Eelgrass Transplant and Monitoring Plan in Support of the Inner Cabrillo Beach Eelgrass Mitigation Project Port of Los Angeles, California

INTRODUCTION

The Port of Los Angeles (Port) is proposing to develop an eelgrass mitigation site in the Inner Cabrillo Beach area. The site is being constructed primarily to mitigate impacts to eelgrass associated with the maintenance dredging of the Berth 24 Boat Ramp Basin and secondarily will be used to offset outstanding eelgrass mitigation obligations associated with the Cabrillo Way Marina Phase II dredging.

Factors assessed to select an eelgrass mitigation site included compatible land and water uses, proximity to existing eelgrass beds, logistics and cost of site construction, and anticipation of no future conflicts within the Port. The selected site is located east of Inner Cabrillo Beach and west of the Cabrillo Beach Fishing Pier. The site is also north of the Outer Cabrillo Beach parking lot (Figure 1). The mitigation site is located adjacent to existing eelgrass beds at Inner Cabrillo Beach.

It is anticipated that the maintenance dredging for Berth 24 would require development of approximately 277-310 m2 (0.07 ac) of replacement eelgrass (Merkel & Associates 2013). The final impact and mitigation determination would be based on the results of the pre-dredging and post-dredging surveys required under the Southern California Eelgrass Mitigation Policy (SCEMP) (NMFS 1991, as revised). In constructing the Cabrillo Way Marina Phase II project, dredging was conducted to lower the bottom elevation beneath the marina to depths of -12 and -15 feet MLLW within different areas of the marina. Impacts to eelgrass within this area were determined to be 1,133 m2 (0.28 ac) (Merkel & Associates 2009). This would generate a mitigation need of 1,360 m2 (0.34 ac). The Inner Cabrillo Beach mitigation site is designed to support a 3-acre eelgrass transplant; however, the final yield of eelgrass bed development is expected to be less than this initial planting scale. Anticipated losses due to cut beach instability and shoal redevelopment would be expected to curtail the overall site yield.

SITE DESCRIPTION

The proposed site would be constructed across an area that transitions from a supratidal and intertidal active sand shoal to a soft bottom harbor environment. The current elevation range at the site extends from +9 feet MLLW to -11 feet MLLW. The shoal has a predominately flat surface at approximately the highest high tide line (Figure 2). The sides of the shoal slope steeply to the bay floor. Bathymetric data collected in September 2013 and July 2014 have been used to verify that the shoal is slowly migrating to the west where it is overrunning the existing eelgrass bed along its northwest margin.

To the west and north of the shoal, eelgrass extends across the harbor bottom from a depth of approximately -2 feet to -8 feet MLLW with the predominance of the eelgrass occurring within a range of -4 feet to -6 feet MLLW. To the east of the shoal, the harbor bottom slopes down below elevations supporting eelgrass, in the range of -9 feet to -11 feet MLLW.

SITE DREDGING/GRADING

Design

The proposed eelgrass mitigation site would be constructed by excavating 11,150 cubic yards of sand from the shoal and placing it in the adjacent waters to raise the elevation of the bottom up to elevations suitable to support eelgrass. The shoal would be cut back toward the shoreline to match the adjacent beach at the top elevations. The slope of the beach would be laid back to 12:1 to create a gentle beach gradient down to an elevation of -4 feet MLLW where a flat bench would be developed. By flattening the slope on the beach and removing the shoal, the functional intertidal beach face would be expanded in area.

The sand removed from the shoal would be placed in the deeper waters adjacent to the site. Within the fill areas, the bottom would be raised to a plateau at an elevation of -5 feet MLLW. This plateau would be a balanced fill with the 11,150 cubic yards of cut. The maximum depth of cut from the site is 8 feet while the maximum fill depth is 6 feet. The resultant site configuration would generate more stable beach slopes and stepped plateaus at -4 feet and -5 feet MLLW (Figure 2 and Figure 3).

The site is to be graded to variable tolerances to meet the project objectives. For intertidal beach grading, the slope shall be cut to elevations that are +/-0.5 foot with a consistent smooth slope of 12:1. For subtidal work, the beach slope shall maintain the same 12:1 slope as through the intertidal zone with an acceptable vertical tolerance of +/-0.5 foot over 80% of the area and +/-1.0 foot over 100% of the subtidal beach slope. For the subtidal plateaus at -4 and -5 feet MLLW, the vertical tolerances shall be not more than +/-1.0 foot over any portion of the site and surface elevation variation on the plateaus shall be limited such that no more than 8:1 slopes occur.

Material Testing

The sand that will be excavated or dredged required chemical and grain size analyses in order to confirm suitability for use in developing an eelgrass mitigation area. Two core samples were collected within the project footprint using a vibratory corer down to a depth of 10 feet below ground surface (Figure 5). Reuse suitability will be based upon: 1) low levels of chemicals within the accreted sand proposed for excavation and reuse, and 2) grain size compatibility. The analyses, methods and detection limits are shown in Table 1. Results of analyses are presented in Table 2.

INSERT PARAGRAPH DISCUSSION

Construction

It is anticipated that site construction will be accomplished by a combination of standard land-based earthmoving equipment including an excavator and bulldozer as well as a clamshell dredge. The sand excavation and contouring of the beach between the shoreline and existing eelgrass is expected to be performed by land based equipment using extreme low-tides to access the outer portions of the shoal. It is anticipated that removal of the shoal will be performed with an excavator that will push sand to the east where it can be picked up for placement using a clamshell dredge on a flat barge.

To protect existing eelgrass beds from damage, self-centering buoys or driven posts will be placed by the project biologists at the edge of the eelgrass to guide the contractor in setting post anchored turbidity curtains a distance of 5 feet from the bed edge marking. All curtain support posts will be placed by the contractor prior to initiation of earthwork. However, because the work area is within proximity (less than 50 feet) of the existing eelgrass beds for a length of 750 feet, a shorter moving turbidity curtain of

not less than 200 feet may be used instead of placing the full length protection at the beginning of the project. This shorter curtain would then be repositioned as needed to maintain a barrier between the eelgrass and the work area.

Prior to acceptance of the final site construction, a detailed bathymetric and topographic survey shall be completed to document the site as-built conditions.

EELGRASS PLANTING PLAN

The transplant site to be used for mitigation purposes is shown in Figures 1 and 4. The proposed transplant area is 3.0 acres. Donor eelgrass for the transplants of eelgrass is to be derived from eelgrass beds along Boy Scout Beach to the north, as well as beds along the northwestern edge of Inner Cabrillo Beach (Figure 1). An eelgrass reference site has been established in a nearby area to the northwest of the transplant site (Figure 1). The reference site has been selected based on proximity to and similarity in physical and biological characteristics to the proposed transplant site. Monitoring of the reference site would be conducted coincident with the monitoring of the transplant site. Monitoring will be conducted annually for 5 years post-transplant.

Prior to commencing eelgrass transplantation work, a letter of authorization to plant eelgrass will be obtained from the California Department of Fish and Wildlife (CDFW) pursuant to §6400 of the California Fish & Game Code. The 3.0-acre planting program will require 12,138 planting anchored bare-root transplant units. The units will be comprised of 6-8 turions each.

Shoreline staging and work areas will be situated on Inner Cabrillo Beach near the transplant site. A grid system will be used to control planting on the site. The plant materials will be planted by excavating a hole in the sediments with a small trowel or by hand. The anchor will be planted parallel to the sediment surface and the root/rhizome bundle will be planted approximately 1 to 2 inches below the sediment surface with the anchor being placed approximately 5 inches below the sediment surface. A planting unit spacing of one meter on center will be used for the present transplant.

Table 1. Chemical and Physical Analyses of Sediment Samples

Analyte	Analysis Method	Sediment Target Reporting Limit[a, b]
Grain Size	ASTM D4464	0.1 %
Total Solids	160.3/SM 2540 B	0.1 %
Total Organic Carbon	9060A	0.1 %
TRPH	418.1M [d]	10 mg/kg
Arsenic	6020 [d]	0.1 mg/kg
Cadmium	6020 [d]	0.1 mg/kg
Chromium	6020 [d]	0.1 mg/kg
Copper	6020 [d]	0.1 mg/kg
Lead	6020 [d]	0.1 mg/kg
Mercury	7471A [d]	0.02 mg/kg
Nickel	6020 [d]	0.1 mg/kg
Selenium	6020 [d]	0.1 mg/kg
Silver	6020 [d]	0.1 mg/kg
Zinc	6020 [d]	1.0 mg/kg
PAHs [e]	8270C SIM [d]	10 µg/kg
Chlorinated Pesticides [f]	8270C SIM/8081A [d]	1.0–20 µg/kg [k]
PCB Congeners [g]	8270C SIM [d]	0.5 µg/kg
Phenols	8270C SIM [d]	10–500 µg/kg
Pyrethroid Pesticides	GC/MS/MS [j]	0.5–1.0 µg/kg
Phthalates	8270C SIM [d]	10 µg/kg
Organotins	Krone et al.[h]	3.0 µg/kg

Notes:

a. Sediment minimum detection limits are on a wet-weight basis.

b. Reporting limits are provided by Eurofins Calscience Environmental Laboratories, Inc.

c. *Standard Methods for the Examination of Water and Wastewater*, 19th Edition, American Public Health Association et al., 1995.

d. USEPA, 1986–1996. SW-846. *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods*, 3rd Edition.

e. Includes naphthalene, acenaphthylene, acenaphthene, fluorene, phenanthrene, fluoranthene, pyrene, benzo(a)anthracene, chrysene, benzo(b,k)fluoranthene, benzo(a)pyrene, indeno(1,2,3-c,d)pyrene, dibenzo(a,h)anthracene, benzo(g,h,i)perylene

f. Includes aldrin, α-benzene hexachloride (BHC), β-BHC, γ-BHC (lindane), δ-BHC, chlordane, 2,4- and 4,4- dichlorodiphenyldichloroethane (DDD), 2,4- and 4,4-dichlorodiphenyldichloroethylene (DDE), 2,4- and 4,4- dichlorodiphenyltrichloroethane (DDT), dieldrin, endosulfan I and II, endosulfan sulfate, endrin, endrin aldehyde, heptachlor, heptachlor epoxide, and toxaphene

g. Polychlorinated biphenyls (PCBs) (sum of 41 congeners: 18, 28, 37, 44, 49, 52, 66, 70, 74, 77, 81, 87, 99, 101, 105, 110, 114, 118, 119, 123, 126, 128, 138, 149, 151, 153, 156, 157, 158, 167, 168, 169, 170, 177, 180, 183, 187, 189, 194, 201, and 206)

h. Krone, C.A., D.W. Brown, D.G. Burrows, R.G. Bogar, S.L. Chan, and U. Varanasi, 1989. A Method for Analysis of Butyltin Species and Measurement of Butyltins in Sediment and English Sole Liver from Puget Sound. Marine Environmental Research 27: 1–18.

i. National Oceanic and Atmospheric Administration. 1993. Sampling and Analytical Methods of the National Status and Trends Program National Benthic Surveillance and Mussel Watch Projects, 1984–1992, Volume IV, Comprehensive Descriptions of Trace Organic Analytical Methods, July 1993

j. Allethrin (bioallethrin), bifenthrin, cyfluthrin-beta (baythroid), cypermethrin, deltamethrin (tralomethrin), fenpropathrin (danitol), esfenvalerate, fenvalerate (sanmarton), fluvalinate, lambda-cyhalothrin, permethrin (cis and trans), sumithrin (phenothrin}, resmethrin (bioresmethrin), and tetramethrin, and transPermethrin(C13)

k. Except toxaphene, which is 1,000 micrograms per kilogram (parts per billion)

% = percent
µg/kg = micrograms per kilogram (parts per billion)
ASTM = American Society for Testing of Materials
GC = gas chromatography
(M) = modified
mg/kg = milligrams per kilogram (parts per million)
PAH = Polycyclic Aromatic Hydrocarbons
PCB = Polychlorinated biphenyl
SM = Standard Method
SIM = selective ion monitoring
TOC = total organic carbon
TRPH = Total Recoverable Petroleum Hydrocarbons

[INSERT TABLE 2, CHEMISTRY RESULTS]