CALIFORNIA COASTAL COMMISSION
South Coast District Office
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Long Beach, CA 90802
(562) 590-5071

W13b

(CDP 5-21-0640, City of Newport Beach)

September 7, 2022

EXHIBITS

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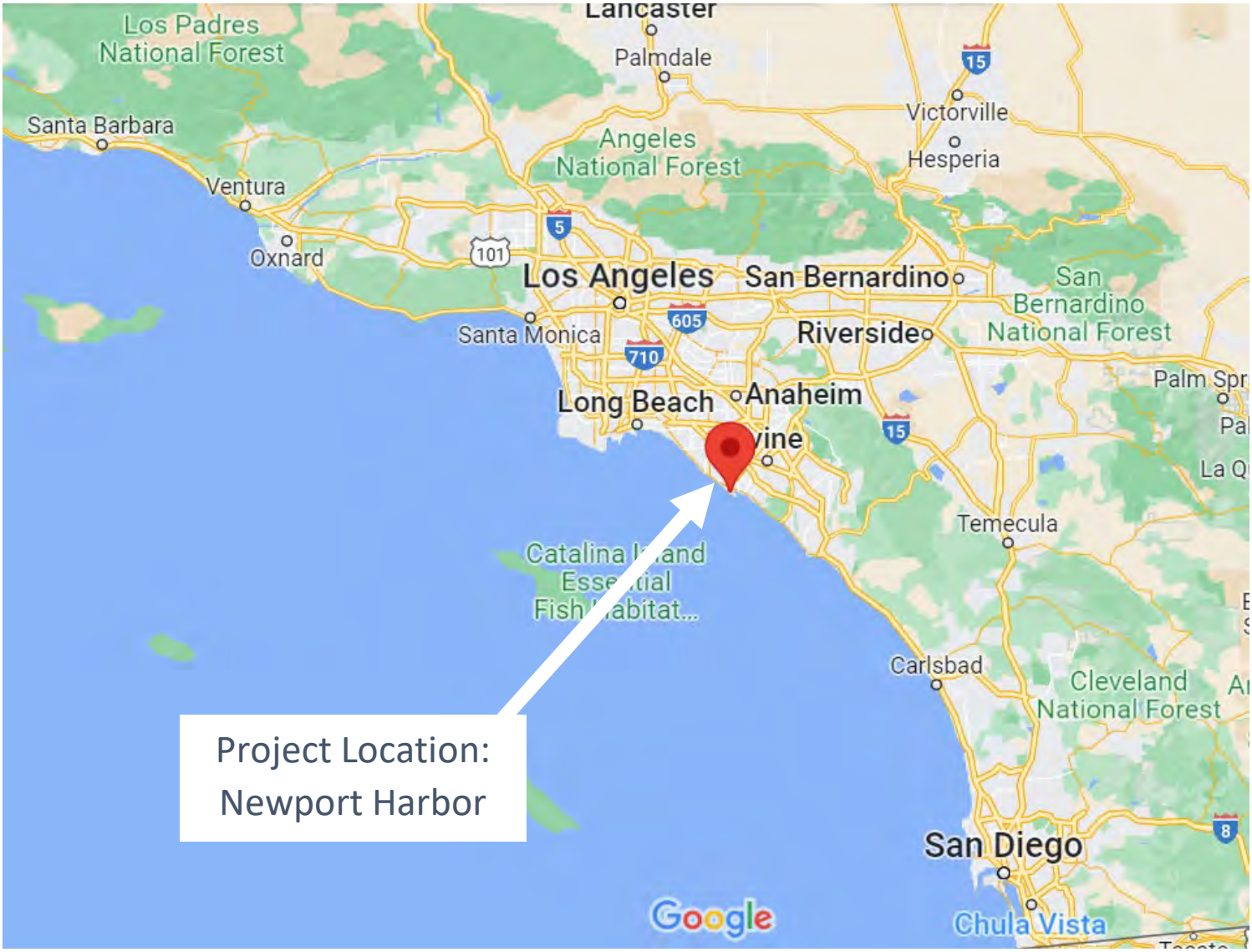
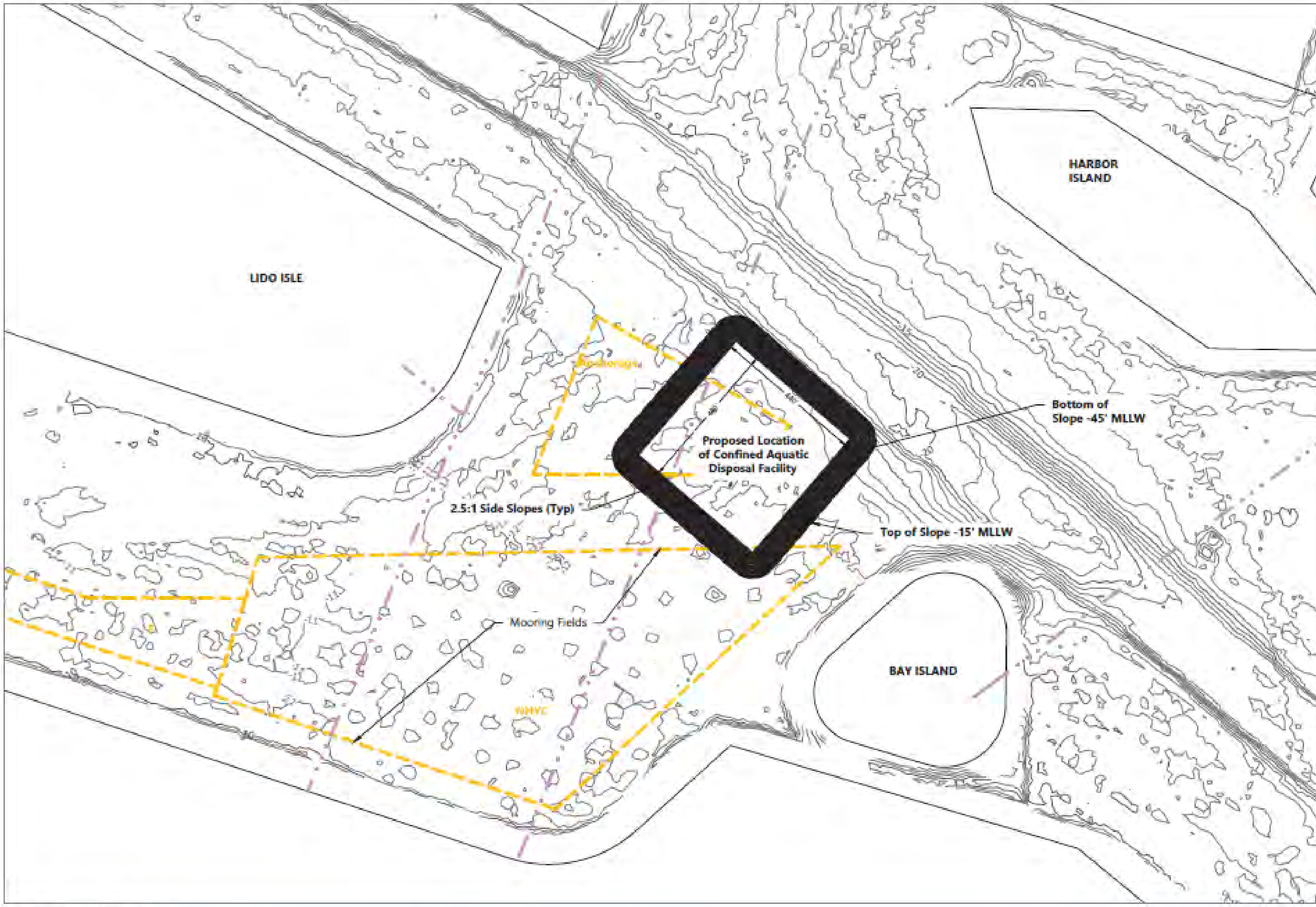

Project Location:
Newport Harbor
Los Padres National Forest
Santa Barbara
Ventura
Oxnard
Lancaster
Palmdale
Angeles National Forest
Victorville
Hesperia
Los Angeles
San Bernardino
San Bernardino National Forest
Santa Monica
Riverside
Long Beach
Anaheim
Temecula
Carlsbad
Cleveland National Forest
San Diego
Chula Vista
Google

SOURCE: Image from Bing maps.
HORIZONTAL DATUM: California State Plane, Zone 6, NAD83
VERTICAL DATUM: Mean Lower Low Water (MLLW)

Approximate Project Location:
33° 36.540', 117° 54.230'

0 1.5
Miles



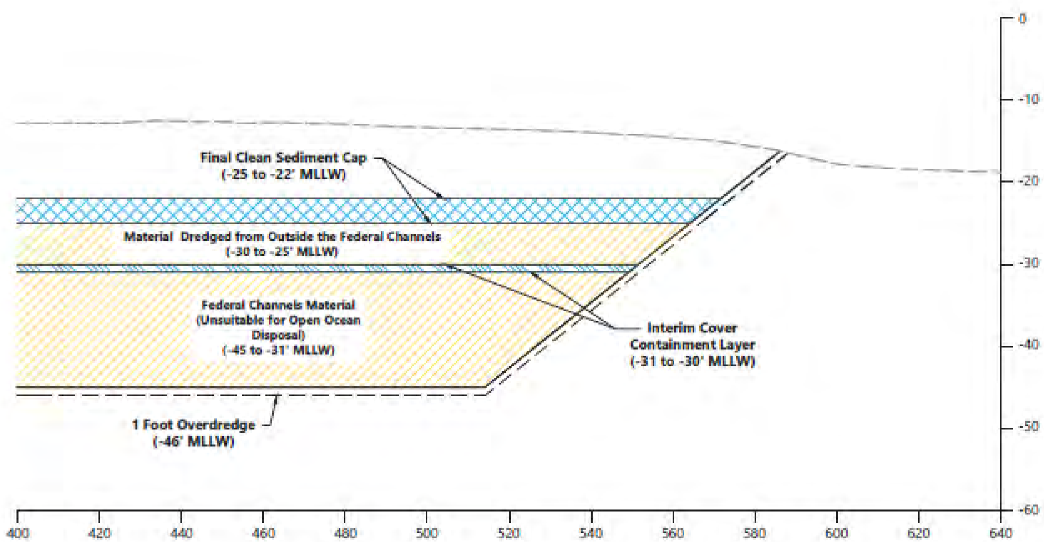
SOURCE: Drawing prepared from Bing maps. Bathymetric contours from U.S. Army Corps of Engineers survey dated June 2018. Dredge units from U.S. Army Corps of Engineers.
HORIZONTAL DATUM: California State Plane, Zone 6, NAD83
VERTICAL DATUM: Mean Lower Low Water (MLLW)

LEGEND:

- City of Newport Beach Mooring Fields
- Approximate Existing Utilities
- Dredge Footprint

ANCHOR QEA

Figure 2
Plan View of CAD Facility
Supplement



SOURCE: Ariel from Bing Maps, 2018.
HORIZONTAL DATUM: California State Plane, Zone 6, North American Datum of 1983 (NAD83), U.S. Survey Feet
VERTICAL DATUM: Mean Lower Low Water (MLLW)

LEGEND:
- Required Dredge Elevation
- Allowable Overdepth Elevation
- Existing Mudline

0 — 30 Feet

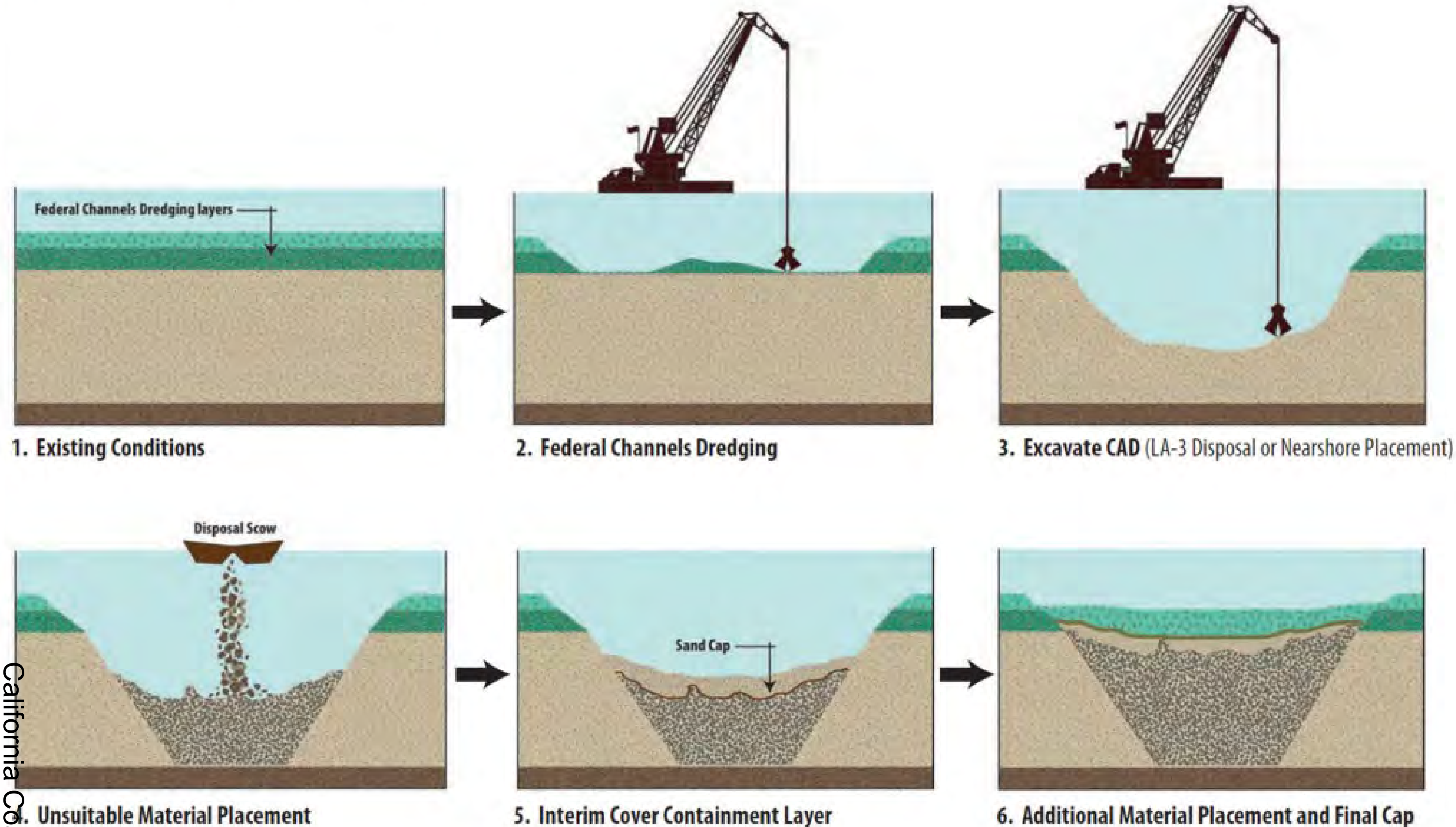
Publish Date: 2020/05/06 8:58 AM | User: bhany
Filepath: K:\Projects\0243-City of Newport Beach\Federal Channels\0243-RP-022 Cross Section View Figure 2-2.dwg Figure 3-2

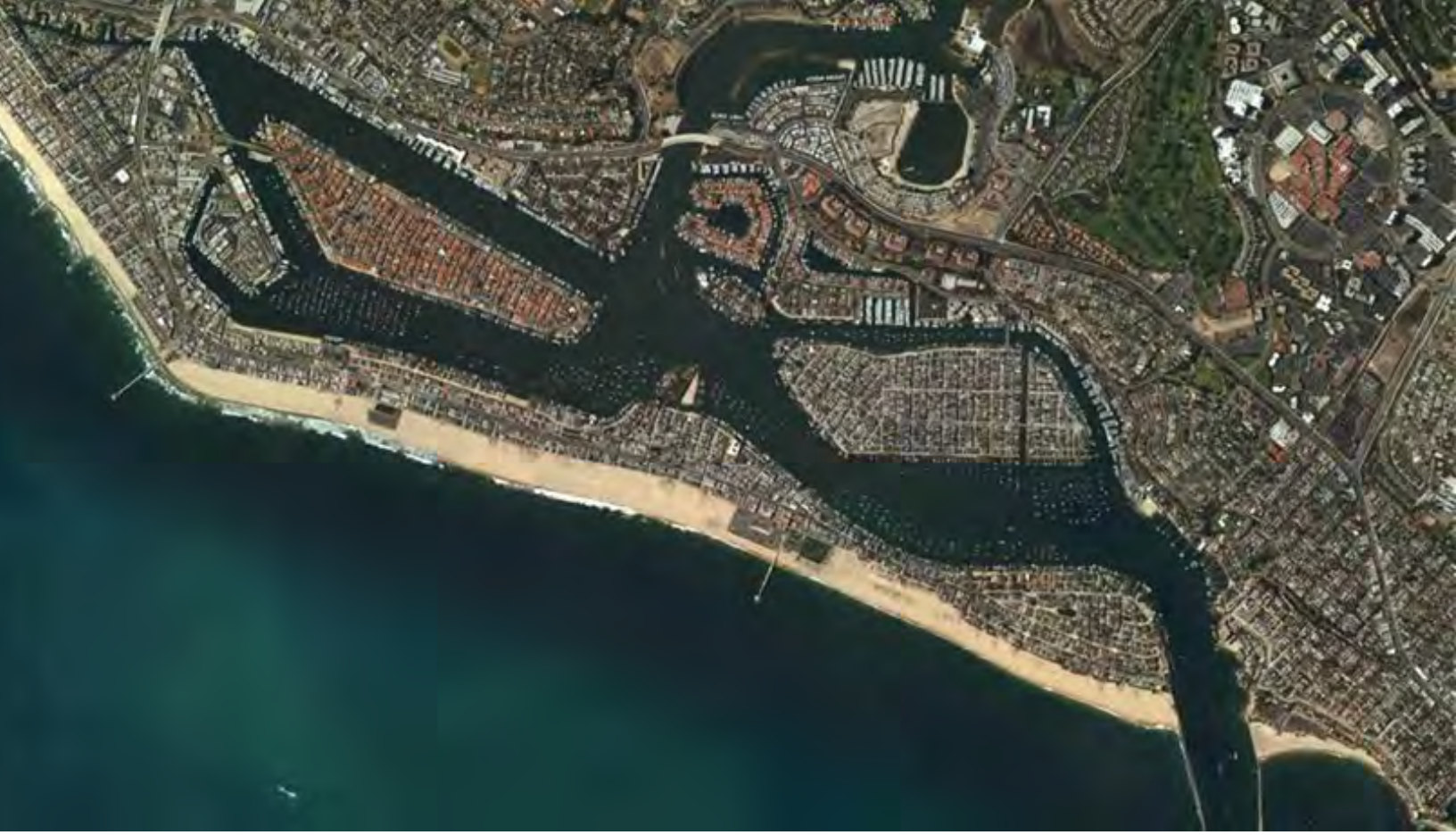
ANCHOR QEA

Figure 3
Cross Section of CAD Facility
Supplement
Lower Newport Bay Confined Aquatic Disposal (CAD) Construction Project

California Coastal Commission
CDP 5-21-0640
Exhibit 2 p. 1 of 2

CAD Construction Overview





August 10, 2022
Lower Newport Bay Confined Aquatic Disposal (CAD) Construction Project

ANCHOR QEA

Revised Permit Application Supplement

Prepared for the City of Newport Beach

August 10, 2022
Lower Newport Bay Confined Aquatic Disposal (CAD) Construction Project

Revised Permit Application Supplement

Prepared for
City of Newport Beach
Public Works Department
100 Civic Center Drive
Newport Beach, California 92660

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9700 Research Drive
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ABBREVIATIONS

µPa	micropascal
BMP	best management practice
BODR	Basis of Design Report
CAD	Confined Aquatic Disposal
CARB	California Air Resource Board
CCR	California Code of Regulations
CDFW	California Department of Fish and Wildlife
CEMP	California Eelgrass Mitigation Policy
CEQA	California Environmental Quality Act
CEQA	California Environmental Quality Act
City	City of Newport Beach
CNDDB	California Natural Diversity Database
cy	cubic yard
dB	decibel
DMMT	Dredged Material Management Team
EFH	Essential Fish Habitat
FE	federally endangered
FMP	Fishery Management Plan
FT	federally threatened
GHG	greenhouse gas
MMPA	Marine Mammal Protection Act
NTU	nephelometric turbidity unit
proposed project	Lower Newport Bay Confined Aquatic Disposal (CAD) Construction Project
RGP	Regional General Permit
RWQCB	Regional Water Quality Control Board
SC	California state species of special concern
SCAQMD	South Coast Air Quality Management District
SE	state endangered
SMP	sediment management plan
SP	state protected (California Department of Fish and Wildlife)
USACE	U.S. Army Corps of Engineers
USEPA	U.S. Environmental Protection Agency

1 Purpose and Nature of the Activity

The City of Newport Beach (City) is proposing the Lower Newport Bay Confined Aquatic Disposal (CAD) Construction Project (proposed project), located in Lower Newport Bay, Newport Beach, California (Figure 1).

The City previously submitted permit applications in August 2021– inclusive of a Permit Application Supplement, detailing project activities to be undertaken under the proposed project. Project activities previously described in the permit application and supplement included 1) maintenance dredging within the Federal Channels to re-establish safe navigation, including dredging of material that has been determined suitable for open ocean disposal and material that is unsuitable for open ocean disposal; and 2) construction of a CAD facility in the central portion of Lower Newport Bay between Bay Island, Lido Isle, and Harbor Island where dredged sediment unsuitable for open ocean disposal can be contained.

Based on coordination and collaboration with the U.S. Army Corps of Engineers (USACE), the City is submitting a revised project description that only entails construction of the CAD facility and placement of a final cap layer. Maintenance dredging of the Federal Channels is being permitted separately by the USACE. Clean material suitable for beach nourishment generated from constructing the CAD facility would be transported and disposed along the nearshore ocean beaches. The proposed CAD facility and nearshore disposal are shown in Figure 1. Typical CAD facility plan view and cross section are shown in Figures 2 and 3, respectively.

Please note that the appendices remain unchanged as previously provided and therefore not being included as part of this revised submittal.

2 Regulatory Approvals and Permits

The City prepared an Environmental Impact Report (EIR) in compliance with the California Environmental Quality Act (CEQA) and in accordance with 22 California Code of Regulations (CCR) Section 66265 et seq., and Public Resources Code Division 13, Section 21000 et seq., and the CEQA Guidelines (CCR 15000 et seq.). The City certified the Final EIR (FEIR), including CAD construction, on May 25, 2021. Copies of the CEQA Draft EIR (DEIR) and FEIR are provided in Appendix A.

A California Coastal Commission Coastal Development Permit, a Regional Water Quality Control Board (RWQCB) Section 401 Water Quality Certification, and a USACE Section 404 Individual Permit (Section 10 of the Rivers and Harbors Act of 1899, as amended) are required for this proposed project. A modified Permit Application Supplement is being submitted to each respective agency.

Additionally, in a letter dated May 24, 2021, the U.S. Environmental Protection Agency (USEPA) provided a statement on the draft Basis of Design Report (BODR) for the proposed project noting that "the draft BODR and its appendices analyze issues associated with CAD in an appropriate manner, consistent with USEPA and U.S. Army Corps of Engineers national technical design guidelines" (Appendix B).

Federal Channel Dredging (Not Included as Part of the City's Applications)

USACE will be responsible for ensuring National Environmental Policy Act compliance to support the separate Federal Channels maintenance dredging program and will be preparing an environmental assessment separately from this CAD construction permit application. As the lead federal agency—and as part of the Federal Channels maintenance dredging program—USACE will assume responsibility for coordinating with resource agencies such as National Marine Fisheries Service and California Department of Fish and Wildlife and for ensuring compliance with statutes such as the Endangered Species Act and the Magnuson-Stevens Fishery Conservation and Management Act. USACE has also assumed the lead role in addressing cultural and historic resource issues, including requirements of Section 106 of the National Historic Properties Act. In addition, USACE will obtain a federal Consistency Determination from the California Coastal Commission, which will satisfy requirements of the Coastal Zone Management Act, and a Clean Water Act Section 401 water quality certification from the Santa Ana RWQCB for the Federal Channels maintenance dredging program.

3 Detailed Description of the Activity

The proposed project will occur within the Lower Harbor, specifically in the central portion of Lower Newport Bay between Bay Island, Lido Isle, and Harbor Island, as well as nearshore waters (Figure 1). Lower Newport Bay requires periodic maintenance dredging to remove sediment that accumulates over time and impedes navigation and full use of the Harbor. While some of the sediment from the Federal Channels maintenance dredging program has been determined suitable for open ocean disposal, another portion of the sediment has been determined unsuitable for open ocean disposal and is proposed for placement into the CAD facility.

3.1 Sediment Suitability

On July 28, 2021, the Dredged Material Management Team (DMMT) provided a preliminary sediment suitability for underlying sediment within the footprint of the CAD facility for nearshore disposal (Appendix C). Additionally, in coordination with the DMMT, the City committed to developing a sediment management plan (SMP; Appendix D). The SMP is a planning document that builds on previous harbor-wide planning tools (e.g., the *Harbor Area Management Plan*; City 2010) to assist the City in managing sediment in Newport Harbor. Specifically, the SMP identifies sediment management options depending on sediment characteristics, including developing alternate disposal locations and permitting requirements.

3.2 Overview of Project Elements

To manage the unsuitable material that will be dredged as part of the Federal Channels maintenance dredging program, the City proposes constructing a CAD facility in the central portion of the Lower Harbor between Bay Island, Lido Isle, and Harbor Island where dredged sediment unsuitable for open ocean disposal can be contained (Figures 1, 2, and 3).

The CAD facility is being constructed to accommodate approximately 106,900 cubic yards (cy) of unsuitable dredged material anticipated to be generated by the Federal Channels maintenance dredging program and an additional 50,000 cy resulting from maintenance dredging primarily of unsuitable material from outside the Federal Channels (to be permitted separately at a later time). Clean material excavated during construction of the CAD facility will be transported to, and disposed along, the nearshore ocean beaches.

CAD facility construction will likely occur using mechanical equipment and bottom-dump barges (also called a dump scow) to excavate the depression and deposit the resulting material within the nearshore zone along the ocean beaches of Newport Beach.

Approximately 2 years following completion of construction of the CAD facility, there will be a second opportunity during a 6-month period for the City and its residents to place material

determined unsuitable for open ocean disposal in the CAD facility. The combined total allowance for the initial and second opportunity will be 50,000 cy of unsuitable material. If there is remaining capacity (within this 50,000-cy allowance) at the end of the 6-month period, the City and its residents will be able to place material from the Regional General Permit (RGP) 54[1] Plan Area determined suitable for open ocean disposal in the CAD facility. This opportunity will provide a more cost-effective and convenient disposal location within the Lower Harbor and will bolster the CAD facility's final cap layer. This activity will be permitted separately through either the City's RGP 54 or through an Individual Permit depending on the scope of work, and not included as part of this permit application.

At the end of the second 6-month placement period opportunity for the public and the City, the final cap layer will be placed in the CAD facility by the City to chemically isolate the underlying sediments from burrowing organisms and biota residing in the overlying water column. This clean sediment final cap layer has been designed to a thickness of 3 feet (or 33,600 cy) of additional sediment sourced by the City. This layer will likely consist of sediment dredged under the City's RGP 54 program, maintenance dredging at the Santa Ana River as a contingency, or other sources available at the time. As the City identifies sources for the final cap layer, material will require testing and confirmation that the sourced material meets the performance criteria of sediment tested and modelled as part of the BODR (Anchor QEA, 2020). Additionally, the City will request final review and approval prior to placement of the final cap layer.

The final elevation of the CAD facility infill will be restricted to an elevation that is at or below the water depths necessary for navigation within the Lower Harbor.

3.2.1 Construction Volumes

To accommodate the required volumes of expected unsuitable material and sediment capping material, the estimated size of the CAD facility is approximately 590 feet by 590 feet at the assumed top of the CAD facility footprint and will require dredging of approximately 282,400 cy of sediment from the existing mudline to the 1-foot overdredge limit (-46 feet Mean Lower Low Water); the underlying sediment within the footprint of the CAD facility would be disposed along nearshore beaches, as presented in Figure 1.

The CAD facility has been designed to accommodate 199,500 cy, in addition to a 10% contingency volume. Please note that the sum represented by the different layers of the CAD facility – as noted in the bullet points below – represent a slight change as compared to what was presented in the updated permit application package from November 2021. The reasoning is based on direction from

[1] RGP 54 authorizes small-scale maintenance dredging in Newport Harbor and covers the following regulated activities in eligible areas of Newport Harbor: 1) maintenance dredging under and adjacent to private, public, and commercial docks, floats, and piers; and 2) discharge of dredged material at adjacent in-bay beach sites for beach nourishment, at LA-3, or at approved upland disposal sites.

the EPA to modify the delineation of the unsuitable material to allow for easier access and constructability (more box-shaped than round). The difference in volumes was approximately 5,600 cy – 106,900 as presented in the November 2021 CDP application compared to 112,500 cy based on updates from the USACE. These updated volumes were negotiated between EPA and the Corps (with City input) as part of the EPA final sediment suitability concurrence in spring 2022. The USACE further acknowledged that the volumes may further slightly change to reflect the 2022 annual harbor-wide bathymetry surveys being conducted by the USACE. As mentioned, the CAD has been designed with a 10% contingency, so the slight variation in volumes – with buffer – can be accommodated.

- 112,500 cy of sediment generated during dredging of the Federal Channels (USACE Federal Channels maintenance dredging program, permitted separately)
- 50,000 cy of sediment generated from the RGP 54 Plan Area and/or other areas outside the Federal Channels (USACE Federal Channels maintenance dredging program, permitted separately)
- 9,000 cy of sediment that will be dredged from the Federal Channels, likely Newport Channel 3, to provide for an interim cover containment layer designed to a thickness of 1 foot (USACE Federal Channels maintenance dredging program, permitted separately)
- 33,600 cy of sediment that will be sourced by the City to provide for the final cap layer designed to a thickness of 3 feet (permitted herein)

The CAD facility's size and volume incorporates side slopes, final CAD facility elevation, and other engineering design considerations to safely accommodate the material and ensure the CAD facility's stability. Incorporation of these elements into the design results in a greater volume of material required to excavate the CAD facility (282,400 cy) as compared to the volume of material placed in the CAD facility (199,500 cy).

3.2.2 Construction Schedule

The proposed CAD facility construction is anticipated to take place over an approximately 6-month duration and begin in late 2022. Placement of dredged material for final containment layer cap is anticipated to take 3 to 4 weeks and begin in late 2024. This conceptual schedule and construction sequence were developed based on current design knowledge, professional judgment, and experience from similar projects and may be modified.

3.2.3 Long-Term Monitoring

An Operations, Management, and Monitoring Plan (OMMP) for the CAD facility has been developed for implementation by the City. The OMMP describes the management and monitoring objectives for the CAD facility, a communications plan covering the entire CAD facility construction and sediment disposal process, construction monitoring and post-disposal monitoring plans, contingency plans,

annual monitoring plans, and long-term management plans for the CAD facility once it has been capped. The OMMP, prepared as an appendix to the draft BODR (Anchor QEA 2020), is provided as Appendix E to this Permit Application Supplement.

4 Essential Fish Habitat and Special-Status Species

This section details the environmental setting and potential impacts to Essential Fish Habitat (EFH) and special-status species.

4.1 Essential Fish Habitat

In accordance with the 1996 amendments to the Magnuson-Stevens Fishery Conservation and Management Act, an assessment of the EFH has been conducted for the proposed project. The proposed project is located within an area designated as EFH for two Fishery Management Plans (FMPs)—the Coastal Pelagic Species Management Plan and the Pacific Groundfish Fishery Management Plan. Many of the more than 90 federally managed species under these FMPs are known to occur in the area and could be affected by the proposed project. Four coastal pelagic species potentially occur in the waters offshore of Newport Beach, and three Pacific Coast groundfish species potentially occur within Newport Bay (Table 1). Although several other coastal pelagic and groundfish FMP species have been observed in Newport Bay, temporal data indicate that their presence in the proposed CAD facility or dredge areas is likely sporadic, and their numbers would be extremely low (CRM 2009).

Table 1
Fish Species with Essential Fish Habitat Present in Newport Bay

Scientific Name	Common Name	Occurrence
Coastal Pelagic Species		
Engraulis mordax	Northern anchovy	Present in Lower Newport Bay
Sardinops sagax	Pacific sardine	Rare in Lower Newport Bay
Trachurus symmetricus	Jack mackerel	None observed
Scomber japonicus	Pacific mackerel	Rare in Lower Newport Bay
Pacific Coast Groundfish		
Parophrys vetulus	English sole	Rare in Lower Newport Bay
Sebastes serranoides	Olive rockfish	Rare in Lower Newport Bay
Scorpaena guttata	California scorpionfish	Rare in Lower Newport Bay

Of these species, only the northern anchovy comprises a significant portion of fish that contribute moderate to heavy abundance to the nearshore fish community, with no recorded levels of abundance within Newport Bay. Although several other coastal pelagic and groundfish FMP species have been observed in Newport Bay, temporal data indicate that their presence in the CAD facility site is likely sporadic, and their numbers would be extremely low (CRM 2009). Construction of the CAD facility may result in short-term, temporary, and minor increases in turbidity; underwater noise; benthic community disturbance; and water quality impacts in the immediate area.

4.1.1 Eelgrass and Caulerpa

The proposed project is also located within the Pacific Coast Groundfish Habitat Areas of Particular Concern: Estuarine and Eelgrass Habitat. Estuaries tend to be shallow, protected, nutrient-rich, and biologically productive, providing important habitat for marine organisms, including groundfish (Pacific Fishery Management Council 2019). Eelgrass grows in quiet bays and harbors as well as open coast regions. It provides many biological and ecosystem services, including shelter for juvenile fishes, important foraging habitat for multiple species, shoreline stabilization, and water quality improvements.

The City conducts shallow-water eelgrass surveys every 2 years in Lower Newport Bay, and harbor-wide surveys—including the deepwater habitat—are conducted every 4 years. The most recent harbor-wide survey was conducted in summer 2020, and the results of the survey (MTS 2020) are included as Appendix F. As described in this appendix, eelgrass is not present in or adjacent to the area proposed for the CAD facility. While there are no known areas of eelgrass beds in or adjacent to the project site, consistent with the California Eelgrass Mitigation Policy (CEMP; NOAA 2014) a pre-construction eelgrass survey will be performed by the City in the proposed project area 30 to 60 days prior to commencement of CAD construction activities. If eelgrass is located during the pre-construction survey, a post-construction survey will also be performed by the City within 30 days following completion of construction to evaluate any immediate effects to eelgrass habitat. If the post-construction survey indicates loss of eelgrass habitat within the proposed project area, any impacts to eelgrass that have not previously been mitigated for will be mitigated in accordance with the CEMP (NOAA 2014).

A substantial threat to the productive marine ecosystems in California is *Caulerpa*, a highly invasive green alga. This tropical species, which was introduced to natural systems through the aquarium trade, can be extremely harmful to marine ecosystems because it invades, out-competes, and eliminates native algae, seagrasses, kelp forests, and reef systems by forming a dense blanket of growth on mud, sand, or rock surfaces. It can grow in shallow coastal lagoons as well as in deeper waters and has a wide range of environmental tolerance. In order to detect existing infestations and avoid the spread of *Caulerpa* within other systems, the National Oceanic and Atmospheric Administration (NOAA) has developed a survey and reporting protocol for California nearshore coastal and enclosed bays, estuaries, and harbors (NOAA 2008). In March 2021, *Caulerpa prolifera* was discovered in small area of Newport Bay at China Cove. California Department of Fish and Wildlife scientists and divers are currently being deployed to map and identify the location of the species (CDFW 2021a). While there is no known *Caulerpa* in or adjacent to the project area, consistent with the *Caulerpa Control Protocol* (NOAA 2008, or as amended), a pre-construction *Caulerpa* survey will be performed by the City in the proposed project area 30 to 60 days prior to

commencement of project activities. If *Caulerpa* is found, the City will notify NOAA and will assist with coordinating a response.

4.2 Special-Status Species

The California Natural Diversity Database (CNDDB) was searched to identify recorded special-status species occurrences within the U.S. Geological Survey Laguna Beach 7.5-minute quadrangle and surrounding quadrangles (Tustin and Laguna Beach; CDFW 2021b).

CNDDB identifies 69 special-status (threatened or endangered under the federal Endangered Species Act or California Endangered Species Act, state species of special concern, or CDFW fully protected species) wildlife species within the study area, as identified through a search of the Newport Beach, Laguna Beach, and Tustin quadrangles. Potential species occurrence was determined based on habitat requirements and on-site conditions. The proposed project site's highly developed condition precludes the presence of most special-status species, although several special-status bird and fish species may have a very low to low potential for occurrence in or around the proposed project site. Table 2 presents special-status species with the potential to occur in or adjacent to the project area.

Table 2
Special-Status Species with the Potential to Occur In or Adjacent to the Project Area

Scientific Name	Common Name	Special Status
Sterna antillarum browni	California least tern	FE, SE
Charadrius alexandrinus nivosus	Western snowy plover	FT, SC
Eucyclogobius newberryi	Tidewater goby	FE, SC
Leuresthes tenuis	California grunion	SP
Phoca vitulina	Harbor seal	MMPA
Zalophus californianus	California sea lion	MMPA
Chelonia mydas	Green sea turtle	FT
Eretmochelys imbricate	Hawksbill turtle	FE

The proposed project would be constructed within an active marine harbor supporting recreational activities that has previously been subject to dredging activities. The proposed project area, nearshore disposal sites, do not support unique or rare habitats whose alteration would significantly impact sensitive species in the area.

Dredging and CAD facility construction have the potential to directly impact benthic flora and fauna, as well as lead to sediment plumes. Noise from construction activities also has the potential to indirectly affect water column species.

Nearshore placement has the potential to affect benthic and water column species. Waves and wave-related currents in the nearshore environment suspend and transport sediment along the shore as a natural process, creating an unstable environment of shifting sands. Because the nearshore is a dynamic and unstable environment, nearshore placement is not anticipated to significantly alter the environmental conditions for flora or fauna in the vicinity of the nearshore disposal. In order to assess the potential for the project to impact the nearshore environment, a nearshore survey is currently being commissioned by the City.

The effects of construction activities related to construction of the CAD facility on specific special-status species directly or indirectly are described below.

4.2.1 California Least Tern and Western Snowy Plover

California least terns have historically nested and are presumed to still nest in colonies at several areas on the beaches adjacent to Newport Bay, and within Upper Bay. They use open sandy or gravelly shores with light-colored substrates, little vegetation, and nearby fishing waters for nesting. Least terns have nested at several locations around Newport Bay, including 18 breeding pairs observed in 2016 at Least Tern Island in the Upper Bay Ecological Reserve (Frost 2017). Migration from wintering areas to southern California coastal areas occurs in late spring and summer. They are present in small numbers from mid-April to mid-September. California least terns feed on small fishes directly under the water surface in coastal waters, primarily foraging within Upper Bay but occasionally entering Lower Newport Bay. Eelgrass beds are critical foraging habitat for California least terns. Preferred nesting habitat includes open beaches free of vegetation such as lagoon entrances and sandy strips on the coast away from human encroachment.

Individuals in the Pacific Coast population of western snowy plovers are known to utilize habitat in the vicinity of Newport Bay for nesting. Critical habitat for the western snowy plover occurs along approximately 25 acres of beach along space the Balboa Peninsula. The site historically supported nesting, but the current potential for nesting is low. Successful nesting has not occurred since 2009, though there have been sightings of western snowy plover in the vicinity (Glenn Lukos Associates 2020). The critical habitat extends from the mean tide line to the boardwalk, between B Street and G Street on East Balboa Boulevard (approximately 2,000 feet). Western snowy plovers usually forage in intertidal zones, feeding on invertebrates, marine worms, and insects. The nesting season is between March 1 and September 30, with most activity occurring in May. Plovers require barren to sparsely vegetated sand beaches for nesting.

The CAD facility construction and nearshore placement activities would not occur within or adjacent to known California least tern or western snowy plover critical habitat or known nesting locations. While the proposed project would not directly support California least tern and western snowy plover nesting, foraging birds may be present in the study area. The California least tern and western

snowy plover are present from mid-April to mid-September and early March to late September, respectively. Foraging birds feed on small fish directly under the water surface in coastal waters, primarily foraging within the Upper Bay but occasionally entering Lower Newport Bay.

CAD facility construction activities would cause increases in suspended sediments and turbidity, which would affect foraging species' ability to see food normally visible in the water. Noise and equipment operation could cause birds to avoid using the beach as a resting area. However, no direct mortality of California least tern nor western snowy plover is reasonably foreseeable because of the lack of nesting habitat in the areas to be affected by the project. During construction of the CAD facility, there would be a loss of benthic and water column habitat, which could reduce the number of small fishes in the immediate area of construction. This loss would be temporary, as the CAD facility would eventually be filled and capped. Impacts to benthic communities and increased turbidity due to dredging activities are also temporary in nature. Because the areas to be dredged for construction of the CAD facility are a small portion of local habitat (approximately 8 acres), the loss of food for bird populations is judged adverse, but not significant.

Effects from sediment suspension and turbidity as a result of sediment placed within the nearshore marine environment would be temporary and minimal. Additionally, it is anticipated that only a small number of organisms would be affected, and those effects would be limited to minor impacts on foraging behavior for individuals.

4.2.2 Tidewater Gobies

Tidewater gobies require coastal brackish waters in lagoons or bays where there is access to freshwater flow. Tidewater gobies may have historically occurred in the Upper Newport Bay but have been extirpated from much of their native southern California range due to habitat degradation and loss.

4.2.3 California Grunion

California grunion are found only in southern California and northern Mexico. California grunion are known to spawn on sandy beaches along the Pacific Coast from southern California to northern Baja California, including Newport Municipal Beach from Balboa Pier Beach to West Newport Park (CDFW 2021c). California grunion inhabit nearshore waters from the surf down to approximately 60 feet. Little is known about grunion foraging habits, but they are presumed to feed on very small organisms. Spawning generally occurs from March through August, with peak spawning in late March to early June. Limited wave action within the Lower Harbor does not facilitate beach access for grunion spawning or returning to the water after hatching. However, grunion use nearshore ocean beaches to spawn.

California grunion leave the water at night to spawn on nearshore beaches at predicted times during the spring and summer months (March through August). Spawning occurs for four consecutive

nights after the highest tide associated with each full or new moon (CDFW 2021c). These spawning events are protected, and any beach activity during spawning must be monitored.

Nearshore placement would occur over a 2-month period during the day hours. As noted above, spawning only occurs during night at a specific period and it is unlikely that nearshore placement would overlap with spawning. In addition, nearshore placement works by depositing sediment at a distance from the beach to allow the normal active sand movement process deliver material to the beach gradually. Nearshore placement would allow material to mix with other sediment in the littoral zone prior to being carried naturally onto the beach or downcoast, with little or no observable change onshore. Therefore, spawning is not anticipated to be affected by nearshore placement even if grunion are present at a beach adjacent to the nearshore disposal activities. Based on guidance provided from the City for the Marina Park Project, and consistent with other projects of similar magnitude and geography, nearshore ocean beach disposal locations do not require grunion monitoring prior to placement activities (CCC 2011; Love 2011; USACE 2012; CDFW 2021c).

4.2.4 Sea Turtles and Marine Mammals

Sea turtles are large, long-lived marine animals that play an important role in the shaping and regulation of coastal marine communities. As large herbivores, sea turtles feed on seagrass and algae, and nesting populations can be found along the Pacific Coast of Mexico. The green sea turtle and hawksbill turtle occasionally visit the nearshore environment of Orange County, but they generally do not utilize the local marine waters as a permanent breeding or foraging habitat. According to *The Orange County Register*, "sea turtles are now being found in the Port of Los Angeles, in the harbor at Marina Del Rey, in Alamitos Bay," and the warm discharge waters of the nearby power-generating facilities in "the San Gabriel River in Long Beach, and off of Carlsbad in San Diego County" (Ritchie 2019). While their occurrence within Newport Bay is expected to be rare, a few green sea turtles were spotted in Newport Harbor in 2017, where they may have utilized the eelgrass beds in Newport Bay as a source of nutrition (Ritchie 2019).

The only marine mammals expected in proposed CAD facility or dredging areas would be California sea lions and harbor seals. Sea lions and seals are expected to forage in the Lower Harbor and rest on the breakwater jetties and navigational buoys. Various dolphin species are known to enter Lower Newport Bay but are not expected to be present at the proposed CAD facility, as general activity and noise during dredging activities typically act as a deterrent for dolphins. There are a variety of marine mammals that are likely to occur in the shallow waters at the nearshore disposal site. While some are year-round residents, others are transients or are observed during seasonal migrations through the area. California sea lions and harbor seals often come into the nearshore zone, while common dolphins (*Delphinus delphis*), Pacific white-sided dolphins (*Lagenorhynchus obliquidens*), and gray whales (*Eshrichtius robustus*) occasionally visit the nearshore zone.

Green sea turtles, hawksbill turtles, California sea lions, and harbor seals in the vicinity of the proposed project site during the CAD facility construction period could be affected by the noise of the dredging operation and by contact with the dredging and disposal equipment during construction. Green sea turtles, hawksbill turtles, California sea lions, harbor seals, common dolphins, Pacific white-sided dolphins, and gray whales in the vicinity of the nearshore placement area during disposal operations would potentially be disturbed by the noise and activity of the disposal tugboat and split-hull barge and by the turbidity plume from disposed sediments.

The proposed project site is currently an active recreational and commercial harbor subject to noise from ongoing operations, including the use of large vessels. Underwater noise levels will temporarily increase due to operation of dredging equipment within the CAD facility and transport of the material to the nearshore disposal site. Clamshell dredges generate a repetitive sequence of sounds from winches, bucket impact with the substrate, closing and opening the bucket, and dumping the dredged material into the barge. However, noise attenuates with increasing distance from the source. As referenced in the Marina Park Draft EIR (City 2009), underwater noise from the clamshell dredging in Los Angeles Harbor averaged 150 to 162 decibels (dB) relative to 1 micropascal of pressure (re 1 µPa), which is less than the designated Level A Harassment threshold of 190 dB root mean square (re 1 µPa) for pinnipeds. Construction of the CAD facility would likely use a clamshell dredge and is anticipated to produce similar underwater noise (150 to 162 dB re 1 µPa). This is comparable to underwater noise levels of 160 to 180 dB produced by small boats and ships (MALSF 2009).

There is limited data on the effects of intense sounds on marine turtles, and thus it is difficult to predict the level of damage to hearing structures. However, the U.S. Navy conducted a study on the range to the onset of temporary or permanent loss of hearing for sea turtles exposed to impact pile driving, which generates more intense underwater noise than dredging equipment. The study found that the range in which noise would affect sea turtles was short (between 6 and 65 feet). This finding was due to sea turtles' relatively high thresholds for auditory impacts compared to source levels of impact pile driving conducted during U.S. Navy training (Navy 2018). Based on prior observations of sea turtle reactions to sound, if a behavioral reaction were to occur, the responses could include increases in swim speed, change of position in the water column, or avoidance of the sound (Popper et al. 2014). There is no evidence to suggest that any behavioral response would persist beyond the sound exposure.

Startle reactions from sea lions or harbor seals that are in close proximity to barges or other equipment could occur as the result of start-up operations in the morning or from loud noises resulting from construction activities. These responses are temporary, however, and individuals in the vicinity are prone to habituation. Considering the source sound level, sound attenuation over distance, and the typical noise generated from boats and land-based sources, such dredging noise levels would likely be within current noise levels.

One of the primary threats facing sea turtles is vessel strikes, and disposal vessel traffic could encounter turtles on the way to the nearshore disposal site. Marine mammals are generally agile and able to avoid injury by equipment, and other foraging area is available nearby in the bay. They would likely avoid the CAD facility during construction, and although individuals may be curious, there is a low potential for harm to an individual or the population within the vicinity of the CAD facility and the nearshore disposal site.

Breeding would not be affected because sea turtles, sea lions, and harbor seals do not breed in the Lower Harbor. Disposal operations at the nearshore disposal site are also not expected to affect breeding or nursing of any sea turtle or marine mammal species. Foraging may be temporarily affected in the vicinity of disposal operations due to a decrease in water clarity, and there may be a potential reduction in prey items. It is highly unlikely that project activities would affect sea turtle or pinniped foraging in the areas around the dredge given the existing environmental baseline and harbor use. Additionally, foraging sea turtles, seals, and sea lions are not expected to be affected by project activities given the amount of surrounding area available for foraging and the existing environmental baseline of almost constant human presence and recreational activity that already occurs in the area. Proposed project activities therefore are not likely to result in "take" as defined in the Marine Mammal Protection Act (MMPA).

5 Avoidance and Minimization of Impacts

The City is committed to avoiding or minimizing environmental effects during construction of the CAD facility and disposal activities. The following best management practices (BMPs) will be required as a condition of the proposed project and incorporated into the proposed project plans and contract specifications as appropriate:

- Rules and methods set out by the Los Angeles Region Contaminated Sediments Task Force's Long-Term Management Strategy BMP toolbox (CSTF 2005) during CAD facility construction dredging activities shall be provided to the dredge contractor to satisfy federal and state water quality requirements.
- General construction BMPs, including removing floating debris, implementing a water quality monitoring plan, preventing barge overflow, adjusting dredge cycle time and bucket velocity as it is raised and lowered, modifying bucket size or type if necessary, modifying the operation of the dredging equipment to minimize resuspension of sediment, and washing the bucket to remove cohesive sediment, will be implemented if necessary.
- Prior to construction, the proposed project area will be surveyed for the invasive alga *Caulerpa* (*Caulerpa* spp.) and eelgrass (*Zostera marina*) in compliance with federal and state protocols.
- Contractors will be required to have emergency spill response plans and employ general BMPs regarding vessel and equipment maintenance and fueling.
- Prior to construction, the City will submit a Cap Placement Plan for review and approval by the agencies.

Additionally, the City will implement all mitigation measures documented in the FEIR, including the following:

- **MM-AQ-1 Tugboats Used During Construction**: The tugboats used during construction must meet USEPA Tier 4 engine standards by 2024; if Tier 4 tugboats are not available in years 2021 and 2022, tugboats must meet Tier 3 compliant standards. If applicable Tier-compliant tugboats are not available, the City shall purchase Emission Reduction Credits from the South Coast Air Quality Management District (SCAQMD) to offset the exceedance of nitrogen oxides emissions.
- **MM-BIO-1 Pre- and Post-Construction Survey**: Consistent with the CEMP (NOAA 2014) and *Caulerpa Control Protocol* (NOAA 2008, or as amended), a pre-construction eelgrass and *Caulerpa* survey shall be performed by the City in the proposed project area 30 to 60 days prior to commencement of proposed construction activities in the Harbor.
  - If eelgrass is located during the pre-construction survey, a post-construction survey shall also be performed by the City within 30 days following completion of construction to evaluate any immediate effects to eelgrass habitat.

  - If *Caulerpa* is found, the City will immediately notify the Southern California *Caulerpa* Action Team, and construction shall not be conducted until such time as the infestation has been isolated and treated, or the risk of spread from the proposed construction is eliminated.
- **MM-BIO-2 Eelgrass Mitigation**: If a post-construction survey is required and indicates loss of eelgrass habitat within the proposed project area, any impacts to eelgrass that have not previously been mitigated for will be mitigated in accordance with the CEMP (NOAA 2014). In-kind compensatory mitigation is the creation, restoration, or enhancement of habitat to mitigate for adverse impacts to the same type of habitat. Per the CEMP guidelines for southern California, for each square meter of vegetated eelgrass cover adversely impacted, 1.38 square meters of new habitat with suitable conditions to support eelgrass should be planted with a comparable bottom coverage and eelgrass density as impacted habitat (NOAA 2014). The 1.38:1 ratio assumes the following: 1) there is no eelgrass function at the mitigation site prior to mitigation efforts; 2) eelgrass function at the mitigation site is achieved within 3 years; 3) mitigation efforts are successful; and 4) there are no landscape differences (e.g., degree of urban influence, proximity to freshwater source) between the impact site and the mitigation site.
- **MM-CHR-1 Stop Work in the Area If Prehistoric or Historical Archaeological Resources Are Encountered**: In the event that any artifact, or an unusual amount of bone, shell, or non-native stone, is encountered during construction, work would be immediately stopped and relocated to another area. The contractor would stop dredging until a qualified archaeologist can be retained by the City to evaluate the find (36 CFR 800.11.1 and 14 CCR 15064.5[f]). Examples of such cultural materials might include ground stone tools such as mortars, bowls, pestles, and manos; chipped stone tools such as projectile points or choppers; historic artifacts such as bottles or ceramics; or resource gathering items such as fish weir stakes. Native American tribes and the Office of Historic Preservation would be notified of the find. Native American tribes consulted on the proposed project to date include the Gabrieleño Band of Mission Indians – Kizh Nation, and the Juaneño Band of Mission Indians Acjachemen Nation. If the resources are found to be significant, they would be avoided or mitigated.
- **MM-GEO-1 Periodic Monitoring of the CAD Facility**: An OMMP has been developed for the proposed project to conduct periodic monitoring of the CAD facility, including bathymetric surveys and cap coring (Appendix E). In the event of a significant earthquake,[2] these techniques could be used to monitor the integrity of the CAD facility final cap layer. As noted, if any changes in environmental conditions or design assumptions become apparent, then management actions will be considered for the CAD facility. Initial management actions

[2] According to NOAA's National Centers for Environmental Information, a significant earthquake "is classified as one that meets at least one of the following criteria: caused deaths, caused moderate damage (approximately $1 million or more), magnitude 7.5 or greater, Modified Mercalli Intensity (MMI) X or greater, or the earthquake generated a tsunami." (NOAA 2020).

would likely include increasing the level or frequency of monitoring. If indicated, the CAD facility cap design would be augmented in one or more of the following ways: adding more sediment to form a thicker cap; changing the cap material to a coarser, more erosion-resistant material type (coarse sand or gravel); or adding enhanced materials to the cap, such as less porous or chemically absorbent materials.

- **MM-GHG-1 Purchase GHG Emission Offsets:** The City shall purchase annual greenhouse gas (GHG) offset credits to offset GHG emissions during the life of the project. The amount of credits purchased shall be determined based on updated emission calculations as determined by the final equipment list secured by the contractor and using industry-accepted GHG calculation methods. Off-site mitigation credits shall be real, quantifiable, permanent, verifiable, enforceable, and additional, consistent with the standards set forth in Health and Safety Code Section 38562, subdivisions (d)(1) and (d)(2). Such credits shall be based on protocols consistent with the criteria set forth in 17 CCR 95972(a) and shall not allow the use of offset projects originating outside of California, except to the extent that the quality of the offsets, and their sufficiency under the standards set forth herein, can be verified by SCAQMD. Such credits must be purchased within 90-days following the conclusion of each operational year through one of the following: (i) a California Air Resource Board (CARB)-approved registry, such as the Climate Action Reserve, the American Carbon Registry, and the Verified Carbon Standard; (ii) any registry approved by CARB to act as a registry under the California Cap and Trade program; or (iii) through the California Air Pollution Control Officers Greenhouse Gas Reduction Exchange and the SCAQMD. Proof of purchase of the off-site mitigation credits shall be retained by the City.
- **MM-HYDRO-1 Conduct water quality monitoring during all construction activities**: The proposed project will obtain the required permits under RWQCB and/or USACE. Water quality monitoring will be implemented to comply with numeric receiving water limitations (Table 3) and other permit requirements during construction activities to minimize potential water quality impacts to Lower Newport Bay.

Table 3
Numeric Receiving Water Limitations

Parameter	Receiving Water Limitation	
	Eelgrass Present Within 300 Feet	**Eelgrass Not Present Within 300 Feet**
Transmissivity	38%	16%
Turbidity	16 NTU	47 NTU
pH	7< pH <8.6; <0.2 change from ambient	
Dissolved Oxygen	>5 milligram per liter	

- **MM-HYDRO-2 Implement Water Quality BMPs**: Construction contractors shall use BMP water quality controls to ensure compliance with the water quality standards identified herein. Measures could include use of a silt curtain during dredging and/or material placement, a floating boom to be maintained around the proposed project area, and daily inspection of construction equipment for leaks or malfunction. Storage or stockpiling of materials related to construction may be prohibited where such materials could enter the waters of Lower Newport Bay.
- **MM-HYDRO-3 Material placement will take place outside tidal extremes**: Material placement activities should be limited to neap and non-peak tides (i.e., plus or minus 2 hours from slack tide) to limit the horizontal distribution of fill material due to reduced current speeds, where possible. In addition, placement activities should be conducted during a non-peak flood tide versus a non-peak ebb tide. These measures will limit the loss of fill material outside the CAD facility during placement operations.
- **MM-REC-1 Coordinate with Sailing Centers**: The City would coordinate with the sailing organizations and yacht clubs to relocate recreational and mooring activities and minimize the disruption to marine recreational activities.

6 Compensatory Mitigation

While there are no known eelgrass beds within the proposed project area, *Caulerpa* has been found in the Harbor. Therefore, biological mitigation measures (MM-BIO-1 and MM-BIO-2) would be implemented during construction to reduce potential impacts. MM-BIO-1 and MM-BIO-2 would ensure that if eelgrass were identified through pre-construction surveys, no net loss would occur after completion of the proposed project. If loss was indicated, mitigation would occur consistent with the CEMP. MM-BIO-1 would ensure that the proposed project would not lead to the spread of *Caulerpa*. No additional compensatory mitigation is proposed.

7 Cultural Resources

As described in the DEIR, there may be some potential for impacts to archaeological resources. Dredging activities began in the area in the early 1900s, and the major dredging and filling project that created Newport Harbor was completed in 1936. Various maintenance dredging operations have occurred since that time. The CAD facility would be dredged below previously authorized depths and would therefore encounter native sediment. Though this sediment would have been in an active intertidal area, there may be some remaining potential to encounter isolated archaeological artifacts that were dropped or redeposited in the intertidal at some point, though the potential is very low. While the proposed project is not expected to encounter archaeological resources, in the unlikely event of such a discovery, mitigation measure MM-CHR-1 would be implemented to reduce any impacts.

8 Alternatives Analysis

CEQA requires that an EIR present a range of reasonable alternatives to the proposed project. Accordingly, the proposed action and five alternatives that meet most of the proposed project objectives (described in Section 2.4 of the DEIR) are analyzed in Section 6.3 of the DEIR. The five alternatives are as follows:

- Alternative 1: No Project Alternative/No Dredging
- Alternative 2: No CAD Construction Alternative
- Alternative 3: Reduced Dredging
- Alternative 4: Upland Trucking of Material
- Alternative 5: Alternative Location within Newport Harbor

The following alternatives were considered but eliminated from the analysis

- Use of an Electric Dredger
- Disposal of Material at Port Fill Site

Alternatives were developed based on comments received during public scoping and City staff consideration. Please refer to Section 6 of the DEIR (provided in Appendix A).

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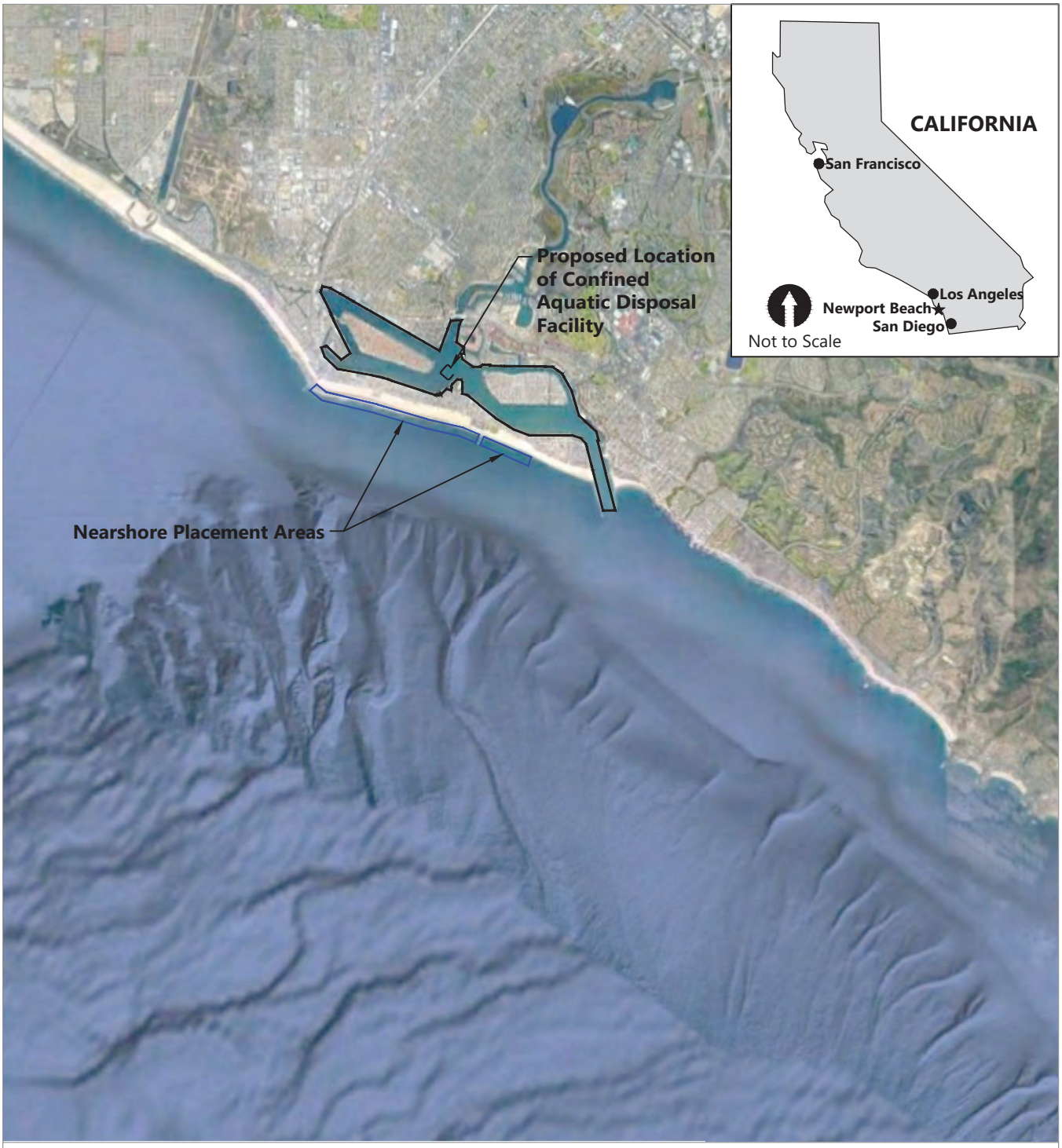

SOURCE: Image from Bing maps.
HORIZONTAL DATUM: California State Plane, Zone 6, NAD83
VERTICAL DATUM: Mean Lower Low Water (MLLW)

Approximate Project Location:
33° 36.540', 117° 54.230'

California Coastal Commission
CDP 5-21-0640
Exhibit 3 p. 30 of 32

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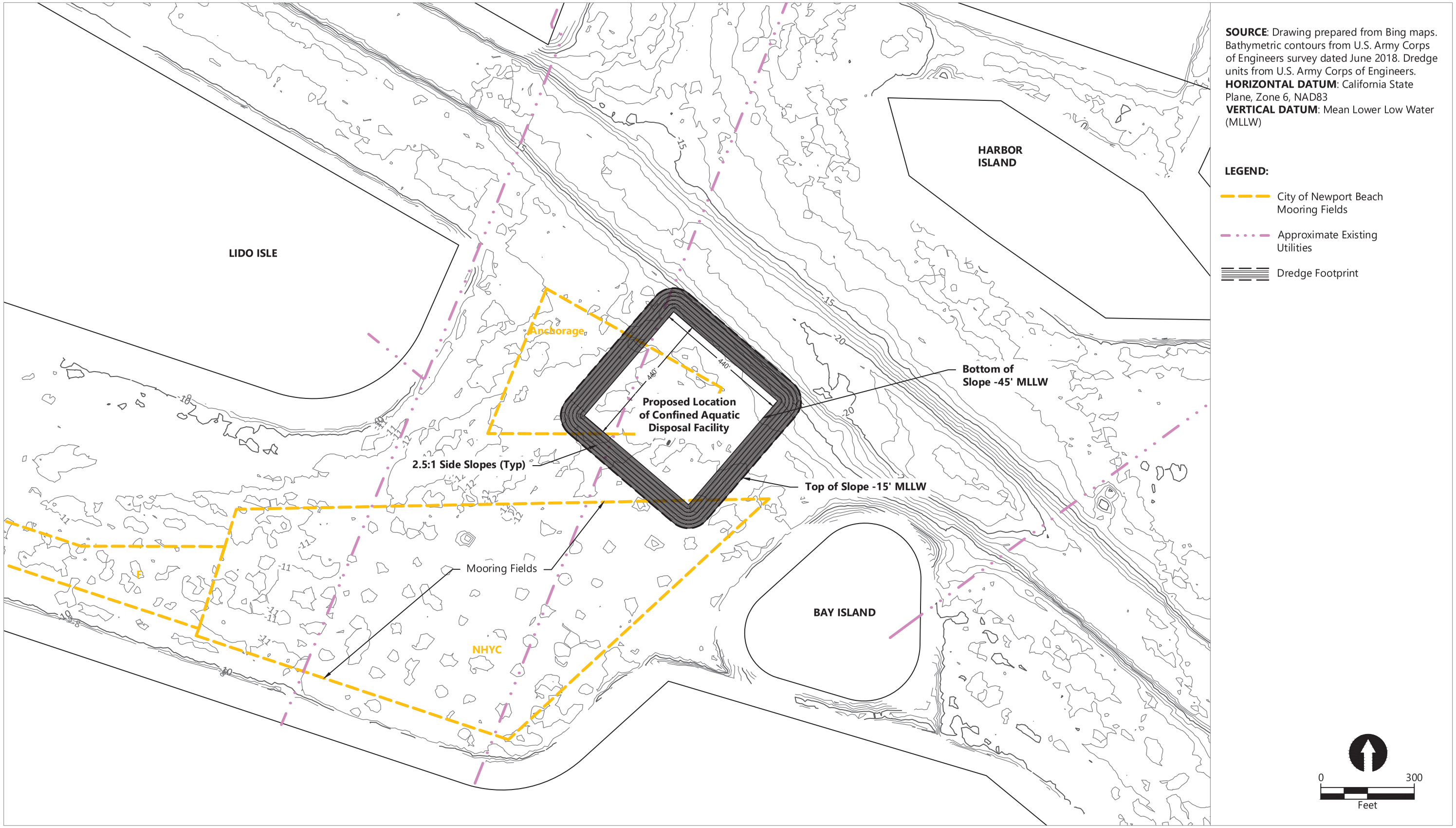
ANCHOR QEA

Figure 1
Project Site and Vicinity
Supplement
Lower Newport Bay Confined Aquatic Disposal (CAD) Construction Project



SOURCE: Drawing prepared from Bing maps. Bathymetric contours from U.S. Army Corps of Engineers survey dated June 2018. Dredge units from U.S. Army Corps of Engineers.
HORIZONTAL DATUM: California State Plane, Zone 6, NAD83
VERTICAL DATUM: Mean Lower Low Water (MLLW)

LEGEND:

- City of Newport Beach Mooring Fields
- Approximate Existing Utilities
- Dredge Footprint

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ANCHOR QEA

Figure 2
Plan View of CAD Facility
Supplement
Lower Newport Bay Confined Aquatic Disposal (CAD) Construction Project

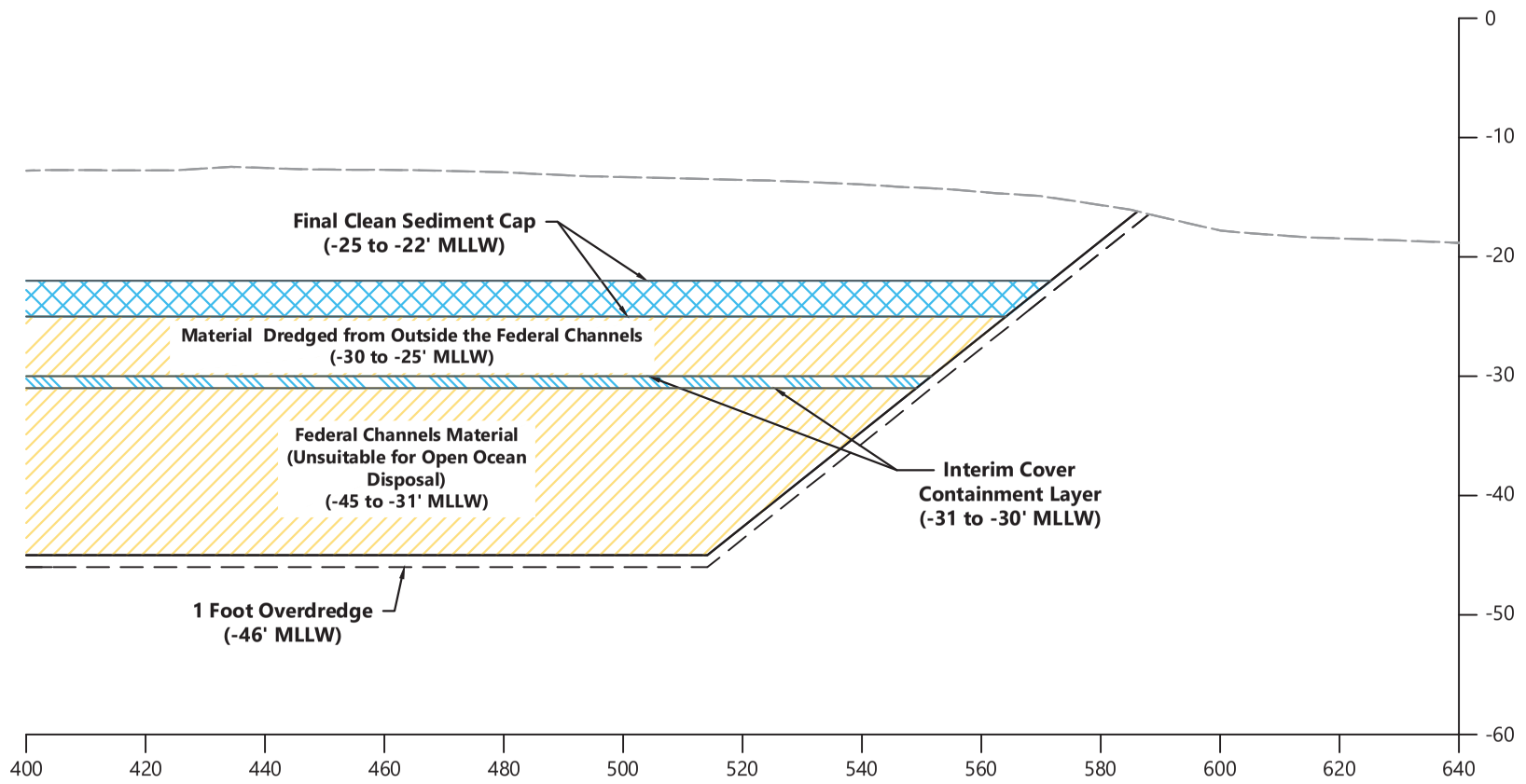
SOURCE: Ariel from Bing Maps, 2018.
HORIZONTAL DATUM: California State Plane, Zone 6, North American Datum of 1983 (NAD83), U.S. Survey Feet
VERTICAL DATUM: Mean Lower Low Water (MLLW)

LEGEND:

Required Dredge Elevation

Allowable Overdepth Elevation

Existing Mudline



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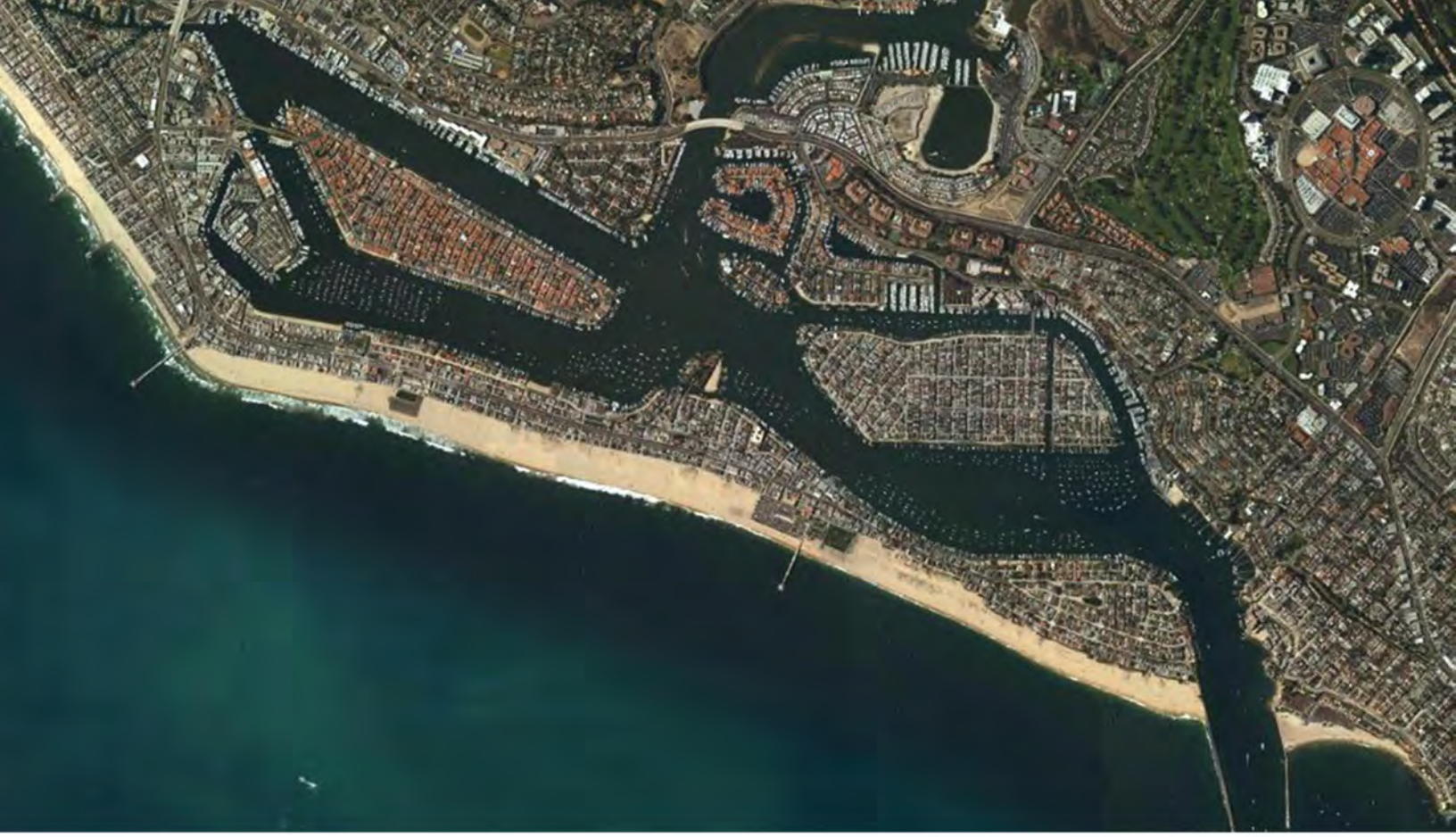
ANCHOR QEA

Figure 3
Cross Section of CAD Facility

Supplement
Lower Newport Bay Confined Aquatic Disposal (CAD) Construction Project



Revised March 10, 2022
Lower Newport Harbor Bay Federal Channels

ANCHOR QEA

Basis of Design Report
Sediment Dredging and Confined Aquatic Disposal

Prepared for City of Newport Beach

Revised March 10, 2022
Lower Newport Harbor Bay Federal Channels

Basis of Design Report
Sediment Dredging and Confined Aquatic Disposal

Prepared for
City of Newport Beach
100 Civic Center Drive
Newport Beach, California 92660

Prepared by
Anchor QEA, LLC
9700 Research Drive
Irvine, California 92618

Project Number: 180243-02.01

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TABLES

ILLUSTRATIONS

FIGURES

APPENDICES

ABBREVIATIONS

µg/L	micrograms per liter
BODR	Basis of Design Report
CAD	confined aquatic disposal
CAD facility	confined aquatic disposal facility
CCR	California Code of Requirements
CEQA	California Environmental Quality Act
City	City of Newport Beach
cy	cubic yard
EIR	Environmental Impact Report
ERM	effects range median
Federal Channels	Lower Newport Bay Federal Channels
FS	factor of safety
LA-3	LA-3 Ocean Dredged Material Disposal Site
MLLW	mean lower low water
NEPA	National Environmental Policy Act
OMMP	Operations, Management, and Monitoring Plan
PCB	polychlorinated biphenyl
RGP 54	Regional General Permit 54
TMDL	Total Maximum Daily Load
USACE	U.S. Army Corps of Engineers

1 Introduction

1.1 Purpose

This Basis of Design Report (BODR) was prepared by Anchor QEA, LLC, on behalf of the City of Newport Beach (City) to support the upcoming maintenance dredging efforts at the Lower Newport Bay Federal Channels (herein referred to as Federal Channels). The overall intent of the maintenance dredging is to achieve current federally authorized design depths throughout Lower Newport Bay. Figure 1-1 shows a vicinity map of Newport Beach and the project location.

Based on recent sediment suitability evaluations, most of the dredged material is suitable for offshore disposal at approved open ocean or nearshore placement sites. However, the remaining sediment is considered unsuitable for open ocean or nearshore placement and requires an alternative disposal option. Anchor QEA is supporting the City and U.S. Army Corps of Engineers (USACE) with the engineering design, environmental documentation, and development of management requirements for the material's placement and permanent confinement in a subaqueous confined aquatic disposal facility (CAD facility) within the Federal Channels.

There are no cost-effective alternatives for disposal of unsuitable sediments in southern California currently. While an upland landfill exists, its use is less practical for the following reasons:

- **Cost-benefit differential**: The total expenditure to dispose to an upland landfill is much more expensive compared to placing sediments within a CAD facility, LA-3, or the nearshore placement area due to offloading, dewatering, re-handling, transport, and disposal costs.
- **Environmental and community toll**: Hauling unsuitable sediments to an upland landfill could cause significant environmental and community effects due to the number of trucks hauling this material over city and state roadways.

Therefore, this BODR presents the basis for designing and constructing a unique solution to this problem where resources of the City and USACE are combined into one large innovative project. As a key component to this larger project, a CAD facility is constructed to contain sediment that is otherwise unsuitable for open ocean and nearshore disposal. This approach is far more cost effective than landfilling, as it requires minimal transportation costs, no tipping fees, and no need for sediment re-handling. The CAD facility is proposed near the center of Lower Newport Bay between Bay Island, Lido Isle, and Harbor Island, as illustrated in Figure 1-2. The CAD facility will be excavated to a sufficient size and depth to hold the material unsuitable for open ocean disposal from the Federal Channels.

Excavating the CAD facility will produce clean, sandy materials that can be placed at a predetermined nearshore placement area or at LA-3 Ocean Dredged Material Disposal Site (LA-3). Subsequently, sediments dredged from the Federal Channels that are not suitable for open ocean or nearshore placement will be placed within the CAD facility. This material would then be covered with clean

sediments, which can be obtained from the remainder of the Federal Channels and possibly augmented by sand from additional sources (e.g., elsewhere in Lower Newport Bay—as permitted under the City's Regional General Permit 54 [RGP 54] program—or from the Santa Ana River that borders Newport Beach and Huntington Beach, California).

Additional capacity has been included in the design to accommodate additional material from Lower Newport Bay that is not suitable for open ocean or nearshore disposal. The CAD facility will be completed and closed by placing an appropriately thick layer of clean material to function as a permanent confining cap.

1.2 Design Objective

Field studies and engineering analyses have been conducted by Anchor QEA, acting as a technical design consultant to the City and USACE, to evaluate the overall technical feasibility of this project, to investigate key technical details associated with the proposed work, to evaluate necessary design features and a feasible construction approach, and to develop and implement a permitting strategy for the various parties. Anchor QEA has prepared this BODR on behalf of the City and in close coordination with the USACE, Los Angeles District.

Key technical details that were investigated included the subsurface conditions and soil types within and near the proposed location of the CAD facility, the required size of the CAD facility, the ability of the CAD facility to provide long-term isolation of sediments, the stability of the CAD facility dredging and adjacent features, the equipment types that would be associated with the project, and the overall permitting strategy. Furthermore, numeric modeling has been used to evaluate potential scour forces acting on the various surface cap layers that will be installed, including an assessment of wind waves, storm waves, vessel wakes, and propeller wash forces from vessels passing through. All analyses have purposefully been conducted using reasonably conservative assumptions and engineering judgment to design the CAD facility to continue to function properly over the long term.

This BODR documents these analyses and their results. Construction drawings and technical specifications for the Federal Channels maintenance dredging and CAD facility will be included following further design development and once the City's California Environmental Quality Act (CEQA) environmental review process is complete.

1.3 Basis of Design Report Organization

The remaining sections of this BODR are organized as follows:

- **Section 1: Introduction**. This section describes the purpose and objectives of the BODR.
- **Section 2: Maintenance Dredging of Federal Channels**. This section describes overall site and sediment characteristics and provides an overview of the dredging requirements for the Federal Channels.

- **Section 3: Sediment Disposal Alternatives**. This section includes a feasibility review of various sediment disposal alternatives for materials both suitable and unsuitable for open ocean or nearshore placement. This includes the alternative sediment placement strategy of confined aquatic disposal.
- **Section 4: Concept for CAD Facility in Lower Newport Bay**. This section describes how a CAD facility could be constructed and managed within Lower Newport Bay and a rationale for where it should be located to minimize impacts and costs while maximizing its benefit.
- **Section 5: Design of CAD Facility for Long-Term Environmental Protection**. This section describes the technical basis for the design of the CAD facility dredging, filling, and overall protectiveness, including discussions of the following:
  - Ability of capping material to isolate contaminants of concern in underlying sediments
  - Stability of capping material against erosive forces and anchoring
  - Stability of CAD facility dredging and adjacent facilities
  - Consolidation of sediments in the CAD facility over time
  - Protection against bioturbation
- **Section 6: Engineering Analysis of CAD Facility Dredging and Filling**. This section provides information on the engineering analyses conducted as part of the design of the CAD facility.
- **Section 7: Short-Term Water Quality Impacts from Construction**. This section evaluates potential short-term water quality impacts from construction and sediment disposal.
- **Section 8: Permitting Strategy**. This section describes the permitting process for the CAD facility.
- **Section 9: Construction Sequencing and Anticipated Schedule**. This section provides information on the anticipated construction sequencing and schedule for the Federal Channels and CAD facility construction.
- **Section 10: Operations, Management, and Monitoring Plan**. This section describes the management and monitoring processes to be employed during dredging as well as long-term monitoring of the CAD facility.
- **Section 11: References**. This section provides references for the materials cited in this BODR.

The following appendices are supplemental documents to the BODR:

- Appendix A: 2019 Bathymetric Condition Survey
- Appendix B: Sampling and Analysis Program Report
- Appendix C: Utility Location Report (RES 2012)
- Appendix D: Chemical Isolation Cap Analysis
- Appendix E: Vessel Scour Analysis
- Appendix F: Geotechnical Investigations
- Appendix G: Analysis of Short-Term Water Quality Impacts During Construction
- Appendix H: Operations, Management, and Monitoring Plan

2 Maintenance Dredging of Federal Channels

2.1 Site and Project Background

Newport Bay occupies the oceanward end of the Newport Bay/San Diego Creek watershed, located in Central Orange County in the southwest corner of the Santa Ana River Basin, about 35 miles southeast of Los Angeles and 70 miles north of San Diego (Figure 1-1). The watershed encompasses 154 square miles and includes portions of the cities of Newport Beach, Irvine, Laguna Hills, Lake Forest, Tustin, Orange, Santa Ana, and Costa Mesa. Mountains encircle the watershed on three sides; runoff from these mountains drains across the Tustin Plain and enters Newport Bay via San Diego Creek.

Newport Bay is a combination of two distinct waterbodies, Lower and Upper Newport Bay, that are divided by the Pacific Coast Highway Bridge. Most of the commercial and recreational boating occurs in Lower Newport Bay, which is highly developed. Upper Newport Bay has a diverse mix of development in its lower reach and an undeveloped ecological reserve in its upper reach.

2.2 Navigational Needs and Authorized Depths in the Federal Channels

The USACE is responsible for maintaining authorized navigation depths for navigational purposes within federally defined channels in Lower Newport Bay. Figure 2-1 illustrates the authorized limits and depths of the Federal Channels, which have been subdivided into different areas (dredge units) based on historical nomenclature, anticipated dredge volumes, and sediment suitability for open ocean disposal. Authorized design depths within the Federal Channels range from -10 to -20 feet mean lower low water (MLLW;). Table 2-1 includes information on the authorized depths for dredge units proposed for dredging as part of the Federal Channels dredging program.

Table 2-1
Authorized Depths for Dredge Units within the Federal Channels

Federal Channels Dredge Unit	Authorized Depth (feet MLLW)
Entrance Channel	-20
Main Channel North 1 through 5	-20
Turning Basin	-20
Bay Island Area	-15
Newport Channel 1 through 3	-15

Note:
1. Areas within the Federal Channels that are authorized to -10 feet MLLW are not proposed for maintenance dredging.

2.3 Previous Dredging and Disposal Activities

In 2009, in preparation for maintenance dredging activity in Lower Newport Bay, the USACE commissioned a dredged sediment evaluation for nine federal channels within Lower Newport Bay to determine their suitability for open ocean disposal at LA-3 (Newfields 2009). After reviewing this evaluation, the Dredged Material Management Team determined that most sediments from the Federal Channels were suitable for ocean disposal except those representing portions of Main Channel North, Bay Island Middle (below -13 feet MLLW), and Balboa Channel due to elevated mercury concentrations. In 2012 and 2013, large portions of the Federal Channels were dredged to depths of -10 to -17 feet MLLW. Sediment unsuitable for open ocean disposal was placed at the Port of Long Beach's Middle Harbor Fill Site, and the remaining majority of dredged sediment was placed at LA-3.

2.4 Current Maintenance Dredging Needs

Updated harbor-wide multibeam surveys were performed by the USACE in July 2019 (Appendix A). The resulting data were processed to generate a bathymetric map which indicates that dredging is required in multiple areas to achieve authorized design depths, as summarized in Figure 2-1.

Areas that require the most dredging include the Entrance Channel, Main Channel North 1 through 5, Bay Island Area, Turning Basin, and Newport Channel 1 through 3 (Figure 2-1). Dredging each of these areas is estimated to result in the sediment volumes summarized in Table 2-2, which includes dredging to the authorized design depths, plus 2 feet of overdredge allowance.

Because most of the Turning Basin is already at design depth, only the shoaled spots around the periphery of the Turning Basin are proposed for dredging. Therefore, a design depth of -19 feet MLLW, plus 2 feet of overdredge allowance, is applied for the Turning Basin.

Table 2-2
Estimated Dredging Volumes and Suitability for Ocean or Nearshore Placement

Federal Channels	Design Depth (feet MLLW)	Estimated Volume to Design Depth (cy)	2-Foot Overdredge Allowance Volume (cy)	Total Volume (cy)	Suitable for Open Ocean Disposal (cy)	Not Suitable for Open Ocean Disposal or Nearshore Placement (cy)
Entrance Channel	-20	51,700	19,200	70,900	70,900[1]	0
Main Channel North 1	-20	36,600	26,600	63,200	43,200	20,000
Main Channel North 2	-20	37,600	23,200	60,800	40,400	20,400
Main Channel North 3	-20	44,600	38,800	83,400	83,400	0
Main Channel North 4	-20	28,300	26,700	55,000	55,000	0
Main Channel North 5	-20	50,200	39,600	89,800	89,800	0
Turning Basin	-19	5,200	14,300	19,500	0	19,500
Bay Island Area	-15	210,900	135,900	346,800	346,800	0
Newport Channel 1	-15	28,300	18,700	47,000	0	47,000
Newport Channel 2	-15	85,800	39,600	125,400	125,400	0
Newport Channel 3	-15	54,200	24,600	78,800	78,800	0
Totals		**633,400**	**407,200**	**1,040,600**	**933,700**	**106,900**

Notes:
All volumes include 3H:1V perimeter side slopes.
Volumes are based on the June 2018 conditional survey conducted by the USACE for the City.
1. Suitable for nearshore placement and open ocean disposal

2.5 Suitability of Sediments in Federal Channels for Open Ocean or Nearshore Disposal

In December 2017, the City—as the local sponsor—initiated a sediment characterization study to determine the suitability of proposed dredged sediment from the Federal Channels for open ocean disposal at the LA-3 offshore disposal site. Sediment from the Entrance Channel was also evaluated to determine compatibility for nearshore placement at beaches north of the harbor entrance and up to the Santa Ana River.

Sediments from the Federal Channels were characterized in 2018 and 2019 (Anchor QEA 2019). Sediment sampling locations and corresponding core logs are included in the *Sampling and Analysis Program Report* (Anchor QEA 2019), which is provided as Appendix B. In general, the sediment to be removed from the Federal Channels consists of silts underlain by silty sands. Trace shells were encountered in the silty sand layer.

Grain size analysis was conducted on composited samples within each dredge area to provide information on the physical characteristics of the sediments. In general, composited sediment from the areas sampled consisted primarily of fines (68.6% to 98.2% silt and clay) except for the Entrance Channel (98.1% sand).

Chemical testing of the sediments indicated multiple contaminants of concern, including mercury, DDTs, and polychlorinated biphenyls (PCBs). Areas of the Federal Channels with elevated concentrations include the following:

- Mercury exceeded the effects range median (ERM) value in sediment from the Turning Basin; Main Channel North 1, 2, and 3; and Newport Channel 1.
- Total DDTs exceeded the ERM value in all areas except the Entrance Channel.
- Total PCBs exceeded the ERM in the Turning Basin.

Based on the Dredged Material Management Team's review of sediment chemistry results and effects-based testing (i.e., toxicity and bioaccumulation), sediments from Main Channel North 3, 4, and 5, Bay Island Area, Newport Channel 2 and 3, and the Entrance Channel were deemed suitable for open ocean disposal (Figure 1-2). Grain size of the Entrance Channel and proposed nearshore placement area (Newport Pier to the West Newport Jetty) were similarly evaluated to determine compatibility, indicating that sediments from the Entrance Channel are also suitable for nearshore placement.

However, due to elevated concentrations of mercury and/or PCBs, the Turning Basin, portions of Main Channel North 1 and 2, and Newport Channel 1 were deemed not suitable for open ocean disposal (Figure 1-2). These sediments require an alternate disposal option where the sediments are

sufficiently isolated from contact with marine organisms. Table 2-2 includes the estimated volumes of sediments suitable and unsuitable for open ocean disposal within the Federal Channels.

2.6 Existing Utilities

Ten utilities were identified during past dredging projects within Lower Newport Bay. Existing utilities include cable and water that traverse locations where Federal Channels maintenance dredging will occur. The City has been working with AT&T and Southern California Edison to remove all de-energized cables that lie within the footprint of the Federal Channels maintenance dredging. It is anticipated that these cables will be removed during the Federal Channels maintenance dredging. Table 2-3 includes a list of the known utilities within the Federal Channels maintenance dredging footprint identified by the dredging contractor prior to the 2012 Federal Channels dredging program (Appendix C). Prior to the Federal Channels dredging, the contractor will be required to conduct a new utility locate investigation.

Table 2-3
Existing Utilities Within the Federal Channels Maintenance Dredging Footprint

Utility Company	Utility Type	Location in Federal Channels
Southern California Edison	Cable	Newport Channel 2
AT&T	Cable	Bay Island Area
AT&T	Cable	Bay Island Area
City	Water	Main Channel North 2
Southern California Edison	Cable	Bay Island Area
AT&T	Cable	Main Channel North 4
AT&T	Cable	Main Channel North 4
City	Water	Main Channel North 4
City	Water	Main Channel North 5
AT&T	Cable	Main Channel North 5
Southern California Edison	Cable	Entrance Channel

Note:
Further information is provided in Appendix C to the BODR.

3 Sediment Disposal Alternatives

The project originates from the need to identify a cost-effective solution for the disposal of suitable and unsuitable sediments in Federal Channels. Past maintenance dredging efforts included the combination of ocean disposal, nearshore placement, and disposal of unsuitable sediment at a fill site located in the Port of Long Beach, California. Unfortunately, this fill site is not an option for this round of maintenance dredging and thus other cost-effective options need to be considered. Disposal alternatives evaluated for the project are discussed in Sections 3.1 and 3.2.

3.1 Sediments Suitable for Open Ocean or Nearshore Placement

3.1.1 Open Ocean Disposal

Based on the sediment characterization described in Section 2, select sediment from Main Channel North1 and Main Channel North 2 and all sediment in the Entrance Channel, Main Channel North 3, Main Channel North 4, Main Channel North 5, Bay Island Area, Newport Channel 2, and Newport Channel 3 are suitable for open ocean disposal (Table 2-2; Figure 1-2). These sediments underwent testing per the *Evaluation for Dredged Material Proposed for Ocean Disposal: Testing Manual* (USEPA and USACE 1991).

Open ocean disposal is a cost-effective alternative that is widely used at maintenance dredging projects in southern California. Because ocean-disposed dredged sediment does not require a re-handling step, sediment can be dredged and placed directly into a bottom-dump barge, hauled to one of several U.S. Environmental Protection Agency-managed open ocean disposal sites, and discharged. The closest open ocean disposal location to Newport Harbor, located approximately 6 miles to the south (Figure 1-1) from the Entrance Channel, is the LA-3 offshore placement site.

3.1.2 Beneficial Reuse

Promoting beneficial reuse of dredged sediment is considered a national goal of the resource agencies. Beach renourishment, frequently used by USACE in southern California, is one example of sediment reuse, but other possibilities include the use of dredged sediment in the development or manufacturing of commercial, industrial, horticultural, agricultural or other products. Reuse of dredged sediment can be categorized into the options presented in Table 3-1.

Table 3-1
Typical Options for Dredged Sediment Reuse

Description	Example
Landfilling	Daily cover
Landscaping	Grading/topsoil
Agricultural	Amendment to farms
Reclamation	Mines/quarries/brownfields
Engineered fill	Parking lots/roads/embankment

Many of the options in Table 3-1 require additives and/or treatment of the sediment, at least one re-handling step, and significant amounts of available area for the processing equipment and sediment stockpiling. There are also many processing technologies that can be used to increase the suitability of dredged material, particularly for materials that are impacted to some degree by contaminants of concern, including the following:

- Sand separation (hydrocyclones)
- Composting (biosolids or cellulose)
- Solidification/stabilization (e.g., cement, lime, fly ash)
- Soil washing (BioGenesis)
- High-temperature thermal treatment (e.g., Ecomelt, lightweight aggregate, bricks)

Typically, such approaches have proven to be cost-prohibitive for projects of this magnitude because they require the construction of large treatment facilities on site to process the material. This is particularly problematic in Lower Newport Bay, a densely populated public/private harbor where readily available upland space immediately adjacent to the harbor shoreline is extremely limited or nonexistent.

3.1.3 Beach Nourishment

Beach nourishment can be a more practical use case than the reuse options listed above in Table 3-1 for Lower Newport Bay sediments that are free of chemical contaminants and have comparable grain size and aesthetic characteristics to that of the beach under consideration. Sandy sediments with appropriate characteristics can be placed on eroding beaches or in nearshore areas to widen, build-out, and/or protect the ocean-facing beach areas.

Based on the sediment characterization for the Federal Channels maintenance dredging, sandy sediment from the Entrance Channel has chemical and physical characteristics deemed as suitable for nearshore nourishment.

3.2 Sediments Not Suitable for Open Ocean or Beach/Nearshore Placement

Options exist for disposing of sediments that are determined not suitable for open ocean disposal, including upland landfill disposal and confined aquatic disposal. These options range in application and associated costs and are discussed in further detail in Sections 3.2.1 and 3.2.2.

3.2.1 Upland Landfill Disposal

For sediments that do not qualify for open ocean disposal, beneficial reuse, or beach nourishment, more costly disposal scenarios must be considered. One commonly used alternative is to haul the sediment to an upland permitted landfill facility. Two factors to consider in determining the suitability of a specific permitted landfill for disposal of dredged sediment are the concentration of contaminants in the sediment and the total quantity of sediment to be disposed. In addition, the dredged sediment disposed at a landfill typically needs to pass the "paint filter" test, which requires that the sediment must be sufficiently dewatered after dredging to prevent drainage during transport and to minimize excess infiltration during disposal.

The concentration of contaminants in dredged sediment determines its waste type and therefore the class of landfill that can accept the material. In California, landfills are identified as Class I, II, or III:

- Class I landfills can accept materials that are classified by the State of California as hazardous wastes under Title 22 of the California Code of Requirements (CCR).
- Class II landfills are similar in design to Class I landfills but accept only designated waste that has been determined to be below hazardous waste criteria concentrations.
- Class III landfills can accept sediment with relatively lower concentrations of contaminants depending on the individual landfill design and location. Each Class III site operator must maintain a certification with the California State Integrated Waste Management Board specifying the facility's waste acceptance criteria and testing requirements in accordance with applicable state and federal discharge regulations.

Sediments in the Federal Channels that are not suitable for open ocean disposal meet the qualifications for disposal at a Class III landfill. This alternative, however, is very expensive for several reasons. First, the sediment must be dewatered prior to transport in order to meet the paint filter test. The dewatering can be accomplished either actively using a mechanical dewatering device (e.g., belt presses, centrifugation, hydro cyclones, or via additives) or passively by constructing a large containment area to hold the sediment until the water evaporates or drains. Next, the sediment must be trucked or shipped via truck or railcar to the landfill. Lastly, the sediment would be subjected to a tipping fee similar to any other waste product that the landfill receives.

Costs, while high, are not the only perceived disadvantage of upland landfill disposal for Federal Channels sediments unsuitable for open disposal. A potentially more significant factor on the greater public is the effect of numerous truck hauling trips, carrying chemically impacted sediments, over City streets and roads for an extended period of time. This activity will pose impacts on noise, emissions, traffic, public street use, and increased wear and tear on road surfacing. For example, at 12 cy per truck, approximately 8,900 truck trips would be required to dispose Federal Channels sediments unsuitable for open ocean disposal without factoring any bulking by the addition of sediment additives for dewatering purposes. Furthermore, about 1 to 2 acres will need to be set aside for the project duration to allow for transfer of sediments onto land, their stockpiling, dewatering and drying, water treatment, truck staging, and placement into the trucks; the Lower Newport Harbor area does not currently have any areas well suited to this purpose.

3.2.2 Alternative Sediment Placement Strategy: Confined Aquatic Disposal

Because of the high costs and environmental impacts associated with upland landfill disposal, an alternative management strategy is desirable for Lower Newport Bay sediments that are not otherwise suitable for open ocean disposal, reuse, or beach placement. The City therefore has committed to evaluating potential alternative disposal techniques and locations.

Sediment disposal guidance for the region is available, as contaminated sediment management options in southern California have been studied thoroughly and documented in two key regional documents: the Los Angeles Contaminated Sediments Task Force Long-Term Management Strategy (CSTF 2005) and the Los Angeles Regional Dredged Material Management Plan (Everest and Anchor QEA 2009). These documents address not only the sediment disposal options already discussed in this section, but also the application of a novel (but not unprecedented) strategy: the use of confined aquatic disposal.

Development of a CAD facility has been shown to be an effective long-term management solution for chemically impacted sediment under the right set of conditions. A CAD facility is constructed underwater by excavating a depression into the existing seabed into which sediment can be placed, and then it is capped with a sufficient type and thickness of clean material (e.g., imported sand or dredged sediment) to keep the underlying sediments permanently isolated from the environment.

The CAD facility concept has been used successfully locally, including the following projects listed below in southern California over the last 20 years:

- At Port Hueneme, which was jointly developed by the U.S. Navy, the USACE, and the Oxnard Harbor District
- At the City of Long Beach (North Energy Island Borrow Pit)

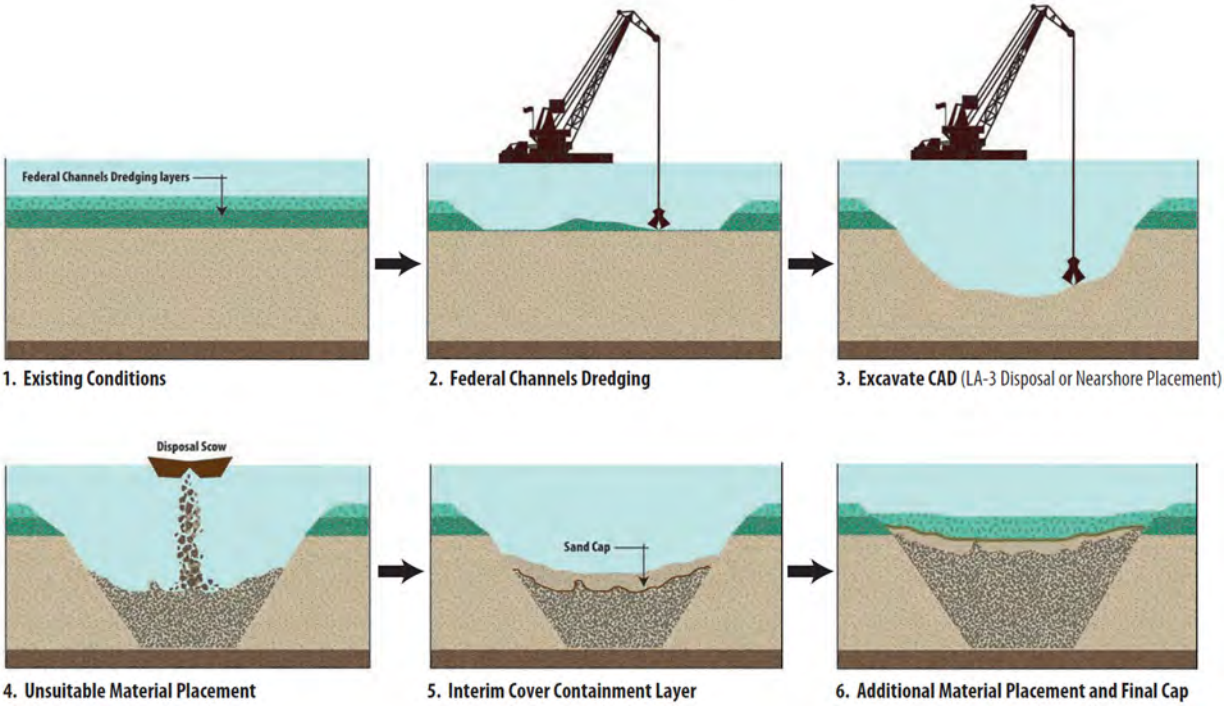
In addition, multiple CAD facilities have been constructed across the country—including harbors in Boston, Massachusetts; Providence, Rhode Island; the Puget Sound Naval Shipyard in Bremerton, Washington; the St. Louis River–Duluth Tar Site, Duluth, Minnesota—and internationally (e.g., a Hong Kong airport; Fredette 2005).

In 2009, the City performed a Feasibility Study for dredged sediment and determined that constructing a CAD facility in Lower Newport Bay was the most cost-effective alternative for managing the City's contaminated sediment (Anchor QEA 2009). In addition, CAD facilities are viewed favorably by regulatory agencies as potential alternatives for management of chemically impacted sediments. Lower Newport Bay offers a unique opportunity to develop a CAD facility in large part for the following reasons:

- Newport Harbor is large enough to accommodate such an approach.
- The sediment that would be removed to create the confined aquatic disposal depression appears to be a good match for nearby beaches—which are in need of nourishment—and would provide a low-cost disposal alternative for suitable sands dredged from within the CAD facility.

This alternative also has the advantage of requiring no rehandling, as unsuitable dredged sediments can be placed directly into a bottom-dump haul barge, moved over the CAD facility, and dropped into the depression, similar to the process that would be used for open ocean disposal (and with a much smaller transportation distance). It provides a cost-effective solution for otherwise unsuitable dredging sediment required to be dredged from the Federal Channels by greatly shortening the sediment haul distance.

Illustration 1
CAD Construction Overview



4 Concept for CAD Facility in Lower Newport Bay

As discussed in Section 3, of the disposal options introduced for otherwise unsuitable sediments, the CAD facility alternative has the greatest potential to be cost effective and environmentally appropriate for Lower Newport Bay. Its cost effectiveness results primarily from the negligible sediment haul distance, the fact that no sediment pretreatment is necessary, and the lack of landfill tipping fees. Furthermore, costs for dredging of the CAD facility can be partially lessened by the reuse of dredged sediment (as appropriate) for a nearby nearshore placement location in Newport Beach.

The basic concept for the CAD facility is that it be excavated to a selected depth and size and then be filled with sediments dredged from the Federal Channels that are not suitable for open ocean or nearshore disposal. These sediments would be overlain by a cap layer consists of clean material that is intended to permanently isolate the underlying sediments from the waters of Newport Bay and the environment.

In order to increase the benefits of the CAD facility for the Newport Beach community, the City also intends to provide additional capacity for subsequent placement of materials dredged from other locations within Lower Newport Bay, which are also unsuitable for open ocean or nearshore disposal. The CAD facility would thereby accommodate additional fill volume from future maintenance dredging projects conducted as part of the City's RGP 54 program as well as sediment that is not covered as part of the program and thus requires an alternative disposal option. At this stage of the design, the City considers 50,000 cy to be a reasonable target capacity for this nonfederal sediment.

During the time that the CAD facility is open (i.e., during placement of the unsuitable material in the CAD facility), the City and its residents would have an initial opportunity to place material dredged from outside the federal navigation channels into the CAD facility; this would be permitted through either the City's RGP 54 program or through an Individual Permit.

Approximately 2 years following construction of the CAD facility and placement of an interim cover containment layer, there would be a second opportunity during a 6-month period for the City and its residents to place material determined unsuitable for unconfined ocean disposal in the CAD facility. The combined total allowance for the initial and second opportunity would be 50,000 cy. If there is remaining capacity (within this 50,000 allowance) at the end of this 6-month period, the City and its residents would be able to place material from the RGP 54 Plan Area determined suitable for unconfined ocean disposal in the CAD facility. This opportunity would provide a more cost-effective and convenient disposal location within the harbor and would bolster the CAD facility's final cap layer.

Figure 4-1 depicts a cross section of the CAD facility concept. The final elevation of the CAD facility infill would be restricted to an elevation that is at or below the water depths necessary for navigation within the harbor.

4.1 Determination of Suitable CAD Location in Lower Newport Bay

Potential CAD facility locations were selected based on preliminary feedback from the City's Harbor Commissioners. The Harbor Commissioners recommended siting the CAD facility next to or within locations where sediment was determined unsuitable and would require placement in the CAD facility. While the recommendation was integral to the siting process, other factors were evaluated that included analysis of geotechnical data to demonstrate CAD facility excavation compliance with current engineering standards and practices, suitability of material for beneficial reuse, feasibility to design and construct the CAD facility based on the volume of sediment to be managed in the CAD facility, logistics during construction, disruption to existing harbor moorings, anchorages, navigation and the public, and public outreach.

The open and relatively large area near the center of Lower Newport Bay—between Lido Isle, Bay Island, and Harbor Island—appears best suited to a CAD facility, as it provides a sufficiently large area in which to excavate the CAD facility and fill it with the appropriate volumes of sediment and capping material. Figure 4-2 shows a plan view of the proposed location and its relation to surrounding harbor features. Additional factors that led to the selection of this location for the CAD facility include its relatively central location within Lower Newport Bay and proximity to the Main Channel, reducing overall transit distances for dredged sediments and providing access for deeper water that allows the barges to be filled to their capacity. This in turn reduces construction duration, costs, and emissions from barge travel due to tugboat operations.

Figure 4-2 shows a plan view of the CAD facility and existing mooring fields and anchorage area used for temporary, short-term anchoring only. The City would coordinate with the public if any vessels within the public mooring area require relocation during construction. In addition, it is anticipated that the anchorage area would be temporarily relocated to the Turning Basin during construction as the City previously did during 2012 Federal Channels dredging.

One known utility (Southern California Edison 12Kv Submarine Cable) requires removal to facilitate the dredging of the CAD facility. The submarine cable, presumed to be currently de-energized, would be removed prior to or during construction of the CAD facility.

The next step is to develop the appropriate scientific and engineering design details for the CAD facility to fully and permanently isolate sediments unsuitable for open ocean disposal from the environment and to avoid any disruptions to the ongoing and future uses of Lower Newport Bay. The evaluation of these details, which results in the fill thicknesses and elevations depicted in Figure 4-1, are the subject of Section 5.

5 Design of CAD Facility for Long-Term Environmental Protection

Section 5 describes the various scientific studies and engineering analyses that were conducted to evaluate and design a permanent cap layer for a CAD facility in Lower Newport Bay that would allow it to physically contain and chemically isolate sediments unsuitable for open ocean disposal. This section also details the development of engineering design elements that are essential for the long-term environmental protectiveness of a CAD facility situated in Lower Newport Bay. A properly designed capping layer—to provide long-term isolation of underlying chemically impacted sediments—requires consideration of several factors and must follow established national standards for CAD facility design and use. In particular, the USACE has published guidance on designing CAD facilities and cap layers to permanently isolate chemically impacted sediments from overlying waters and the environment (Palermo et al. 1998a, 1998b).

The following subsections describe scientific and engineering evaluations involving long-term environmental isolation of sediments below a material cap:

- **Section 5.1** discusses potential erosive forces acting on the CAD facility's surface from the movements of vessels and mooring anchorages in Lower Newport Bay.
- **Section 5.2** discusses protection against bioturbation from burrowing organisms and biota residing in the overlying water column under long-term scenarios.
- **Section 5.3** discusses modeling analyses conducted to predict the ability of surficial capping sediment to chemically isolate the underlying sediments.
- **Section 5.4** integrates the previously described analyses to develop the selected design of the environmentally protective final cap layer and considers possible material sources for the final cap layer.
- **Section 5.5** presents an overview of studies of regional and underlying groundwater aquifers and their positions and depths relative to the CAD facility, focusing on the CAD facility's overall protectiveness of existing groundwater resources.

5.1 Protection Against Physical Disturbance

Vessels travelling over the proposed CAD facility produce propeller-generated currents (i.e., propeller wash) whose magnitude at the seabed depends on vessel characteristics and water depths. Vessels with larger operating power and propeller size in combination with shallower water depths would result in relatively larger forces upon the seabed. As a result, exposure to propeller wash may scour the CAD facility surface material, depending on the sediment properties, tide conditions, and vessel characteristics. This section summarizes the evaluation of the physical stability of the CAD facility surface under various elevations to better understand how vessels may impact the CAD facility's cap.

5.1.1 Propeller Wash

A propeller wash scour model was used to estimate scour depths from propeller wash and evaluate impacts to the CAD facility's surface physical stability and thickness.

Propeller wash scour depths were estimated at three elevations—interim cover containment layer at -30 feet MLLW, material outside the Federal Channels at -25 feet MLLW, and final cap layer elevation at -22 feet MLLW—that are intended to represent a range of fill and cap elevations within the CAD facility. Representative sediment properties were determined based on sediment data (collected in 2013 and 2019) from the proposed cap sources (Anchor QEA 2013, 2018, and 2019). Hydrodynamic conditions based on water levels were evaluated using representative tide conditions (i.e., mean higher high water and MLLW) and one extreme condition (i.e., lowest observed water). Commonly used vessels in Lower Newport Bay were analyzed and included the following:

- Sailboats (50- and 70-feet)
- Tugboat
- Charter boat (e.g., Hornblower)
- Powerboats (90- and 135-feet)

Vessel characteristics from the list above were used to calculate propeller wash velocities, including vessel draft, propeller diameter, and operating power. For the top of each fill and cap layer in the CAD facility, combinations of water levels and vessel operating power were used to provide a range of propeller wash velocities. The corresponding scour depths were then estimated based on the properties of the fill surface existing in the CAD facility at that point.

At an elevation of -25 feet MLLW—the surface of the layer with a combination of sediments under the City's RGP 54 program, along with sediment not covered as part of the City's RGP 54 program—propeller-induced scour depths will be negligible for vessel operations at 25% power. At 50% power, the scour depth is estimated to be 0.1 foot during low tide conditions when water levels are less than 0 foot MLLW. Over the duration of the material placements for this layer, impacts from vessel traffic over the proposed CAD facility are expected to be minimal.

Initially, material placement will have negligible impacts from propeller wash due to the deeper water depths and likely remain negligible most of the time. Propeller-induced scour depths of about 0.1 foot could start occurring at the completion of the interim cover containment layer. After the designed elevation for this layer is achieved, the CAD facility surface will be stable given the relatively small scour depths. Impacts to this layer from vessel traffic may be minimized by limiting the time between completion of this layer and placement of the final cap layer.

Maximum scour depths of the final cap layer are estimated to range from 0.1 to 0.3 foot, which occur at water levels less than 0 foot MLLW. Vessels that may impact the final cap layer include the tugboat, charter boat, 90-foot powerboat, and 135-foot powerboat.

Full details of the scour analysis are provided in Appendix E.

5.1.2 Anchoring Does Not Permanently Affect CAD Facility Surface

The proposed CAD facility would be located near the Newport Harbor Yacht Club mooring area and within a portion of the harbor's anchorage area between Lido Island and Bay Island, so it is expected that vessel anchoring will occur within the CAD facility and capped area footprint. Private vessels anchoring in this area of Lower Newport Bay are likely to penetrate up to one foot into the seabed. However, repeated anchoring events of this sort over time are not considered to cause any permanent effect on the cap integrity. As described in the *Guidance for Subaqueous Dredged Material Capping* (Palermo et al. 1998a), for areas traveled by recreational vessels such as Lower Newport Bay, the impact area from anchoring tends to be relatively small, and after anchors are removed, the area disturbed by the anchor is quickly filled back in by surrounding clean cap sediments and new accumulation.

In the short-term temporary timeframe, individual anchoring events will only disturb the uppermost portion of the cap. Previous studies of ship anchoring (Maushake 2013; Anchor QEA 2016a) have shown that even for vessels much larger than those typically anchoring in Lower Newport Bay (e.g., a 960-foot cargo ship with a 18,000-pound AC-14 anchor), the anchors are only likely to penetrate approximately 2 feet into the seabed, significantly less than the planned cap thickness for the CAD facility in Lower Newport Bay. In reality, the smaller vessels in Lower Newport Bay use smaller anchor types (Ultra anchors; up to 350 pounds), which penetrate more shallowly into the seabed surface.

5.2 Protection Against Bioturbation

In soft bottom marine substrates, bioturbation is the mixing and overturning of sediments caused by organisms residing in the sediments (i.e., benthic organisms). Consistent with Palermo et al. (1998a, 1998b), cap thickness design needs to include a component of thickness that is sufficient to prevent substantial bioturbation of sediments underlying the cap. As such, a cap intending to isolate sediments unsuitable for open ocean disposal should have a thickness greater than or equivalent to the depth where the future bioturbation rate is expected to be close to zero.

A common method of estimating the lower extent of bioturbation (to determine adequate cap design thickness) is to examine those organisms present or likely to be present at the site and identify the deepest burrowers. Applying the most extreme estimate of burrowing depth for a given location tends to be an overly conservative approach because many burrowing organisms are primarily suspension feeders that do little to mix or churn the sediment on a continual basis.

In terms of relative abundance, diversity, and biomass, the majority of benthic organisms reside in the upper 4 to 6 inches of the surface sediments (Berner 1980), which is commonly referred to as the mixed zone. Bioturbation is expected to decrease rapidly below the mixed zone and approaches zero at greater depths where it is so sporadic or infrequent that it is inconsequential and immeasurable.

Although uncommon, in some situations, a small amount of mixing may occur at greater depths because some organisms burrow in sediments deeper than 6 inches. Ghost shrimp (*Neotrypaea californiensis*) and other shrimp of this genus are known to burrow to considerable depths in sediments. However, the preferred habitat for dense beds of ghost shrimp is sandy or muddy intertidal to extremely shallow subtidal estuarine bays. The proposed final cap layer for the CAD facility would be more than 20 feet deep, well below the preferred depth range for burrowing ghost shrimp. Existing regional information collected during 12 years of monitoring at a similar CAD facility in Long Beach indicates that a genus of *Neotrypaea* was present, but only in very low densities (about 1 per 10 square feet), and their presence on the cap did not result in burrows deep enough to affect the integrity of the final cap layer (Anchor QEA 2016b).

Altogether, these factors suggest that substantial bioturbation by ghost shrimp is not expected at the proposed CAD facility location. For the CAD facility proposed at Lower Newport Bay, a more appropriate design depth for bioturbation is estimated as 6 inches where most benthic organisms reside.

5.3 Protection Against Chemical Breakthrough

Chemical isolation modeling was conducted following U.S. Environmental Protection Agency and USACE guidance to simulate the transport of mercury, DDTs, and PCBs through the final cap layer (Palermo et al. 1998a). Model simulations were performed to assess the performance of the cap over a 100-year period. Model-predicted concentrations 6 inches below the surface of the final cap are predicted to remain below the porewater criteria (California Toxics Rule for porewater) and sorbed phase criteria (ERM) for more than 100 years. The model used to evaluate the performance of the interim and final caps and the results are presented in Appendix D.

5.4 Selection and Rationale for Final Cap Layer Material and Thickness

Results of the previously presented analyses indicate the following thickness requirements for the cap layers:

- Up to 0.3 foot (3.6 inches) to protect against scour disturbance from vessel prop wash
- Six inches to protect against bioturbation
- Successful prevention of chemical breakthrough at a depth below the anticipated scouring depth

For the final cap layer, an additional 2 feet of thickness would be included, so that the specified thickness is 3 feet (36 inches). This is significantly greater than the minimum cap thickness required per the analyses conducted, thus providing additional distance between benthic organisms and the underlying sediment and an environmentally conservative, purposefully overdesigned approach to the final cap layer design. Additional overdesign features, such as additional cap thickness, could be readily incorporated initially or in the future, if appropriate.

It is expected that the final cap layer could be sourced from various locations within Lower Newport Bay, including Newport Channel 3 and the Entrance Channel. As such, analyses were conducted using the physical and chemical characteristics at both locations, and each location was determined as a suitable source for the final cap layer. Other potential sources exist, including clean sediments dredged under the City's RGP 54 program or future maintenance dredging efforts at Santa Ana River, though additional analyses would be required prior to approving these as appropriate cap sources.

5.5 Protection of Existing Groundwater Resources

The area of the planned CAD facility was evaluated for its proximity within and/or above significant groundwater sources and aquifers. The interpretation of the hydrogeology of the area was based on previous studies conducted at sites around Newport Beach and regionally.

The main source of groundwater in Orange County is the Main Groundwater Basin, which covers approximately 350 square miles and lies primarily under the Lower Santa Ana River Watershed. However, near the coast at Lower Newport Bay, most of the groundwater wells are in the surrounding area to the north and east of Newport Beach. The local groundwater regime in and around Lower Newport Bay does not have significant aquifers with the capability of producing more than a small amount to a domestic well or stock watering well (COCWMA 2012). Furthermore, the surrounding area of Orange County extracts groundwater from an aquifer that lies at depths of as much as 180 feet below the area, which is well below the depth of the proposed CAD facility.

The lack of groundwater production and use in the Lower Newport Bay area, and the relative depth of the aquifer in the region, suggest that the CAD facility would not affect groundwater resources. The lack of actively used aquifers and the relative depth of the Orange County main groundwater basin also suggest that negligible groundwater upwelling is expected in and through the CAD facility.

6 Engineering Analysis of CAD Facility Dredging and Filling

The following subsections describe the engineering analyses conducted as part of the design of the Lower Newport Bay CAD facility:

- **Section 6.1** discusses the physical and geotechnical properties of materials in which the CAD facility would be situated and the material's apparent suitability for beach placement.
- **Section 6.2** describes the selection of a stable angle of inclination for the CAD facility.
- **Section 6.3** discusses the process of filling the CAD facility with sediments and considerations related to the material's compression and stability.
- **Section 6.4** combines the results of the preceding analyses to determine target dimensions and depths of the CAD facility, as necessary, to contain the required volume of sediment and cap layers.

6.1 Sediment Types to be Dredged to Create CAD Facility

The local geology of Newport Bay consists of crystalline granular soils overlain by sequences of more recently deposited alluvial, fluvial, and marine sediments, which are the typical targeted materials for dredging activity. Myriad studies of subsurface conditions have been conducted over the past 15 years near the proposed location for the CAD facility, including the following:

- Geotechnical investigation in 2005 at Bay Island for a proposed seawall rehabilitation project
- Geotechnical investigation in 2009 for CAD facility locations during the feasibility stage of the project: Borings were conducted in Newport and Main Channel
- Sediment sampling in 2018 and 2019 to below the design depth of the Federal Channels limits to determine the extent of the non-native and native sediment

Locations of the geotechnical investigations and sediment sampling within the footprint of the CAD facility are shown in Figure 6-1. Sections 6.1.1 through 6.1.3 provide summaries of the three investigations and their findings. Detailed reports from each investigation event are provided in Appendix F.

6.1.1 2005 Bay Island Seawall Geotechnical Investigations

Bay Island is an island southwest of the proposed location for the CAD facility. In 2005, a geotechnical investigation was conducted for the proposed Bay Island Sea Wall and Bridge Rehabilitation Project (Diaz Yourman & Associates 2007). Borings were conducted at five locations around Bay Island as well as on each side of the bridge that connects Bay Island with Balboa Peninsula. Boring depths ranged from approximately 8 to 80 feet deep.

Information from this geotechnical investigation provides evidence on the subsurface characteristics of Lower Newport Bay in the general region of the CAD facility. Four of the borings (Bay Island

Seawall Boring 01, 02, 03, and 05) are located less than 1,000 feet from the center of the proposed CAD facility.

Generally, the geotechnical investigation concluded that the soils around Bay Island consist of silty sands to poorly graded sands underlain by sandstone. No bedrock was encountered in any of the explorations, including areas adjacent to the planned dredging depth of the CAD facility. The geotechnical report is included in Appendix F.

6.1.2 2009 Geotechnical Investigation for CAD Facility Feasibility Evaluation

In 2009, two borings were conducted—one in Newport Channel and other located in the Main Channel—to understand the subsurface conditions as part of a previously proposed CAD facility feasibility evaluation for the City (Anchor QEA 2009). Results indicated that the predominant sediment type present was fine to medium sand between and below the likely range of depths that would be excavated for a CAD facility, a sediment type that would likely be well suited for nearshore placement. Chemical analyses were also conducted on these sediments for several different analytes. All concentrations were below effects range low and ERM values. (Boring logs and laboratory results from the 2009 feasibility study [Anchor QEA 2009] are included in Appendix F.)

6.1.3 Additional Sediment Sampling in 2018 and 2019

As part of 2018 and 2019 sediment suitability investigations for the Federal Channels, several sediment cores were collected with vibracoring equipment in the proposed location of the CAD facility to below the dredging depths planned for the Federal Channels. Three cores were collected in the footprint of the proposed CAD facility location, and six cores (three to the north and three to the south) were collected nearby. Depths of the cores ranged from approximately -11 feet MLLW to -20 feet MLLW. Two distinct sediment types were apparent: an upper layer of soft silts and clays, underlain by a dense fine sand (Anchor QEA 2019). Field logs and grain size reports are included in Appendix F for sample locations within the CAD facility footprint.

6.1.4 Conclusions Regarding Suitability of Dredged Sediment for Beach Nourishment

According to the existing physical and chemical characteristics of the sediments within the CAD facility location, the sediments are suitable for open ocean disposal. Confirmatory sampling during construction for grain size is expected to be required in the technical specifications of the construction documents to determine the acceptability of sediments at nearshore placement areas. Because material below the upper layer of soft silts and clays may be relatively consolidated, the dredging contractor will need to be prepared to break up clumped or blocky materials (such as by use of a grizzly or other mechanical device) prior to nearshore placement or open ocean disposal.

6.2 Side Slopes of CAD Facility Dredging

Slope stability of the CAD facility dredging was evaluated using standard engineering methodology: the limit equilibrium method applied using the Rocscience Slide v2018.0 software package. The limit equilibrium method calculates a factor of safety (FS) for stability of a given slope as the resisting force (i.e., soil strength) divided by the driving force (i.e., weight of the soil mass plus other external loads). The FS was computed for a suite of assumed trial "slip surfaces" that were identified using a search routine in the software. The search routine iteratively optimized the geometry of the slip surfaces until the lowest FS was identified, and that surface was identified as the "critical" slip surface.

The target FS is the minimum recommended FS for long-term and short-term stability evaluations and is based on recommendations presented by USACE (2003) and Duncan and Wright (2005). The analysis concluded that a post-dredged slope of 2.5H:1V for the CAD facility would have an FS of 1.4, which exceeds the minimum recommended short-term FS of 1.3 (USACE 2003; Duncan and Wright 2005), indicating a sufficient level of stability during the period that the CAD dredging would be open and not yet completely filled.

6.3 Engineering Analysis of CAD Facility Filling

Sections 6.3.1 and 6.3.2 provide information on additional geotechnical analysis conducted on the cap stability and placement methods. In addition, compression of sediment was estimated after placement within the CAD facility to understand settlement of dredged material within the CAD facility.

6.3.1 Sediment Placement Methods

Rapid or irregular placement of ~~s~~ediment could potentially lead to instability of the CAD facility's underlying materials. This can be controlled by limiting the rate or methods of material placement. The technical specifications would require the contractor to place sediments in the CAD facility in individual layers that are of reasonably uniform thickness and free of large mounds. The contractor would be required to open the bottom-dump barge gradually in a controlled manner to minimize mixing of freshly placed sediment with previously placed material.

The contractor would be required to place sediment in individual lifts that are no more than 5 feet thick across the entire footprint of the CAD facility. Each lift would have no more than a 2-foot variation in its surface elevation. Surveys will be conducted throughout the placement process to verify the variance across the CAD facility as lifts progress. Frequent surveys were an effective quality assurance and control measure during material placement at the Port Hueneme CAD facility, If variance is outside the tolerance of the specifications, the contractor will be required to conduct corrective measures to be approved by the engineer.

6.3.2 Compression of Sediment After Confinement in CAD Facility

Sediment would be likely placed in the CAD facility by releasing it from a bottom-dump barge. Although the sediment would undergo some degree of initial "bulking" during the dredging and dumping process, this increase in volume is expected to be short in duration as additional sediment is added to the CAD facility and compresses the previously placed materials. During the placement of subsequent sediment and capping layers, the sediment is expected to undergo both initial and long-term consolidation. Based on expectations regarding the current (in situ) and post-excavation physical properties of the dredged sediment, the total amount of sediment consolidation is predicted to be 2 to 6 feet relative to its initial in situ volume. This consolidation of sediments could provide future opportunities to increase the thickness of the final cap layer if its thickness is observed to decrease over time. In addition, the expected compression of the CAD facility could provide the City with additional "overdesign" opportunities via future clean sediment dredging and placement, which would further increase the thickness of the clean final cap layer.

6.4 Selection of CAD Facility Size, Dredge Depth, and Clean Sediment Cap Elevation

The CAD facility size, depth, and final cap thicknesses were designed to achieve the following goals:

- Accommodates the full volume of sediment determined unsuitable for open ocean disposal that is dredged during the Federal Channels maintenance dredging
- Allowance for additional volume to accommodate materials dredged from outside the Federal Channels
- Allowance for a sufficiently thick final cap layer
- Allowance for sufficient water depth at the proposed location of the CAD facility

Once filled, the top elevation of the final cap layer needs to be deep enough to avoid precluding marine traffic in the area while accommodating the possibility of future harbor deepening activities. In the future, this area could be deepened to an elevation -20 feet MLLW (to match the adjacent Main Channel North 3 design depth), which would result in dredging to depths of -20 to -22 feet MLLW when a 2-foot allowance for overdredging is considered. This is deeper than the currently authorized depth of -15 feet MLLW within the proposed location of the CAD facility. It is desirable to maintain the top elevation of the final cap at or below this elevation range to avoid having the capping material inadvertently dredged during future maintenance dredging. Therefore, the highest extent of the final cap layer would be restricted to no more than -22 feet MLLW elevation.

The primary element in designing the CAD facility is to determine an appropriate volume capacity that is sufficient to contain the necessary volume of sediment to be deposited within it. Figure 4-1

shows a typical cross section through the CAD facility, incorporating the following individual layers, listed from bottom (deepest) to top (shallowest):

- Placement of 106,900 cy of Federal Channels sediment determined unsuitable for open ocean disposal
  - For this stage in the design, an additional 10% contingency has been included in this layer to be conservative, bringing the total dredged to approximately 117,600 cy.
- Placement of enough clean material to create a 1-foot-thick interim cover containment layer
- Placement of as much as 50,000 cy of sediment within Lower Newport Bay but outside the Federal Channels (permittable and not permittable under the City's RGP 54 program)
  - This would occur over predetermined time frames (pending agency approval) to allow for City residents and City maintenance dredging projects to take advantage of the CAD facility as a local solution for disposal.
- Placement of enough capping material for final isolation to create a final cap layer that is at least 3 feet thick

6.4.1 Effects of Sediment Consolidation

The volume occupied by sediment within the CAD facility would change over time because it occupies a larger volume in its initially "bulked" state and then gradually consolidates to lesser volumes. As a result, the sediment surface within the CAD facility may appear to be artificially "high" immediately after its placement, but subsequent settlement is to be expected and some of which would occur as the filling proceeds.

The volume of sediment initially placed within the CAD facility may undergo temporary "bulking," occupying a volume that is 20% higher than after compression has occurred. Over time, a consolidation analysis indicates that the placed materials within the CAD facility could undergo 2 to 6 feet of compression from its original pre-dredge volume, which may ultimately result in the CAD facility having additional volume capacity above those estimated here. The gap in time between the initial placement of sediment unsuitable for open ocean disposal and final clean sediment cap should provide enough time for the consolidation to occur (see Section 9 for additional information on construction sequencing). The final elevation of the CAD facility is designed to accommodate material to a final surface elevation of -22 feet MLLW. Sediment settlement would drop the final surface farther below this limiting elevation, thus providing additional capacity.

6.4.2 Selection of CAD Dimensions

The CAD facility dredging needs to have the following:

- Adequate sizing to contain the minimum estimated volume of sediment produced as a result of the various project components (as listed in Section 6.4)
- A final top surface that is no higher than -22 feet MLLW (as discussed previously)

A geometric analysis of a trapezoidal-shaped CAD facility with a base footprint of 435 feet by 435 feet, 2.5H:1V side slopes, and a base elevation of up to -46 feet MLLW will have about 222,400 cy of capacity below an elevation -22 feet MLLW. At the top of the CAD facility (-15 feet MLLW), the footprint is 590 feet by 590 feet. This footprint fits between Lido Isle, Bay Island, and Harbor Island, and it is well offset (more than 200 feet) from adjacent waterside facilities and seawalls.

It is expected that maintenance dredging within the Bay Island Area would take place prior to the CAD facility dredging. If the design depth of -15 feet MLLW plus 2 feet of overdredge is achieved during this phase of the maintenance dredging, the total dredging of the CAD facility itself (-17 feet MLLW down to a bottom elevation of -45 feet MLLW, plus 1 foot of overdredge allowance) would equate to approximately 282,400 cy.[1] If no dredging takes place within the Bay Island Area, the total dredging of the CAD facility itself from the existing mudline of approximately -13 feet MLLW to -45 feet MLLW, plus 1 foot of overdredge allowance, equates to approximately 340,700 cy based off the conditional survey conducted by the USACE in June 2018.

Additional details on the Federal Channels dredging and CAD facility design will be included in the construction drawings and technical specifications.

[1] For this stage of the design, maintenance dredging in Bay Island Area is expected to dredge to the full 2 foot overdredge allowance (-17 feet MLLW). If the contractor only dredges to the design depth (-15 feet MLLW), an additional 25,000 cy of dredging would be required.

7 Short-Term Water Quality Impacts from Construction

Short-Term Fate (STFATE) model scenarios were developed, executed, and evaluated to estimate the potential for sediment drift and loss of material during fill operations at the proposed CAD facility in Lower Newport Bay. The model includes the ability to evaluate potential water quality impacts relative to applicable water quality standards (e.g., California Toxics Rule saltwater continuous concentration). Results from five distinct scenarios were evaluated to estimate depositional patterns within the CAD facility during various tidal currents and the potential for water quality exceedances. The five scenarios evaluated are as follows:

1. The first scenario represented the layer of material consisting of sediment from areas determined unsuitable for open ocean disposal within the Federal Channels.
2. The second scenario represented the layer of material consisting of sediment from areas identified for use as either an interim containment layer or final cap layer from the Federal Channels program.
3. The third scenario represented the layer of material consisting of sediment determined unsuitable for open ocean disposal within the boundaries of the RGP 54 Plan Area.
4. The fourth scenario represented sediment from the Federal Channels identified as an alternative source for an interim containment layer or final cap layer (sediments associated with the Entrance Channel).
5. The fifth scenario represented material consisting of sediment from within Main Channel North 1 that was determined unsuitable for open ocean disposal and contained the greatest amount of fine-grained materials.

Key findings from these model simulations are as follows:

- There are no restrictions of placement events during neap tides (i.e., first and third quarters of the moon).
- During spring tides, best management practices should be implemented to limit placement events during non-peak tidal current velocities (i.e., plus or minus 2 hours from slack tide; Figure G-3 in Appendix G) to limit the horizontal distribution of fill material.
  - Disposal events occurring during non-peak ebbing tides result in 10% to 21% of material lost outside the proposed CAD facility.
    - Most of the material lost outside the proposed CAD facility would deposit within 75 feet (one model grid cell)
    - The greatest amount of material lost outside the proposed CAD facility occurred during ebbing tides when placement of material suitable for use as an interim cover containment layer or final cap layer (Scenarios 2 and 4) was occurring. Because this material would be sequenced after placement of unsuitable material, any material from Scenarios 2 and 4 deposited beyond the boundaries of the

proposed CAD facility would act as thin layer cover over any unsuitable material that may have been "lost" from the proposed CAD facility.

  - Disposal events occurring during non-peak flooding tides result in 6% to 9% of material to be lost outside the proposed CAD facility.
- The maximum observed thicknesses of deposited material ranged from 1.3 to 2.3 feet within the model grid cell directly associated with the placement location. Deposit thicknesses rapidly decreased in adjacent model grid cells (within 75 feet).
- The water quality standards for dissolved copper, dissolved mercury, and total PCBs were not violated.
- The water quality standard for total DDx was exceeded during the modeled disposal events for all material types. However, predicted water quality concentrations after 4 hours of material placement from Scenarios 1, 2, 3, and 4 were equal to the existing background water quality concentration (0.00130 micrograms per liter [µg/L]), and predicted water quality concentrations after 4 hours of material placement from Scenario 5 were only 0.0003 µg/L greater than background.
  - Predicted water column concentrations for total DDx do not exceed the Lower Newport Bay organochlorine compounds Total Maximum Daily Load (TMDL) acute water quality targets; however, they do exceed the TMDL's chronic water quality targets.
  - The removal, placement, and containment of DDx-contaminated Lower Newport Bay sediments at the proposed CAD facility provide a greater benefit than any short-term water quality impacts.
- Water quality monitoring following placement of materials from Scenarios 1 through 4 (listed above) may have limited practicality because predicted total DDx concentrations are similar to typical method detection limits currently achieved by regional analytical laboratories. Predicted total DDx concentrations following placement of materials from Scenario 5 (listed above) were greater than typical method detection limits. Strategies to minimize the volume of material from Scenario 5, such as mixing with material from other dredge units, should be used to minimize water quality impairments.

The full assessment and associated results and discussion are provided as Appendix G.

8 Permitting Strategy

Dredging of the USACE Federal Channels and CAD facility are subject to CEQA and NEPA review. The City is acting as the lead CEQA agency, and the USACE is acting as the lead NEPA agency. The process of obtaining project approvals and permits is complex, and the information presented in this section is intended only as a general summary of the permitting process for the project.

The first step of the City's CEQA process and the USACE NEPA process was to develop appropriate CEQA and NEPA documentation for the project.

The USACE is responsible for NEPA compliance for the Federal Channels maintenance dredging component of the overall project and is preparing a supplement to their existing Environmental Assessment. As the lead federal agency, and as part of the Federal Channels maintenance dredging, the USACE has assumed responsibility for coordinating with resource agencies such as the National Marine Fisheries Service and California Department of Fish and Wildlife and ensuring compliance with requirements of statutes such as the Endangered Species Act and the Magnuson-Stevens Fishery Conservation and Enhancement Act. In addition, the USACE assumed the lead role in addressing cultural and historic resource issues, including requirements of Section 106 of the National Historic Properties Act. The USACE will also be obtaining a federal consistency determination from the California Coastal Commission, which satisfies requirements of the Coastal Zone Management Act and Clean Water Act (Section 401) water quality certification from the Santa Ana Regional Water Quality Control Board.

Identification, design, permitting, and construction of an alternate disposal location is the responsibility of the City of Newport Beach as the local sponsor. In November 2019, the City released a Notice of Preparation and Initial Study, which initiated preparation of an Environmental Impact Report (EIR) under CEQA. The EIR will address construction of the CAD facility, dredging of unsuitable material and placement in the CAD facility, dredging of suitable material from within the Federal Channels to support the interim cover containment layer and final cap layer, and dredging of additional material from outside the Federal Channels. Following completion of the EIR public notice, the City will submit permit applications to the following agencies:

- **Coastal Development Permit:** The California Coastal Commission is the agency responsible for this permit.
- **Standard Individual Permit:** USACE will be the Lead Agency for the Rivers and Harbors Act Section 10 and Clean Water Act Section 404 permits as well as associated consultations for Endangered Species Act and Essential Fish Habitat. Additionally, pursuant to 33 United States Code 408 (Section 14 of the Rivers and Harbors Act of 1899, as amended) review under Section 408 will be required approval of any proposed activity that might interfere with, injure, or impair the use of a river or harbor improvement project. This approach furthers the

USACE's interest, expressed throughout the Rivers and Harbors Act of 1899, in protecting the navigability of United States waters by prohibiting the use or alteration of navigation or flood control works where contrary to the public interest or where it would impair those works' usefulness.

- **Clean Water Act Section 401 Water Quality Certification**: A Clean Water Act Section 401 Water Quality Certification will be required by the Santa Ana Regional Water Quality Control Board.
- **Surface Lease Agreement**: A Surface Lease Agreement may be required from the California State Lands Commission.

This permitting strategy has been coordinated extensively with the USACE in addition to the various regulatory agencies; however, pending additional public feedback during the CEQA EIR process and through subsequent coordination with the regulatory agencies, this permit strategy may be updated and revised.

9 Construction Sequencing and Anticipated Schedule

Section 9 describes the recommended construction sequencing for the Federal Channels maintenance dredging and CAD facility construction. The production rates, durations, and construction sequence reflected in Section 9 are based on professional judgment, similar project experience, and knowledge of the existing conditions in Lower Newport Bay.

9.1 Recommended Project Sequence

It is expected that the maintenance dredging portion of the project would be accomplished under a USACE contract and take place as several discrete dredging, disposal, and sediment placement events. The City would be responsible for the dredging of the CAD facility and all ancillary costs associated with the CAD facility dredging (e.g., surveys and water quality monitoring). These two projects (though independent) would require close coordination and planning during construction. It is anticipated that the CAD facility would be included in the final design for the Federal Channels project to accommodate the unsuitable sediment in Main Channel North 1, Main Channel North 2, the Turning Basin, and Newport Channel 1. Newport Channel 3 was selected for the interim cover containment layer and final cap layer due to its chemical composition and proximity to the proposed CAD facility location.[2]

The following list provides the recommended sequence of events to accomplish the goals of both projects (Sections 9.3 through 9.8 detail the processes for accomplishing each step):

- **Phase 1 (Section 9.3):** Entrance Channel Dredging and Placement in Nearshore Placement Area
- **Phase 2 (Section 9.4):** Lower Newport Bay Federal Channels Dredging (Suitable for Open Ocean Disposal) and Placement at LA-3
- **Phase 3 (Section 9.5):** CAD Facility Dredging and Placement at Nearshore Placement Area or LA-3
- **Phase 4 (Section 9.6):** Federal Channels Dredging (Unsuitable for Open Ocean Disposal) and Placement at CAD facility
- **Phase 5 (Section 9.7):** Newport Channel 3 Dredging and Placement in CAD Facility for Interim Cover Containment Layer
- **Phase 6 (Section 9.8):** Dredging Outside the Federal Channels and Placement in CAD Facility (To Be Conducted After Completion of Federal Channels)
- **Phase 7 (Section 9.9):** Newport Channel 3 Dredging and Placement in CAD Facility for Final Cap Layer (To Be Conducted After Completion of Federal Channels)

[2] If the City identifies additional sources for the final cap layer, material will require testing and confirmation that the sourced material meets the performance criteria of sediments tested and modelled as part of this BODR.

9.2 Debris Removal

No debris within the Federal Channels were identified during the conditional survey conducted by the USACE in 2018. If debris is encountered during any elements of the dredging process, debris would be removed mechanically and placed onto a flat deck barge for appropriate disposal. Remnant timber piles would be required to be removed in their entirety, to the extent feasible. Debris would be transported to an on-site offloading location (e.g., at the end of the Rhine Channel) and placed into trucks for final transport and disposal at an approved disposal site.

9.3 Entrance Channel Dredging and Placement at Nearshore Placement Area

Approximately 70,900 cy of sediment will be dredged from the Entrance Channel in 2020 as part of the Federal Channels maintenance dredging project. The dredged sediments will be disposed of at an approved nearshore placement area. The volume estimates are based on a dredging template that includes dredging from the existing mudline to an authorized depth of -20 feet MLLW (plus 2 feet of overdredge allowance). The design slopes of the Entrance Channel are set at 3H:1V to minimize sloughing of material.

In addition to the Entrance Channel dredging, it is expected that the USACE will repair rock revetment along the jetties of the Entrance Channel during this phase of the project. However, it is outside the scope of this design and therefore not included in the BODR.

9.3.1 Equipment

Maintenance dredging projects typically use mechanical dredges (crane utilizing a clamshell) to conduct dredging. Dredged sediments are placed into a bottom-dump barge, then the barge is transported to the nearshore placement area where the sediment is dumped within a predefined location.

9.3.2 Anticipated Production Rate

The dredging production rate (i.e., the volume of dredged materials removed per hour) for a crane utilizing a clamshell bucket was estimated for purposes of developing a schedule for Entrance Channel dredging. Factors that impact dredging productivity vary with equipment, site characteristics, and weather conditions. Production rates may be higher in some areas of the site and lower in others, depending on sediment type, water depths, and the presence of debris. In addition, production rates may also be impacted by turbidity control requirements stipulated in the permits.

The following assumptions were made to estimate the dredge production rate:

- Size of clamshell bucket is 15 to 18 cy

- Cycle time (i.e., the time to close the bucket with dredged material, pull it out of the water, place the dredged sediment into the barge/offloading area, and return the bucket to the water for the next dredge cut) equals 60 seconds per cycle
- Uptime (i.e., the time that the dredge is working, excluding routine maintenance, unexpected maintenance, dredge positioning, encountering unexpected debris, and the need to periodically switch out the barges used to transport dredged material) equals 70%
- Bucket load equals 60% in situ sediment and 40% water by volume

The assumptions in the aforementioned bullet list are based on engineering judgment, familiarity with harbor conditions, and discussions with dredging contractors. It is further assumed that dredging operations would be conducted 6 days per week for 10 hours a day, yielding a production rate of approximately 5,000 cy per day. This results in a total estimated dredging duration of approximately 15 days for the project for a total removal volume of 70,900 cy. The project schedule for dredging depends on the additional time required for mobilization and demobilization (including installation and removal of the turbidity barrier system, if required) and the number of dredges used, among other factors.

9.3.3 Dredging Limits

The dredging limits are defined by the target dredging surface and the horizontal limits of removal. Dredging limits, which define the volume and current disposition of sediment that must be removed, are defined by the Federal Channels limits. The development of the target dredging surface involves identifying the surface of the native sediment underlying the sediment to be dredged and specifying a cut back slope around the perimeter to minimize sloughing of materials into the dredging area. The horizontal dredging limit for the footprint was defined by the Federal Channels plus any additional extent resulting from side slopes. The design slopes of the Federal Channels dredging are set at 3H:1V to minimize sloughing of material. The vertical dredging limit was limited to an elevation of -20 feet MLLW (plus 2 feet of overdredge allowance).

9.4 Lower Newport Bay Federal Channels Dredging (Suitable for Open Ocean Disposal) and Placement at LA-3

Prior to dredging the CAD facility, it is expected that additional areas with sediment suitable for open ocean disposal (including Main Channel North 1 through 5, Bay Island Area, and Newport Channel 2) will be dredged and disposed at LA-3. Based on bathymetric data collected by the USACE in June 2018, approximately 784,000 cy of suitable sediment will be dredged from these locations as part of Federal Channels maintenance dredging. The dredged sediments will be disposed at an open ocean disposal site (LA-3). The volume estimates are based on a dredging template that includes dredging from the existing mudline to an authorized depth between -15 feet MLLW and -20 feet

MLLW (plus 2 feet of overdredge allowance). The design slopes are set at 3H:1V to minimize sloughing of material.

9.4.1 Equipment

Dredging mechanically using a crane (or other suitable equipment) mounted on a flatdeck barge has been selected as the preferred dredging method based on an evaluation of Federal Channels conditions. The mechanical dredge will be equipped with a clamshell bucket or equivalent for soft material. The specific make and model of the bucket to be employed (to be determined by the selected contractor) will be based on the sediment types present and the dredging requirements. However, due consideration will be given to the ability of the selected bucket and associated equipment to keep turbidity generation to within acceptable limits given the expected turbidity monitoring requirements at the Federal Channels and sediment characteristics.

Dredged sediment removed from the water will be placed into a split-hull material barge. Once filled, the split-hull material barge will transport the dredged sediment to LA-3 for disposal using a tender for power and maneuvering.

9.4.2 Anticipated Production Rate

The dredging production rate is assumed to be approximately 5,000 cy per day (i.e., the production rate used in Section 9.3.2 for clamshell dredging). This results in a total estimated dredging duration of approximately 157 days for the project with a total removal volume of 784,000 cy. The project schedule for dredging depends on the additional time required for mobilization and demobilization (including installation and removal of the turbidity barrier system) and the number of dredges used, among other factors.

9.4.3 Dredging Limits

The horizontal dredging limits for sediment suitable for open ocean disposal within Main Channel North 1 through 5, Bay Island Area, and Newport Channel 2 are defined by the Federal Channels and public and private marinas and jetties. The vertical dredging is set to an elevation between -15 feet MLLW and -20 feet MLLW with an overdredge allowance of 2 feet. The slopes are set at 3H:1V to minimize sloughing of material. The total dredging volume of Federal Channels sediment that is suitable for open ocean or nearshore placement is listed in Table 2-2.

9.5 CAD Facility Dredging and Placement at Nearshore Placement Area or LA-3

Based on bathymetric data collected by the USACE in June 2018, approximately 282,400 cy of sediment will require removal and disposal. Bay deposits will be transported to LA-3 for open ocean disposal and sand material (greater than 80%) will be transported to a predetermined nearshore

placement area along Newport Beach. The selection of design dimensions and volume capacity of the CAD facility is discussed in detail in Section 6.4.2.

9.5.1 Equipment

The contractor that will be selected to dredge in the previous section will likely be the same contractor that conducts the CAD facility dredging. Therefore, it is expected this dredging will occur with a mechanical dredge equipped with a clamshell bucket and split-hull barge for placement at an approved nearshore placement area or LA-3.

According to the sediment samples collected within the CAD facility footprint, silty material may be present to approximately -18 feet MLLW, which may require disposal at LA-3 pending sediment testing. Most of the sediment within the CAD facility footprint is expected to be sand and acceptable for placement at an approved nearshore placement area. In situ testing and monitoring of the dredge sediment will be required for confirmation of suitability for beach placement and will be included in the technical specifications.

9.5.2 Anticipated Production Rate

The dredging production rate is assumed to be approximately 5,000 cy or more per day (i.e., the production rate used in Section 9.3.2 for clamshell dredging). This results in a total estimated dredging duration of approximately 57 days for the project with a total removal volume of 282,400 cy. The total project schedule for dredging depends on the additional time required for mobilization and demobilization (including installation and removal of the turbidity barrier system, if required), and the number of dredges used, among other factors.

9.5.3 Dredging Limits

The dredging limits for the CAD facility are defined by the target dredging surface and the horizontal limits of removal. Dredging limits were determined by the following (see Section 6.4):

- The capacity necessary to contain dredged sediment from the Federal Channels that is unsuitable for open ocean disposal
- Additional sediment from Lower Newport Bay that is unsuitable for open ocean disposal
- An appropriate interim cover containment layer
- A final cap layer

The horizontal dredging limit for the CAD facility is designed to be within the boundary of the Bay Island Area and the dredge footprint of the Federal Channels. The vertical dredging limit is an elevation of -46 feet MLLW (includes 1 foot of allowable overdredge) to stay well above the principal aquifer in Newport Beach. The design slopes of the CAD facility dredging are set at 2.5H:1V to minimize sloughing of material while reducing the overall footprint of the CAD facility.

9.6 Federal Channels Dredging (Unsuitable for Open Ocean Disposal) and Placement at CAD Facility

Approximately 117,600 cy of sediment unsuitable for open ocean disposal (includes 10% contingency) will be removed from the Turning Basin, Main Channel North 1, Main Channel North 2, and Newport Channel 1. Volume estimates for select areas within Main Channel North 1 and North 2 that were determined unsuitable for open ocean disposal are based on a dredging template that includes dredging to the authorized depth of -20 feet MLLW with a 2 foot overdredge allowance. The Turning Basin volume estimates are based on a dredging template that includes an authorized depth of -19 feet MLLW with a 2 foot overdredge allowance. Newport Channel 1 volume estimates are based on a dredging template that includes an authorized depth of -15 feet MLLW with a 2 foot overdredge allowance.

9.6.1 Equipment

It is likely that the contractor selected to conduct maintenance and CAD facility dredging would also dredge the Federal Channels. Therefore, it is expected this dredging will occur with a mechanical dredge equipped a clamshell bucket and bottom-dump barge for placement within the CAD facility.

9.6.2 Anticipated Production Rate

The dredging production rate is assumed to be approximately 5,000 cy per day (i.e., the production rate used in Section 9.3.2 for clamshell dredging). This results in a total estimated dredging duration of approximately 24 days for the project with a total removal volume of 117,600 cy. The total project schedule for dredging depends on the additional time required for mobilization and demobilization (including installation and removal of the turbidity barrier system, if required) and the number of dredges used, among other factors.

9.6.3 Dredging Limits

The horizontal dredging limits for sediment unsuitable for open ocean disposal within Main Channel North 1 through 5, Turning Basin, and Newport Channel 1 are defined by the Federal Channels plus any additional extent resulting from side slopes. The vertical dredging limit was limited to an elevation of -15 feet MLLW and -20 feet MLLW with an overdredge allowance of 2 feet. The slopes are set at 3H:1V to minimize sloughing of material.

9.6.4 Dredging Volumes

Based on bathymetric data collected by the USACE in 2018 at Main Channel North1, Main Channel North 2, Turning Basin, and the Newport Channel 1 (Appendix A) and recent sampling performed by Anchor QEA (Appendix B), it is estimated that approximately 106,900 cy of dredged sediment will be removed from these locations. These volumes have been increased by 10% (117,600 cy) to provide a

more conservative capacity within this layer. Volumes for sediment unsuitable for open ocean disposal in Main Channel North 1, Main Channel North 2, Turning Basin, and the Newport Channel 1 are summarized in Table 2-2.

9.7 Newport Channel 3 Dredging and Placement at CAD Facility for Interim Cover Containment Layer

After sediments unsuitable for open ocean disposal have been removed and placed within the CAD facility, a 1-foot-thick interim cover containment layer will be placed to provide physical protection of the underlying sediments from any erosive forces imposed from vessel uses above. It is anticipated that interim cover containment layer would be sourced from the Federal Channels (e.g., Newport Channel 3) as the maintenance dredging continues. Approximately 9,900 cy of cover material will be required from the Federal Channels maintenance dredging to provide a 1-foot-thick interim cover containment layer. This could be achieved in a few days using a mechanical dredge with a clamshell bucket.

9.8 Dredging Outside Federal Channels and Placement at CAD Facility

As mentioned in Section 6.4, the CAD facility capacity was designed to accommodate additional sediment from Lower Newport Bay dredged outside of the Federal Channels and either permitted or not permitted under the City's RGP 54 program. This additional capacity has been estimated at approximately 50,000 cy. Sourcing for this sediment will be coordinated amongst the applicants, the City, and agencies but could include the following:

- Public and private marinas that do not pass chemical testing for open ocean disposal under the City's RGP 54 program
- City marinas that are not included under the RGP 54 program (Balboa Yacht Basin, Promontory Bay, etc.)

The City has agreed to develop a Sediment Management Plan for sediment that is unsuitable for open ocean disposal and outside of the Federal Channels. At this stage of the design, it is assumed that the capacity limit for sediment is 50,000 cy.

Dredging is anticipated to be conducted using smaller mechanical dredging equipment with bottom-dump barges. Contractors will be required to follow the same permit conditions as those required under the larger CAD facility dredging and disposal project to minimize impacts to water quality and ensure accurate disposal within the CAD facility footprint. The contractors will also be required to obtain approval under the City's RGP 54 program or Individual Permit process.

Due to the timing uncertainties for this component of the project, the construction schedule in Section 9.9 expects this dredging to take place 2 years after the interim cover containment layer is placed. Production and duration will vary between projects and as such are not included in the

BODR. Instead, a 6-month period is expected to be included after the 2-year period has passed to allow City applicants to obtain permits for their respective projects.

9.9 Newport Channel 3 Dredging and Placement at CAD Facility for Final Clean Cap Layer

After the dredging window for public and City projects closes, the final cap layer will be placed in the CAD facility by the City to chemically isolate the underlying sediments from burrowing organisms and biota residing in the overlying water column. This clean sediment cap has been designed to a thickness of 3 feet, equating to approximately 33,600 cy of additional sediment sourced by the City. Sourcing for this capping material would be coordinated between the City and agencies prior to construction. For this stage of the design, it is expected that the final cap layer will be sourced from undredged material within Newport Channel 3. Other sources to be considered include future dredging at the Entrance Channel, sediments dredged under the City's RPG 54 program, and maintenance dredging at the Santa Ana River.[3] This final cap layer could be constructed in 1 to 2 weeks using a mechanical dredge with a clamshell bucket.

If both the interim cover containment layer and final cap layer are sourced from Newport Channel 3, approximately 35,300 cy of material will remain within Newport Channel 3 after both layers have been placed within the CAD facility. To achieve the authorized designed depth plus 2 feet of overdredge allowance, additional dredging and disposal at LA-3 would be required within Newport Channel 3.

9.10 Construction Schedule

A draft construction schedule is presented in Figure 9-1. This schedule—developed based on current design knowledge, professional judgment, and experience from other similar projects—may be modified as part of subsequent design development. CAD facility placement activities discussed in Sections 9.8 and 9.9 are estimates since the time frame for these activities would be determined after consultation with the City and agencies. As such, it is expected that these two layers would be completed as separate projects.

[3] If the City identifies additional sources for the final cap layer, material will require testing and confirmation that the sourced material meets the performance criteria of sediments tested and modelled as part of this BODR.

10 Operations, Management, and Monitoring Plan

An Operations, Management, and Monitoring Plan (OMMP) has been developed to present the City's planned approach for managing the site as a disposal facility for use by the City and USACE during a single combined dredging project. The OMMP, provided as Appendix H, includes the following elements:

- Overview of the OMMP objectives, establishment of the OMMP, and the proposed CAD facility description (Sections 2 to 4)
- Discussion of the legal authority and responsibility for the City to operate a CAD facility within Lower Newport Bay (Section 3)
- Discussion of associated regulatory permits needed for creation and operation of the CAD facility (Section 5)
- Explanation of communications plan and operating requirements for site use (Section 6)
- Presentation of an environmental monitoring program (Section 7)
- Details for proposed annual reporting (Section 7)
- Discussion of contingency plans to address unexpected construction issues or long-term stability should they become a concern (Section 8)

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Exhibit 5