological Resources, Hazards and Hazardous Materials, Air Quality,
7 Cultural Resources, and Land Use and Recreation. With the imposition of mitigation
8 measures specified in this report, however, all these impacts would be reduced to less
9 than significant with the exception of one impact which would have significant and
10 unavoidable impacts after all appropriate mitigation measures are applied. This impact
11 has been identified as BIO-8. As described in the Cumulative Impact discussion in
12 Section 4.1, Biological Resources, Impact BIO-8 is considered both a significant Project
13 impact and a significant cumulative impact. As discussed in Section 6.0, Other Required
14 CEQA Sections and Environmentally Superior Alternative, the Project is not expected to
15 result in a growth-inducing impact or a significant irreversible environmental effect.

16 Table ES-3 (see the end of this Executive Summary) presents a summary of impacts
17 and mitigation measures for the proposed Project by issue area. Within each issue area
18 each impact is described and classified, recommended mitigations are listed, and the
19 level of impact with mitigation is stated. The table shows the Project's significant
20 adverse impacts that can be eliminated or reduced below an issue's significance criteria
21 and those adverse impacts that do not meet or exceed an issue's significance criteria.

22 **COMPARISON OF PROPOSED PROJECT AND ALTERNATIVES**

23 The State CEQA Guidelines (§ 15126.6, subd. (d)) require that an EIR include sufficient
24 information about each alternative to allow meaningful evaluation, analysis, and
25 comparison with the proposed Project. A matrix displaying the major characteristics and
26 significant environmental effects of each alternative may be used to summarize the
27 comparison. Table ES-4 (see the end of this Executive Summary) provides a
28 comparison of the proposed Project with each of the alternatives evaluated in this
29 document, including the No Project Alternative.

30 **ENVIRONMENTALLY SUPERIOR ALTERNATIVE**

31 As noted above, the State CEQA Guidelines (§ 15126.6, subd. (d)) require that an EIR
32 include sufficient information about each alternative to allow meaningful evaluation,

1 analysis, and comparison with the proposed Project. State CEQA Guidelines
2 section 15126.6(e)(2) further states, in part, that “*If the environmentally superior*
3 *alternative is the “no project” alternative*, the EIR shall also identify an environmentally
4 superior alternative among the other alternatives.” (Emphasis added.)

5 The No Project Alternative could avoid most of the significant impacts of the Project,
6 including Impact BIO-8. This alternative would, however, require the Bay Area
7 construction industry to acquire sand from other, likely more distant sources, with
8 consequent increases in air emissions, including greenhouse gases (GHGs) (see
9 Table ES-4). Therefore, the No Project Alternative is not considered environmentally
10 superior to the other alternatives or to the Project as proposed. Both the LTMS
11 Conformance Alternative and the Clamshell Dredge Mining Alternative could reduce or
12 avoid some impacts of the Project, but also may result in significant unavoidable air
13 quality impacts.

14 The Reduced Project Alternative would reduce the intensity of the Project's significant
15 impacts, and would likely render mitigation measures easier to implement and achieve.
16 Even though the Reduced Project Alternative may result in significant unavoidable air
17 quality impacts associated with importing sand and obtaining sand from quarries, the
18 overall intensity of impacts would be less than the other alternatives. Therefore, the
19 Reduced Project Alternative is considered the Environmentally Superior Alternative.

20 **KNOWN AREAS OF CONTROVERSY OR UNRESOLVED ISSUES**

21 Several areas of controversy and unresolved issues remain after completion of the Draft
22 EIR. These include the following:

- 23 • The BCDC staff raised several concerns in its comments on the NOP regarding
24 potential effects of sand mining on Bay ecology, morphology, and sediment
25 transport. Many of these concerns are addressed in special studies conducted
26 for this EIR (Appendices E, F, and G), the results of which are incorporated into
27 the EIR analysis. Recent studies indicate a precipitous decline in the biological
28 productivity of the Bay, however, uncertainty remains regarding the long-term
29 effects of sand mining on the physical and biological resources of the Bay/Delta
30 and the contribution of sand mining to this decline appears to be outweighed by
31 water diversions, invasive species, habitat modification and other factors. The
32 consistency of the Project with BCDC policies is analyzed in Section 4.7, Land
33 Use and Recreation; the final determination of consistency is under the purview
34 of the BCDC.
- 35 • Past studies, including the 2004 Hanson Sand Mining Study conducted on behalf
36 of the Applicant, conclude or assume that sand removed by mining will be

1 replenished or renewed by sediment carried to the Bay by rivers, streams, and
2 tides. U.S. Geological Survey (USGS) comments on the NOP state that more
3 than 100 million cubic yards of sediment have been lost from the mouth of San
4 Francisco Bay in the last 50 years, a time period broadly coincident with major
5 sand mining activities in Central San Francisco Bay. This comment postulates
6 that future extraction of sediments from San Francisco Bay could further reduce
7 the coastal sediment supply, leading to enhanced rates of beach erosion as has
8 occurred along the southern extent of Ocean Beach in the last several decades.
9 The Coast and Harbor Engineering (CHE) study conducted for this EIR
10 (Appendix G) demonstrates conclusively that most of the areas being mined,
11 including the Central Bay lease areas, are not being replenished. However,
12 hydrodynamic modeling conducted by CHE demonstrates that sand mining is not
13 expected to affect sediment transport and deposition within the Bay and ocean,
14 except in areas within and immediately outside of the mining leases.

- 15 • A special study on the potential for sand mining to entrain fish and other aquatic
16 organisms was conducted for this EIR (see Appendix E). The results of this study
17 are incorporated into the impact analysis in Section 4.1, Biological Resources,
18 which concludes that sand mining has the potential to entrain and kill several
19 special status species, including delta and longfin smelt. To date, the CDFG has
20 not provided incidental take authorization to the Applicants for these species,
21 which are protected under the California Endangered Species Act (ESA),
22 although incidental take authorization has been granted for several species
23 protected under the Federal ESA. This issue is addressed in Impacts BIO-8
24 (impact on delta smelt and longfin smelt) and BIO-9 (impact on green sturgeon,
25 Chinook salmon, and steelhead trout). Mitigation Measures BIO-9a and BIO-9b
26 would reduce Impact BIO-9 to less than significant. Impact BIO-8, however,
27 would remain significant even with implementation of Mitigation Measures BIO-
28 8a and BIO-8b.

Table ES-3. Summary of Environmental Impacts for the Proposed Project

Impact No.	Potential Impact	Impact Class*	Recommended Mitigation Measures (MMs)
Section 4.1 Biological Resources			
BIO-1	Potential displacement of special status species.	III	LTS impact; no mitigation necessary.
BIO-2	Potential impacts to fish and wildlife species from increased noise.	III	LTS impact; no mitigation necessary.
BIO-3	Potential sand mining impacts on benthic habitat, infauna, epifauna, and foraging habitat.	III	LTS impact; no mitigation necessary.
BIO-4	Discharge of suspended sediments may potentially release contaminants into waters that affect plankton and wildlife species.	III	LTS impact; no mitigation necessary.
BIO-5	Disturbance of sediments at the seafloor could result in increased turbidity, suspended sediment concentrations, and release of contaminants that potentially impact plankton and wildlife species.	III	LTS impact; no mitigation necessary.
BIO-6	Sand mining could result in smothering or burial of, or mechanical damage to, infauna and epifauna, and reduced fish foraging.	II	BIO-6. Establish a 100-foot buffer around hard bottom areas within and adjacent to Central Bay mining leases.
BIO-7	Sand mining will cause entrainment and mortality of common and managed aquatic species.	III	LTS impact; no mitigation necessary.
BIO-8	Regular operation of sand mining activities will cause entrainment and mortality of delta and longfin smelt.	I	BIO-8a. Applicants shall implement operational measures to minimize the potential for entrainment and mortality of delta and longfin smelt. BIO-8b. Applicants shall provide off-site mitigation to compensate for the impacts of the taking that may be unavoidable.

* Impact Class: I = Significant adverse impact that remains significant after mitigation.
 II = Significant adverse impact that can be eliminated or reduced below an issue's significance criteria.
 III = Less than significant (LTS) impact/adverse impact that does not meet or exceed an issue's significance criteria.
 NI = No impact

Table ES-3. Summary of Environmental Impacts for the Proposed Project

Impact No.	Potential Impact	Impact Class*	Recommended Mitigation Measures (MMs)
BIO-9	Green sturgeon, Chinook salmon, and steelhead trout will be impacted during sand mining.	II	BIO-9a Sand mining halted during peak Chinook salmon migration. BIO-9b. Sand mining limited to daylight hours from January 1 to May 31.
BIO-10	Potential effects on fish movement and migration.	III	LTS impact; no mitigation necessary.
Section 4.2 Mineral Resources			
MIN-1	Loss of availability of a known mineral resource.	III	LTS impact; no mitigation necessary.
MIN-2	Loss of availability of a locally-important mineral resource recovery site.	III	LTS impact; no mitigation necessary.
Section 4.3 Hydrology and Water Quality			
HYD-1	Potentially adverse effects on water quality.	III	LTS impact; no mitigation necessary.
HYD-2	Potentially adverse effects on the hydrology and geomorphology of the Bay and Delta.	III	LTS impact; no mitigation necessary.
Section 4.4 Hazards and Hazardous Materials			
HAZ-1	Potential for accidental leak or spill of hazardous materials.	II	HAZ-1. Provide a California Non-tank Vessel Contingency Plan (CANTVCP) to the CSLC
Section 4.5 Air Quality			
AIR-1	Emissions of criteria pollutants.	III	LTS impact; no mitigation necessary.
AIR-2	Potential impacts on climate change.	II	AIR-2. Prepare and implement a Greenhouse Gas Reduction Plan.
AIR-3	Potential health risk from diesel particulate matter.	III	LTS impact; no mitigation necessary.
AIR-4	Potential odor impacts.	III	LTS impact; no mitigation necessary.

* Impact Class: I = Significant adverse impact that remains significant after mitigation.
 II = Significant adverse impact that can be eliminated or reduced below an issue's significance criteria.
 III = Less than significant (LTS) impact/adverse impact that does not meet or exceed an issue's significance criteria.
 NI = No impact

Table ES-3. Summary of Environmental Impacts for the Proposed Project

Impact No.	Potential Impact	Impact Class*	Recommended Mitigation Measures (MMs)
Section 4.6 Cultural Resources			
CUL-1	Inadvertent discovery of historical resources or “unique archaeological resources”	II	CUL-1. Cease operations and notify CSLC and ACOE.
CUL-2	Inadvertent discovery of paleontological resources.	III	LTS impact; no mitigation necessary.
CUL-3	Inadvertent discovery of human remains.	II	CUL-3. Cease operations and notify County Coroner.
Section 4.7 Land Use and Recreation			
LU-1	Incompatible land uses.	III	LTS impact; no mitigation necessary.
LU-2	Incompatible recreational uses.	III	LTS impact; no mitigation necessary.
LU-3	Residual impacts on recreation resources due to interference with sand replenishment at down-current beaches.	III	LTS impact; no mitigation necessary.
LU-4	Conflicts with regional or local land use plans or policies.	II	Implement MM BIO-6, BIO-8a, BIO-8b, BIO-9a, BIO-9b, HAZ-1, CUL-1, and CUL-3.

* Impact Class: I = Significant adverse impact that remains significant after mitigation.
 II = Significant adverse impact that can be eliminated or reduced below an issue’s significance criteria.
 III = Less than significant (LTS) impact/adverse impact that does not meet or exceed an issue’s significance criteria.
 NI = No impact

Table ES-4. Summary of Environmental Impacts for the Proposed Project and Alternatives

Impact No.	Impact Description	Impact Classes*				
		Proposed Project	No Project	LTMS Conformance	Clamshell Dredge Mining	Reduced Project
Section 4.1 Biological Resources						
BIO-1	Potential displacement of special status species.	III	NI	III	III	III
BIO-2	Potential impacts to fish and wildlife species from increased noise.	III	NI	III	III	III
BIO-3	Potential sand mining impacts on benthic habitat, infauna, epifauna, and foraging habitat.	III	NI	III	III	III
BIO-4	Discharge of suspended sediments may potentially release contaminants into waters that affect plankton and wildlife species.	III	NI	III	III	III
BIO-5	Disturbance of sediments at the seafloor could result in increased turbidity, suspended sediment concentrations, and release of contaminants that potentially impact plankton and wildlife species.	III	NI	III	III	III
BIO-6	Sand mining could result in smothering or burial of, or mechanical damage to, infauna and epifauna, and reduced fish foraging.	II	NI	II	II	II
BIO-7	Sand mining will cause entrainment and mortality of common and managed aquatic species.	III	NI	III	III	III
BIO-8	Regular operation of sand mining activities will cause entrainment and mortality of delta and longfin smelt.	I	NI	I	III	I
BIO-9	Green sturgeon, Chinook salmon, and steelhead trout will be impacted during sand mining.	II	NI	II	III	II
BIO-10	Potential effects on fish movement and migration.	III	NI	III	III	III
<p>Discussion: Under the No Project Alternative, sand mining in the Bay-Delta estuary would not continue and none of the impacts of the proposed Project on biological resources would occur.</p> <p>The LTMS Management Plan Conformance Alternative would have the same potential impact on the benthic community as would the Project, and MM BIO-6 would apply. This Alternative would avoid most of the Project's significant impacts on green sturgeon,</p>						

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	<p>Chinook salmon, steelhead trout, and delta smelt because the LTMS is designed to protect special status species, and protective measures required by the 2006 NMFS conference opinion would remain in effect. However, because the LTMS does not address impacts on longfin smelt (this species was listed after the LTMS was adopted), the potential impacts of this Alternative on longfin smelt would be similar to the Project's, and MMs BIO-8a and 8b would apply; as with the Project, although this measure would reduce the severity of the impact on longfin smelt and delta smelt, it would not reduce the impact to less than significant. Although green sturgeon also is not included in the LTMS (it too was listed after the LTMS was adopted) the measures included in the 2006 NMFS conference opinion would reduce impacts on this species to less than significant.</p> <p>The potential impacts of the Clamshell Dredge Alternative on biological resources would generally be less than under the proposed Project. This Alternative would have a potential impact on the benthic community similar to the Project's and MM BIO-6 would apply; other impacts on biological resources would be less than the Project's, and would likely be less than significant, because this method of mining greatly reduces the potential for fish entrainment and fish are likely to avoid and not become entrapped in the clamshell bucket. Because the turbidity and suspended sediment characteristics of plumes from clamshell and suction head mining are similar, the effect of this Alternative on turbidity and suspended sediments would be similar to that of the proposed Project.</p> <p>The Reduced Project Alternative would reduce the severity of impacts on special status species (green sturgeon, Chinook salmon, steelhead trout, delta smelt, and longfin smelt) because it would reduce the permitted volume of mining. However, because impacts on benthic habitat and some take of special status species would still occur, this Alternative would, like the Project as proposed, have significant impacts on the benthic community and special status species, and MMs BIO-6, BIO-8a, BIO-8b, BIO-9a, and BIO-9b would also apply to this Alternative. As with the proposed Project, Impact BIO-8 would remain significant and unavoidable.</p>					
Section 4.2 Mineral Resources						
MIN-1	Loss of availability of a known mineral resource.	III	III	III	III	III
MIN-2	Loss of availability of a locally-important mineral resource recovery site.	III	III	III	III	III
<p>Discussion: The No Project Alternative would have a less-than-significant impact on the availability of known mineral resources in the Bay and Delta area. The impact of the LTMS Conformance Alternative, Clamshell Dredge Mining Alternative, and Reduced Project Alternative on mineral resources would be the same as that of the proposed Project (less than significant), because they would not limit availability of or access to a known mineral resource deposit.</p>						

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Section 4.3 Hydrology and Water Quality						
HYD-1	Potentially adverse effects on water quality.	III	NI	III	III	III
HYD-2	Potentially adverse effects on the hydrology and geomorphology of the Bay and Delta.	III	NI	III	III	III
<p>Discussion: The No Project Alternative would have no hydrology or water quality impacts because sand mining in the Bay-Delta estuary over the next ten years would not occur.</p> <p>Although the LTMS Management Plan Conformance Alternative could cause incrementally greater short-term water quality effects associated with the overflow plume, since more mining would occur within the LTMS work windows, the impact of this alternative would be less than significant, as would the proposed Project. Because the turbidity and suspended sediment characteristics of plumes from clamshell and suction head dredging are similar, the impacts of the Clamshell Dredge Mining Alternative on water quality would be similar to the less-than-significant impact of the proposed Project. The impacts of the LTMS Conformance and Clamshell Dredge Mining Alternatives on hydrology and geomorphology would be similar to the Project's less-than-significant impacts since the same amount of sand would be mined under these alternatives.</p> <p>The Reduced Project Alternative would reduce the severity of the Project's less-than-significant impacts on water quality and hydrology because this alternative would entail less discharge of turbid water to the Bay and Delta and the removal of less sediment from the seafloor than would the Project.</p>						
Section 4.4 Hazards and Hazardous Materials						
HAZ-1	Potential for accidental leak or spill of hazardous materials.	II	NI	II	II	II
<p>Discussion: The No Project Alternative would have no potential for a hazard to the public or the environment related to a release of hazardous materials. The other alternatives would have the same potential impact as the proposed Project, though with the Reduced Project Alternative, the potential for accidental spill or release of hazardous materials would be reduced.</p>						

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		Proposed Project	No Project	LTMS Conformance	Clamshell Dredge Mining	Reduced Project
Section 4.5 Air Quality						
AIR-1	Emissions of criteria pollutants.	III	I	I	I	I
AIR-2	Potential impacts on climate change.	II	I	II	I	I
AIR-3	Potential health risk from diesel particulate matter.	III	I	III	I	I
AIR-4	Potential odor impacts.	III	III	III	III	III
<p>Discussion: The No Project Alternative would likely have greater impacts than the proposed Project, since the sand that would be mined from the Bay under the proposed Project would likely be replaced with sand mined at land-based quarries and sand transported from more distant sources. Assuming the same amount of sand is brought to market as proposed for the Project, with half coming from local quarries and half from British Columbia, the No Project Alternative would result in substantially higher emissions of particulate matter (PM₁₀) compared to the Project. This would be a significant impact. Total nitrogen oxides (NO_x) emissions for the No Project Alternative scenario would be higher than under the Project when ocean-going vessel emissions are counted; however, emissions within the Bay Area Air Basin would be lower under this alternative, as most emissions would occur outside of the Bay Area Air Basin. The No Project Alternative would result in substantially higher emissions of GHGs compared to the Project, mostly due to the assumed ocean transport of approximately half of the sand to the Bay Area from British Columbia. This would be considered a significant impact. Since the offloading facilities could continue to be used to receive, stockpile, and ship sand or other aggregate materials, the air emissions in the vicinity of those facilities under the No Project Alternative are assumed to be similar to the Project's. Criteria pollutant and GHG emissions would be significant and unavoidable.</p> <p>The LTMS Management Plan Conformance Alternative would have annual emissions of criteria pollutants, GHGs, and Toxic Air Contaminants (TACs) similar to the Project, since this alternative would allow for the same volume of sand to be mined per year. However, during the LTMS work windows, this alternative would likely have higher criteria air pollutant emissions that could exceed the daily emission thresholds and result in a potentially significant adverse impact, since mining activities would be more intensive during the LTMS work windows. The Clamshell Dredge Mining Alternative would result in greater, potentially significant and unavoidable, impacts due to emissions of criteria air pollutants, GHGs, and TACs because this alternative would employ a less efficient mining method to extract the same volume of sand.</p>						

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<p>Similar to the No Project Alternative, the Reduced Project Alternative would likely have greater impacts than the proposed Project, since it is assumed that sand would be mined from the Bay only up to the volume of the baseline scenario and that the remainder of sand would be replaced with sand mined at land-based quarries (e.g., half from local quarries and half from British Columbia). Consequently, the Reduced Project Alternative would result in higher total emissions of PM₁₀, NO_x, and GHGs than the Project as proposed. Within the Bay Area Air Basin, PM₁₀ emissions would be higher, and NO_x emissions would be lower than with the Project. The increase in PM₁₀ in the Bay Area Air Basin under the Reduced Project Alternative would be significant. The Reduced Project Alternative would also result in higher emissions of GHGs compared to the Project, mostly due to the assumed ocean transport of some sand to the Bay Area from British Columbia. This would be a significant impact. Since the offloading facilities would continue to be used to receive, stockpile, and ship sand or other aggregate materials, air emissions in the vicinity of those facilities under the Reduced Project Alternative are assumed to be similar to the Project's. Since the increase in GHG emissions associated with this alternative would be from sources beyond the control of the CSLC, MM AIR-2 would not be applicable, and the impact would be significant and unavoidable.</p>						
Section 4.6 Cultural Resources						
CUL-1	Inadvertent discovery of historical resources or "unique archaeological resources."	II	NI	II	II	II
CUL-2	Inadvertent discovery of paleontological resources.	III	NI	III	III	III
CUL-3	Inadvertent discovery of human remains.	II	NI	II	II	II
<p>Discussion: The No Project Alternative would have no potential to disturb unrecorded cultural resources because no sand mining in the Bay and Delta would occur. Because mining would occur within the Central Bay and Delta under all the other alternatives, they would have the same potential impacts as the proposed Project.</p>						

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Section 4.7 Land Use and Recreation						
LU-1	Incompatible land uses.	III	III	III	III	III
LU-2	Incompatible recreational uses.	III	III	III	III	III
LU-3	Residual impacts on recreation resources due to interference with sand replenishment at down-current beaches.	III	NI	III	III	III
LU-4	Conflicts with regional or local land use plans and policies.	II	NI	II	II	II
<p>Discussion: The No Project Alternative would have no impact on sand replenishment at down-current beaches and would not conflict with regional and local land use plans and policies of cities and counties around the Bay, because no sand mining would occur within the waters of the Bay or Delta. Other impacts of this alternative would be similar to or incrementally less than the Project's less-than-significant impacts.</p> <p>Although the LTMS Management Strategy Alternative would have an incrementally greater potential to conflict with recreational uses during the LTMS work windows, due to the time of year the work windows occur and the level of mining intensity during the work windows, conflicts between sand miners and recreational users would be less than significant, as they would be under the Project.</p> <p>The Clamshell Dredge Mining Alternative would have an incrementally greater potential to conflict with recreational uses and to conflict with applicable land use plans and policies, due to the longer period of time required to mine the same volume of sand; however, conflicts between sand miners and recreational users would be less than significant, as they would be under the Project, and mitigation measures identified for the Project, which would apply to this alternative, would reduce potential conflicts with plans and policies to a less-than-significant level.</p> <p>The Reduced Project Alternative would reduce, but not eliminate, the potential for conflict with applicable land use plans and policies; mitigation measures identified for the Project, which would apply to this alternative, would reduce this impact to a less-than-significant level.</p>						

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