APPENDIX C
Essential Fish Habitat Study

Essential Fish Habitat

Little Corona Beach Infiltration Construction Essential Fish Habitat Study

City of Newport, CA

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1.0 INTRODUCTION

The City of Newport has proposed improvements to provide long-term solutions to eliminate dry weather flows from the mouth of the Buck Gully Channel (Figure 1) at Little Corona Beach (LCB). The improvements will include a diversion structure that captures dry weather flow at the upstream side of a pre-existing concrete weir, and diverts the flow through a proposed 8" PVC into a 48 inch continuous deflection system (CDS). The CDS will capture free flowing sediment and route into a proposed 5,202 square foot underground infiltration system.

In order to comply with the Magnuson–Stevens Fishery Conservation and Management Act (MFCMA), and in accordance with National Marine Fisheries Service (NMFS) regulations, an Essential Fish Habitat (EFH) assessment was prepared to evaluate potential impacts due to proposed construction activities. The EFH includes an assessment of fish species and marine biological resources that may be potentially disturbed during the construction activities. Project construction activities to support the filtration project site and CDS is completely land based extending out to the Mean Higher High Water (MHHW) line, minimizing the potential impacts to fish and sensitive resources in habitats adjacent to the point of construction. The Crystal Cove State Marine Conservation Area is adjacent to the project area extending up to the MHHW line. The Marine Protected Area (MPA) MHHW boundary separates the project area from tidal waters, and will reduce the chance of suspending material in the water column as is common with coastal construction projects.

2.0 PROJECT DISCRIPTION

A reinforced concrete vault is proposed upstream of the existing Buck Gully concrete weir wall. The system will be designed with a capacity to divert dry weather flow of approximately 0.5 cubic feet per second (cfs). The structure will include a 3 foot (ft) long concrete wall located 3 ft upstream and parallel to the existing weir wall and two side walls joining the existing wall at just outside the limits of the existing low flow weir notch (Approximately 12 ft on the downstream end). The vault bottom will be a 12 ft thick reinforced concrete slab. The proposed vault will be 3 ft deep on the upstream and 5 ft deep at the downstream side. The fault top will be an upstream slanting Coanda channel screen per manufacturer's specifications. The screen will sit on the existing wall on the downstream side and slope down towards the upstream proposed wall which is 1 ft lower. Water flowing from up the channel will fall through the screen and large debris will slide down to fall upstream of the proposed 3 ft wall to be washed down during large storm events. Coanda screen is a stainless steel self-cleaning screen which is an ideal solution for handling debris-laden water in flowing streams.

A 3 ft wide by 1.5 ft high opening will be added on the downstream side of the vault by saw-cutting through the existing wall. The opening will be sealed using a removable sluice gate that can be opened as needed to sweep out any accumulated sand from inside the vault. Flow that enters the vault will be conveyed through an 8 inch PVC pipe that will run west along the upstream side of the existing weir wall. The invert of the 8 inch pipe will be set at 1 ft above the vault bottom, to allow for sand that passes through the Coanda screen to fall to the bottom below the pipe invert, to be swept downstream through the 3 ft by 1.5 ft when the sluice gate is opened as part of the regular vault maintenance. The 8 inch PVC will turn south at the end of the existing wall to discharge the dry weather flows into a proposed Continuous Deflection System (CDS) unit.

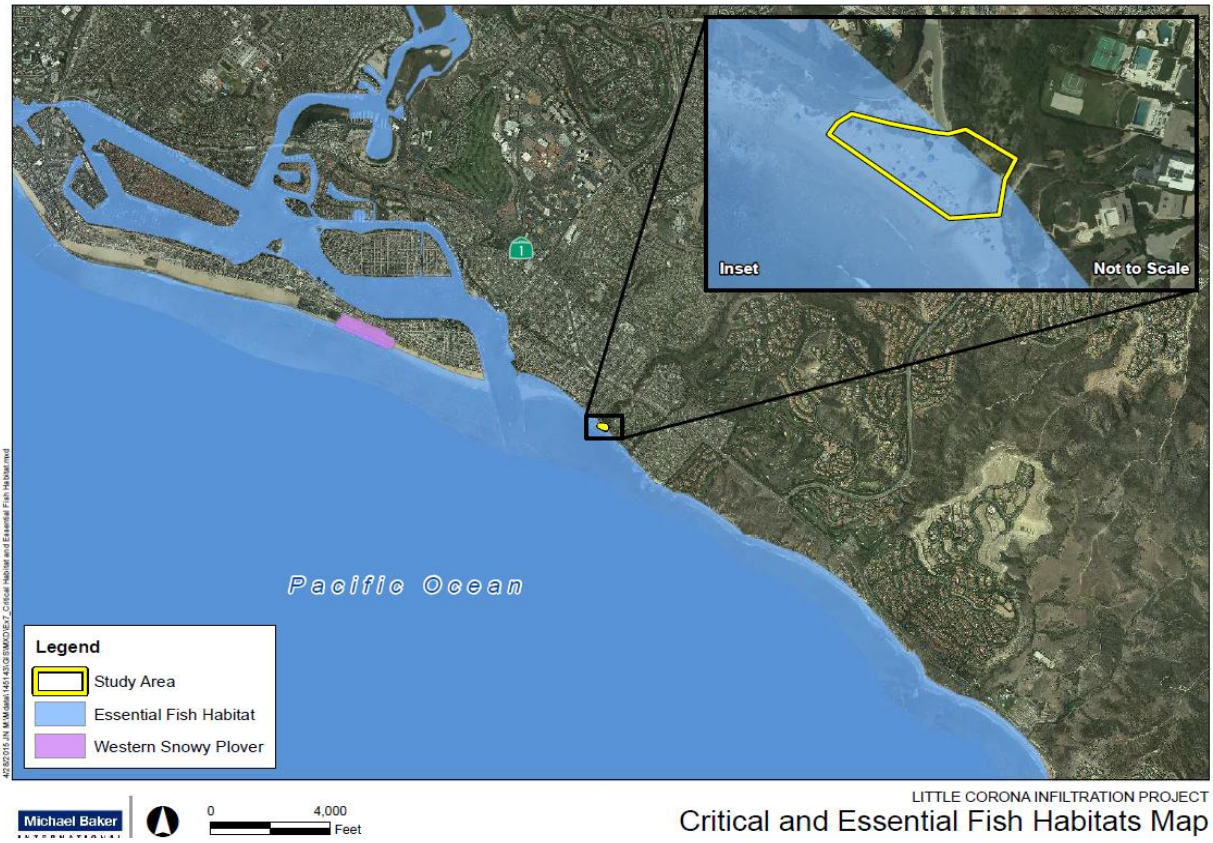

Figure 1. Construction Area Little Corona Beach Newport, CA

3.0 DESCRIPTION OF STUDY AREA

The site of the proposed infiltration project is located at Little Corona Beach in Newport, CA. The project area consists of sandy beach that has undergone a partial conversion from natural habitats into residential and recreational land use, with patches of disturbed natural habitat and restored/revegetated streambed remaining. The footprint of the project area is bordered by residential development to the east and the Pacific Ocean to the west. Buck Gully is a perennial stream, begins in the San Joaquin Hills and courses through Newport for approximately 3.5 miles before flowing via modified channel into the Pacific Ocean. Buck Gully is separated from the sandy beach by a concrete weir, which allows water to overflow onto the beach and into the Ocean.

The upstream of Buck Gully was restored in 2011 thru 2012 and included installation of hydraulic grade control structures as well as non-native vegetation removal and native plant restoration. Buck Gully is in its third year of habitat mitigation and monitoring program. The lower limits of the restoration area are approximately 140 feet upstream of the project area. The project area extends westward to the Mean Higher High Water (MHHW) line.

Adjacent to the project sight is the Crystal Cove State Marine Conservation Area (SMCA) which extends from the MHHW line at Little Corona Beach directly offshore. The Crystal Cove SMCA is part of the California Marine Protected Areas (MPA). This area is a limited recreational and commercial take area.

4.0 FISH AND INVERTIBRATE COMMUNITIES

4.1 Fish Diversity

Orange County Sanitation District (OCSD) conducts semi-annual trawls to collect fish and large invertebrates at pre determined stations and depth regimes adjacent to the project area. In the 2012 and 2013 surveys a 7.6 meter wide otter trawl fitted with a 0.64 cm cod-end mesh net was towed via research vessel. The net was towed for 450 meters at approximately 2 knots (OCSD 2014). A total of 11,822 fish were collected in 2012 and 2013 surveys that represented 42 species. However according to Allen 2006 there have been 142 species occurring in the coastal Southern California Bight found in studies over the last 4 decades.

To focus on the more recent data during the 2012 & 2013 surveys Pacific Sanddab (*Citharicthys sordidus*; 46%), Longspine Combfish (*Zaniolepis latipinnis*; 14%) California Lizardfish (*Synodus lucioceps*; 12%), and Yellowchin Sculpin (*Icelinus quadriseriatus*; 6%) were the most abundant fish collected, representing 78% of the total catch (OCSD 2014). Of the 19 families represented, *Paralichthyidae* (sand flounders), Hexagrammidae (greenlings), *Synodontidae* (Lizardfish), *Pleuronectidae* (right-eye flounders), and *Cottidae* (sculpins) accounted for 41% of the species and 90% of the total abundance (table 1). Fish abundance has historically been highly variable, although some patterns are consistent (OCSD 2011); the shallower stations typically have the lowest abundances, while the deep stations have the highest abundances. Depth-related abundance patterns in 2012-13 were generally consistent with previous years (OCSD 2014).

Table 1.Number of species and abundance summarized by family for the 2012 and 2013 surveys.

Family/Common Name	Number of Species		Abundance	
	Total	Percentage	Total	Percentage
Paralichthyidae sand flounders	5	12	6,060	51
Hexagrammidae greenlings	3	7	1,694	14
Synodontidae lizardfishes	1	2	1,439	12
Pleuronectidae righteye flounders	6	15	863	7
Cottidaesculpins	2	5	755	6
Scorpaenidae scorpionfishes	10	22	319	3
Embiotocidae surfperches	2	5	220	2
Cynoglossidae tonguefishes	1	2	207	2
Batrachoididae toadfishes	1	2	132	1
Zoarcidae eelpouts	1	2	52	<1
Agonidae poachers	2	5	45	<1
Rajidae skates	1	2	18	<1
Ophidiidae cusk-eels	1	2	11	<1
Sciaenidae drums & croakers	1	2	2	<1
Argentinidae argentines	1	2	1	<1
Merlucciidae merlucciid hakes	1	2	1	<1
Moridaecodlings	1	2	1	<1
Serranidae sea basses	1	2	1	<1
Torpedinidae torpedo electric rays	1	2	1	<1
Total	**42**	**100**	**11,822**	**100**

4.2 Invertebrate Diversity

A total of 8,605 macroinvertebrates were collected representing 49 species during the 2012 & 2013 surveys. According to OCSD 2014 Two species accounted for 79% of the total abundance, the brittle star (*Ophiura luetkenii*; 47%) and white sea urchin (*Lytechinus pictus*; 32%). Other generally abundant species included *Thesea* sp. (yellow sea twig), *Sicyonia ingentis* (ridgeback rock shrimp), *Hamatoscalpellum californicum* (California blade barnacle), *Pleurobranchaea californica* (California sea slug).

There was no apparent influence of depth on number of species. Number of individuals per trawl ranged from 34 to 2,592 (OCSD 2014). Historically, abundance is highly variable from year to year. These fluctuations typically reflect changes in several dominant species, such as *O. luetkenii, L. pictus, Thesea sp., S. ingentis, and H. californicum.*

5.0 EFH AND MANAGED SPECIES

Essential Fish Habitat is regulated under the MFCMA, protecting waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity (Magnuson-Stevens Act, 16 U.S.C. 1801 et seq.). Substrates includes sediment, hard bottom, structures underlying waters, and associated biological communities (NMFS 2005). For example, eelgrass is considered Essential Fish Habitat for some managed species. Fish and invertebrate communities of the study area are presented in Section 4.0 of this report.

5.1 Fishery Management Plans

Under the MFCMA, the federal government has jurisdiction to manage fisheries in the U.S. Exclusive Economic Zone (EEZ), which extends from the outer boundary of state waters (3 nm from shore) to a distance of 200 nm from shore. Fishery Management Plans (FMPs) are extensive documents that are regularly updated. The goal of a FMPs include the development and sustainability of an efficient and profitable fishery, optimal yield, adequate forage for dependent species and long term monitoring. There are two FMPs that include waters adjacent to the proposed project site; the Coastal Pelagic FMP covering 6 species and the Pacific Groundfish FMP covering 89 species.

5.1.1 Coastal Pelagics

In 2008 the Coastal Pelagic FMP covered one invertebrate (market squid) and four fish species (northern anchovy, jack mackerel, Pacific mackerel, and Pacific sardine). Amendment 12 to the Pelagic FMP was finalized in 2009 to protect krill. Krill, a shrimp like crustacean are very important on a trophic level and are the basis of the marine food chain. EFHs for Coastal Pelagics are defined as all marine and estuarine waters from the shoreline of the coasts of California, Oregon and Washington offshore to the limits of the EEZ and above the thermocline.

5.1.2 Pacific Groundfish

There are 89 fish species included in the Pacific Groundfish FMP. EFH for Pacific Groundfish include all waters off southern California between Mean Higher High Water (MHHW) and depths to 11,483 ft. The Groundfish FMP also includes the extent of salt water intrusion into freshwater inputs. Habitat Areas of

Particular Concern (HAPCs) include but are not limited to estuaries, canopy kelp, seagrass, and rocky reefs.

5.2 Relevant Species

There are 93 fish species that are covered by the Coastal Pelagics and Pacific Groundfish FMPs, but not all occur near the proposed project area. Table 2 lists species that have been collected near or occur in similar coastal conditions as the project area and are discussed below.

5.2.1 Coastal Pelagics

Although no Coastal Pelagic FMP species were observed during 2012 and 2013 surveys for the adjacent Orange County Sanitation District, all species covered could occur at some point during their life stages (Allen 2006). The northern anchovy historically ranged from the Queen Charlotte Islands, British Columbia, south to Cabo San Lucas, Baja California. More recently, populations have moved into the Gulf of California, Mexico. Larvae and juveniles are often abundant in nearshore areas and estuaries with adults being more oceanic; however, adults may also be found in shallow nearshore areas and estuaries. anchovy are non-migratory but do make extensive inshore-offshore and along-shore movements (Emmett et al. 1991). During times of high abundance (from the early part of the 20th century into the 1940s) Pacific sardines ranged from the Gulf of California north to southeastern before the fishery crashed in the 1950's. Large populations still occur south of point conception into Baja California. The Pacific sardine is epipelagic, occurring in loosely aggregated schools. In times of abundance this species can occur up to 150 miles offshore (Wolf et al., 2001)

Jack mackerel and Pacific mackerel occur from Santa Maria Bay, Mexico to Yaquina Bay, Oregon. They are found in California bays, estuaries and coastal pelagic ocean waters throughout the year. They are schooling fish which prefer shallow water less than 100 feet and are most common in 5 to 50 foot depths (CDFW 2013). All costal pelagics are associated with the water column except for the female market squid, which lays egg masses on sandy bottoms during spawning at depths of about 15-180 ft. The market squid ranges coastally from Baja California to Alaska and can be found within 200 miles of the shore (PFMC, 2008b).

5.2.2 Pacific Groundfish

The most abundant Pacific Groundfish groups captured during the OCSD 2012 and 2013 surveys were the flatfish followed by the rockfish, roundfish and then sharks. Of the 89 fish species covered in this FMP 17 species were observed during the surveys. In the flatfish group, Pacific sanddabs had the greatest abundance with 46% of the total catch and recording 5,488 individuals. English sole were the 5th most abundant species with 4% of the total catch and recording 455 individuals, while Dover sole (13th most abundant) accounted for 1% of the total catch with 126 individuals. Petrale sole (30th most abundant) and curlfin sole (40th most abundant) were both recorded as less than 1% of the catch and less than 10 individuals.

The rockfish included stripetail (9th most abundant) which accounted for 2 % of the total catch with 185 individuals. The halfbanded rockfish (18th most abundant), California scorpionfish (21st most abundant), calico rockfish (25th most abundant), and greenstripe rockfish (27th most abundant) individually accounted for less than 1% of the total catch with 53, 24, 16 and 10 individuals captured, respectively. While the treefish (28th most abundant), pink rockfish (32nd most abundant), cowcod (33rd most abundant) and vermilion rockfish (41st most abundant) all recorded less than 10 individuals captured per species.

The roundfish included lingcod (23rd most abundant) with 23 individuals accounting for less than 1 % of the total catch and Pacific whiting (hake) (37th most abundant) with less than 10 individuals captured. California skate (24th most abundant) was the only species from the FMPs shark group that was recorded at less than 1% of the total catch with 18 individuals (Table 2).

Table 2. NMFS Managed Species near Little Corona Beach, including Abundance, Total Percent and Habitat.

Common Name	Scientific Name	Observed during OCSD 2012 & 2013 Survey	Abundance Rank and % of Total	Habitat
Coastal Pelagics				
Northern Anchovy	*Engraulis mordax*	No	-	Open water
Pacific Sardine	*Sardinops sagax*	No	-	Open water
Pacific Mackerel	*Scomber japonicus*	No	-	Open shallow water
Jack Mackerel	*Trachurus symmetricus*	No	-	Open shallow water
Market Squid		No	-	Open water
Pacific Groundfish				
Pacific Sanddab	*Citharichthys sordidus*	Yes	1st/46%	Soft bottom habitats
English Sole	*Parophyrys vetulus*	Yes	5th/4%	Soft bottom habitats
Stripetail Rockfish	*Sebastes saxicola*	Yes	9th/2%	
Dover Sole	*Microstomus pacificus*	Yes	13th/1%	Soft bottom habitats
Halfbanded Rockfish	*Sebastes semicinctus*	Yes	18th/<1%	Hard substrate and kelp
California Scorpion fish	*Scorpaena gutatta*	Yes	21st/<1%	Soft and hard substrate
Lingcod	*Ophiodon elongatus*	Yes	23rd/<1%	Hard substrate
California Skate	*Raja inornata*	Yes	24th/<1%	Open water
Calico Rockfish	*Sebastes dallii*	Yes	25th/<1%	Hard substrate and kelp
Greenstripe Rockfish	*Sebastes elongatus*	Yes	27th/<1%	Hard substrate and kelp
Treefish	*Sebastes serriceps*	Yes	28th/<1%	Hard substrate and kelp
Petrale Sole	*Eopsetta jordani*	Yes	30th/<1%	Soft bottom habitats
Pink Rockfish	*Sebastes eos*	Yes	32nd/<1%	Hard substrate and kelp
Cowcod	*Sebastes levis*	Yes	33rd/<1%	Hard substrate and kelp
Pacific Whiting (Hake)	*Merluccius productus*	Yes	41st/<1%	Open water and hard substrate
Curlfin Sole	*Pleuronichthys decurrens*	Yes	44th/<1%	Soft bottom habitats
Vermilion Rockfish	*Sebastes miniatus*	Yes	45th/<1%	Hard substrate and kelp

*ranking is based on observations published by OCSD 2014 total catch in 2012 and 2013 surveys.

6.0 ASSESSMENT OF POTENTIAL IMPACTS

The following section includes a discussion of the potential impacts resulting from the construction of the proposed project. Potential effects to the marine environment could result from:

- Increased turbidity from construction equipment and land manipulations
- Fluid spills from construction related equipment

The assessment of impacts is based on the assumption that the proposed project would include the following.

- Coverage under the General Construction Activity Storm Water Permit for proposed project. The associated Stormwater Pollution Prevention Plan (SWPPP) would contain the following measures:
    - Equipment Shall be inspected regularly (daily) during construction, and any leaks found shall be repaired immediately.
    - refueling of vehicles and equipment shall be in a designated, contained area.
    - Drip pans shall be used under stationary equipment when refueling or maintenance
    - Drip pans that are used shall be covered during rainfall to prevent leaching of contaminants.
    - Construction and maintenance of appropriate containment structures to prevent offsite transport of pollutants from spills and construction debris
    - Monitoring to verify Best Management Practices (BMPs) are implemented and kept in good working order

6.1 Construction

The proposed project includes the installation of a diversion structure at the upstream side of the concrete weir at Buck Gully (Figure 2). The diverted flow will be conveyed through the installation of an 8 inch PVC pipe into a 48 inch continuous deflection system intended to catch any sediments. The sediment free flow will then continue into the proposed 5,202 square foot underground filtration system. This system will be constructed subsurface by the excavation and manipulation of surface sands and soils and the setting of concrete footings.

The project site is bordered by open waters of the Pacific at Little Corona Beach and all construction activity is land based and extends westward to the MHHW line. Activities associated with the installation of the filtration system could slightly affect water quality if BMPs fail. If BMPs were unable to capture runoff or construction breaches the tidal system, sediments could suspend in the available water column. However, all suspended sediments would be introduced to open waters so impacts would be short in duration and easily flushed away to dissipate.

There are no special aquatic habitats or other sensitive natural communities identified at the proposed project site. The project area bordered by the MHHW line will not extend into any area that will affect bottom substrate essential to fish habitat. The sandy bottom and kelp forests existing near shore adjacent to the project area are outside of any construction activities and will not be disturbed. The sandy bottom in adjacent waters does not provide substrate to support eelgrass (*Zostera marina*), therefore construction activities are not expected to affect eelgrass beds.

Other effects of the construction of the infiltration system include the unnatural occurrence of light and noise. Both would be short-term during construction activities. It is unlikely that these effects would lead to reduced survival, and if so, only a small percentage of individuals within fish populations would potentially be affected.

Fish eggs and larval, juvenile fish, and adult fish would likely experience few to no effects due to construction activities. Fish eggs and larval fish are primarily found in the water column in this area and are dispersed by water movement away from the intertidal zone during lower tides, while juvenile and adult fishes have the ability to move to avoid the disturbance during construction activities. Short-term water quality impacts (e.g., turbidity) may slightly affect resident fishes; however, these impacts would likely have no effect on the success of fish populations due to the ability of the juvenile and adult fishes to relocate to other areas. The constant water replenishment that occurs in open waters transport fish larvae and eggs to various areas along the coastal the near shore habitat, which is abundant. A brief relocation of these transient species would not result in biologically significant impacts with regard to competition, predation, or spawning.

North at Buck Gully.

West from Center of Project Site

East Subsurface Infiltration System Location

South at Pacific Ocean

Figure 2. Little Corona Beach Infiltration System Project Site Photos

7.0 ASSESSMENT SUMMARY

The potential impacts resulting from construction of the infiltration system and associated structures are expected to be minimal and temporary to the managed fish species occurring in this near shore coastal habitat. During construction activities, should any individuals of these managed pelagic or groundfish species occur within the adjacent vicinity of the project area, they would most likely relocate to another area of open water or other shallow water habitat, to avoid any disturbances caused by construction activities. No adverse effects are expected from construction activites that will impact recruitment or populations of the protected species within Crystal Cove SMCA. A review of the current habitat data shows no sign of Eelgrass (*Zostera marina*) adjacent to the proposed construction site, and kelp forest outside the direct influences of the project area, which further reduces the potential for managed species at the site. Long-term, the infiltration system will reduce dry weather flows from the mouth of Buck Gully channel while retaining transported sediments and reducing sedimentation. The net effect of the infiltration system construction on biological resources will be positive, as the project will improve water quality improving impacting localized water quality conditions within the Crystal Cove SMCA.

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