UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
75 Hawthorne Street
San Francisco, CA 94105

MEMORANDUM

DATE: March 17, 2014

SUBJECT: Action Memorandum
Yosemite Slough Site, San Francisco, CA
Site ID # CAN000908486

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I. PURPOSE

The purpose of this Action Memorandum (AM) is to request and document approval of the selected non-time critical removal action (NTCRA) described herein for the Yosemite Slough Site (also known as the Yosemite Creek Sediment Site or Site) located near 1250 Yosemite Avenue, San Francisco, California, 94124. The EPA CERCLIS Site ID Number for this Site is CAN000908486.

This AM is not using the On-Scene Coordinator (OSC) $50,000/$250,000 delegation and warrant authority. There are no nationally significant or precedent-setting issues associated with the removal action described herein.

This AM is based on the Final Engineering Evaluation/Cost Analysis (EE/CA) for the Site dated December 2013.

II. SITE CONDITIONS AND BACKGROUND

A. Site Description

1. Removal site evaluation

The environmental medium of concern is contaminated sediment. The Site generally consists of sediment within Yosemite Slough below the mean high water line (MHWL) and the approximate Site boundary is shown in Figure 1. A formal survey will be required during the removal action design phase to establish the official boundaries of the Site.

As discussed in this AM, hazardous substances have historically been released to the Site and present an imminent threat to human health and the environment. A Superfund site investigation and listing site inspection has been conducted for the Site. The Site is not currently on or proposed for the National Priorities List (NPL).

2. Physical location

The Site is located between Hunters Point Shipyard (HPS) and Candlestick Point in the Bayview neighborhood of southeastern San Francisco, California (Figures 1 and 2). The Site is approximately 1,600 feet long and 200 feet wide, with an area of approximately 414,000 square feet. The approximate location of the Site is 37° 43' 25" north latitude, 122° 23' 07" west longitude near the street address of 1250 Yosemite Street, San Francisco, California, 94124.

In addition, there are certain suitable areas in very close proximity to the Site where it is necessary to implement the cleanup response action. These areas are considered to be "on-site" (40 Code of Federal Regulations [CFR] 300.5). Examples of such areas include areas used for project staging or sediment dewatering as described in this AM.

As shown on Figure 2, the south, west, and north sides of the Site are contiguous with the Candlestick Point State Recreational Area (CPSRA) which is operated by the California Department of Parks and Recreation (CDPR). The majority of lands within the Site, specifically the water-covered lands below the mean high tide line, are owned by the City and County of San Francisco pursuant to a land grant from the State of California under the Burton Act of 1968, 1986 Cal. Stat. Ch. 1333. Certain other submerged lands and tidelands within the Site boundaries are owned by the California State Lands Commission (CSLC), which leases them to the CDPR. Small remaining portions of the Site are privately owned. The east edge of the Site is contiguous with a portion of San Francisco Bay called "South Basin." Most of South Basin is encompassed within the HPS Parcel F, which is owned by the U.S. Navy.

The Site is surrounded by several blocks of light industrial and commercial properties, including metal works shops, an auto salvage yard, auto repair shops, wood-working and cabinet shops, tile and stone shops, a green waste recycling facility, and other light industrial operations. The light industrial zone transitions to a large residential district to the north, west, and south known as San Francisco's Bayview neighborhood. Gilman Playground and Brett Harte Elementary School are located approximately 0.5 miles south of the Site. Approximately 0.5 miles southeast of the Site is Candlestick Park, a large stadium with an associated parking lot. HPS and Candlestick Park properties are included in a large redevelopment project called the Bayview Hunters Point Redevelopment (BVHP) Plan[1], which consists of recreational, residential, and commercial reuses for the area. Portions of the CPSRA immediately adjacent to the Site are currently being restored for purposes of creating wetland habitat.

The Site community consists of those living or working in the 94124 zip code, which covers approximately 5 square miles and has a population of approximately 35,000. San Francisco's total population is approximately 850,000.

A search of the California Department of Fish and Game Natural Diversity Database found no documented occurrences of special status species within the Site. Two special status species may occasionally forage within subtidal and intertidal areas of the Site: the California brown pelican and double-crested cormorant. However, these two birds do not nest within or adjacent to the Site. The special status species California clapper rail and green sturgeon were retained in the EE/CA because Yosemite Slough may provide appropriate habitat for these species in the future. A detailed evaluation of potential risks to the clapper rail and green sturgeon is provided in Appendix A of the EE/CA.

In accordance with Section 106 of the National Historic Preservation Act (NHPA), EPA commenced a formal consultation process with Native American stakeholders identified for San Francisco County by the Native American Heritage Council. Section 106 consultation is required due to future ground-disturbing activities that may be associated with response actions at the Site. A formal consultation meeting between EPA and Native American stakeholders occurred on August 31, 2012. This consultation process will continue if requested by Native American stakeholders. The EPA will continue its compliance efforts in accordance with NHPA Section 106 during the design stage for this project.

3. Site characteristics

During typical daily tidal cycles, the western (upgradient) portions of the Site become an exposed mudflat. The eastern portion of the Site is exposed as a mudflat only at lower tides.

[1] For more information, visit the following Web site: http://www.sfredevelopment.org/index.aspx?page=53.

At mean high tide, 3 to 6 feet of bay water covers the Site depending on the location within the Site. The sources of contaminated sediments at the Site likely originated throughout the broader Yosemite Creek Basin watershed and include the following:

- Industrial activities in the Yosemite Creek drainage basin, which released contaminants and contaminated sediments that were transported to the Yosemite Slough by way of the combined storm and sewer system;
- Non-native fill material placed along the Yosemite Slough banks and which at times may have been placed directly in the Slough during the late 1940s and 1950s, which erode into the Slough;
- Potential undocumented commercial and industrial discharges directly into Yosemite Slough;
- Urban runoff of storm water discharging directly into Yosemite Slough;
- Groundwater transport of contaminants into Yosemite Slough;
- Regular flooding of both Armstrong and Griffith pump stations at high tide flowing back into the Slough; and
- Release of contamination from materials placed during filling and/or development activities.

4. Release or threatened release into the environment of a hazardous substance, or pollutant or contaminant.

Hazardous substances as defined by section 101(14) of CERCLA, known to be present at the Site include metals (cadmium, chromium, copper, lead, mercury, silver, and zinc), total petroleum hydrocarbons, total polychlorinated aromatic hydrocarbons, pesticides (aldrin, chlordanes, dichlorodiphenyltrichloroethanes, dieldrin, and heptachlor), and polychlorinated biphenyls (PCBs). As discussed in Section V, key hazardous substances at the Site are PCBs and lead. Area-weighted average concentrations for PCBs and lead in the top one-foot interval of the Site sediment are provided in Table 1.

Table 1: Area-Weighted Average Concentrations in the Top 1-foot Interval in Yosemite Slough Site Sediment

Contaminant	Area-Weighted Average Concentration
Lead	359 mg/kg
PCBs	5,049 µg/kg

mg/kg = milligram per kilogram µg/kg = microgram per kilogram

Note: See Table 4 for sediment cleanup remediation goals.

Table 2 presents an estimate of the volume of sediment exceeding PCB and lead remedial goals in each 1-foot depth interval at the Site.

Table 2: Estimated Volumes of Sediments Containing PCBs and Lead above Remedial Goals at Yosemite Slough Site

Depth Interval (feet)	Contaminated Volume (cubic yards)
0 to 1	5,500
1 to 2	12,100
2 to 3	8,300*
3 to 4	4,300*
4 to 5	0*

*Note: As explained in Section III of this AM, PCB and lead contamination deeper than two feet does not likely pose a significant current or future risk to Site receptors.

For purposes of this AM, the EPA has determined that applying conservative lead and PCB cleanup levels to the top 2 feet of Site sediments includes an appropriate margin of safety for identifying all Site contamination that may pose unacceptable risk. During the design phase for the selected response action, the EPA will re-evaluate this assumption based on information collected as part of additional pre-design technical studies.

A 2005 hydrodynamic study found that the western and central portions of Yosemite Slough to be low energy environments with minimal deposition and erosion potential. Toward the eastern portion of the Site (the mouth of the slough), tidal energies appear to increase, elevating erosion potential. At this time, the EPA believes the generally accepted sediment bed change in most of Yosemite Slough ranges between -1.0 cm/yr (sediment scouring) and 0.5 cm/yr (sediment accumulation) as a result of tidal fluctuations and tidal flows. EPA will require additional hydrodynamic modeling of the Site during the response action design phase to better estimate net erosion potential within the Site based on the current and future projected geometries of the slough.

5. NPL Status

The Site has previously been referred to the EPA Region 9 NPL site assessment program. EPA completed a Hazard Ranking System (HRS) rating for the Site and the Site was deemed eligible for listing on the NPL. However, at this time, the Site is currently not listed nor proposed for listing on the NPL.

6. Maps, pictures, and other graphic representations

Site boundaries and adjacent features are present in Figures 1 and 2. Additional Site maps and photographs of the Site are provided in the EE/CA.

B. Other Actions to Date

To date, no prior removal or other cleanup actions have addressed contamination within the Site boundaries.

There are cleanup actions occurring on properties adjacent to the Site. As part of its wetlands restoration project at Yosemite Slough, the CDPR is identifying and addressing contamination on State Parks property adjacent to the Site pursuant to California Regional Water Quality Control Board Order Number R2-2007-0046 dated July 11, 2011. Also, as stated above, the U.S Navy owns Parcel F, a water-based sediment parcel in the South Basin area of San Francisco Bay located immediately east of the Site. Parcel F is one of several operable units of the Hunters Point Naval Shipyard NPL Site. The Navy has recently completed its remedial investigation and feasibility study (RI/FS) of Parcel F and the Proposed Plan for Parcel F is scheduled to be released by the Navy in 2014.

EPA has been in close coordination with CDPR, the U.S. Navy, and the California Regional Water Quality Control Board (RWQCB) to ensure that planned cleanup actions at the Site are consistent and in coordination with on-going and planned cleanup actions on CDPR and U.S. Navy properties.

C. State and Local Authorities' Roles

1. State and local actions to date

In March 1999, the RWQCB listed the Site in its Final Regional Toxic Hot Spot Cleanup Plan. The San Francisco Public Utilities Commission (SFPUC) carried out studies of Site sediments in 1999 and 2004. In 2007, the RWQCB formally requested assistance from the U.S. EPA to address the release and threat of pollutants and contaminants at the Site. In 2009, U.S. EPA carried out a removal assessment of Site sediments and issued its report in 2011.

2. Potential for continued State/local response

No State cost share under CERCLA is anticipated at this time. EPA will provide the State of California with advance notification should EPA recommend proposing the Site for the NPL or if any State cost share under CERCLA is applicable to this Site. In light of RWQCB's lead regulatory role at the adjacent CDPR wetlands restoration project, there is potential for the State to participate in regulatory oversight during the design, implementation, and monitoring of the response action at the Site.

III. THREATS TO PUBLIC HEALTH OR WELFARE OR THE ENVIRONMENT, AND STATUTORY AND REGULATORY AUTHORITIES

Section 300.415(b)(2) of the National Contingency Plan (NCP) provides factors for determining the appropriateness of a removal action. The factor most applicable to current conditions at Yosemite Slough is the actual or potential contamination of sensitive ecosystems. Other factors that may be applicable include: high levels of hazardous substances (e.g., PCBs) in sediments largely at or near the surface that may migrate; and actual or potential exposure to nearby human populations, animals, or the food chain from hazardous substances or pollutants.

A. Actual or Potential Contamination of Sensitive Ecosystems

The Site originally consisted of an extensive natural tidal wetland area. Large areas of Yosemite Slough were filled during World War II, leaving a narrow channel that now comprises the Site. Since the 1950s, the land immediately surrounding the Site has consisted of active or abandoned industrial or commercial operations, eroded asphalt pavement, and areas vegetated with ruderal (non-native) plants and weeds. The Biologically Active Zone (BAZ) is the top layer of Site sediment where the majority of biological activity occurs. The Site BAZ is assumed to consist of the top 6 inches (approximately 15 centimeters) of Site sediments. The average concentrations of PCBs and Lead in the top foot of Site sediment are presented in Table 1. In the top one foot of Site sediments, which includes the BAZ, average PCBs concentrations are 13 times greater the acceptable average Site cleanup level for PCBs. In addition, elevated PCB concentrations have been detected down to four feet deep in Site sediments. The Site contamination, especially PCBs in the BAZ, presents a current and future threat to the Site ecosystem and a threat to the success of wetlands restoration efforts in areas adjacent to the Site. Species threatened by Site contamination include the following:

- Benethic infauna and Epibenthic organisms. These receptors consist of organisms, such as invertebrates, that are in contact with the top layer of Site sediment. Many species of infauna are also filter feeders or otherwise process sediment during feeding.
- Shallow Bay Fish. Fish, such as Pacific Herring, northern anchovy, lingcod, starry flounder, jacksmelt, and several surf perches may visit the Site and have direct contact with Site sediment, and may ingest Site sediment as they forage.
- Waterfowl and Wading Birds. Waterfowl and wading birds that may visit the Site include double-crested cormorant, and several dabbling and diving ducks, such as the surf scoter. These birds may be directly exposed to contaminated sediment as a result of ingestion of contaminated prey, ingestion of contaminated sediment, or ingestion of vegetation with contamination during feeding.

- Raptors. Aquatic-feeding raptors, such as the osprey, hawks, and eagles may be indirectly exposed to Site contaminants as they ingest contaminated fish from the water column.
- Marine Mammals. Marine mammals, such as the California sea lion and habor seal, have been observed in waters near HPS. Marine mammal use of the Site is less likely due to the shallow water conditions; however, occasional visitation to the Site is possible.

Due to the primarily intertidal, marine mudflat habitat at Yosemite Slough, Site ecological risk is most acute to benthic feeding and piscivorous birds (e.g., surf scoter). Two special status species may occasionally forage at the Site: the California brown pelican and the double-breasted cormorant. Based on existing habitat conditions, there is a low potential for occurrence on the Site of other special status species. However, efforts are now underway to restore wetland habitat adjacent to and immediately north of the Site and plans are in place for wetland restoration immediately to the south of the Site. In addition, immediately to the northeast of the Site, the U.S. Navy is planning marine wetlands restoration in Parcel E-2 of the Hunters Point Shipyard. Once complete, the Yosemite Slough area wetlands restoration will provide several acres of newly restored marine wetlands, two isolated bird nesting islands including one designed specifically for special status species, nursery areas for fish and benthic organisms and transitional and upland areas to buffer future sensitive habitats. It is anticipated that wetlands and habitat improvements surrounding the Site might attract additional wildlife, including state and federally listed threatened or endangered species such as the California Clapper Rail and the green sturgeon.

B. Actual or Potential Exposure to Nearby Human Populations, Animals, or the Food Chain from Hazardous Substances or Pollutants

High levels of hazardous substances, especially PCBs, in the Site BAZ, constitute a significant threat to public health, public welfare, and the environment. PCBs have been demonstrated to cause a variety of adverse health effects and are classified as a probable human carcinogen. PCBs have been shown to cause cancer in animals. PCBs have also been shown to cause a number of serious non-cancer health effects in animals, including effects on the immune system, reproductive system, nervous system, endocrine system, and other health effects. Studies in humans provide supportive evidence for the potential carcinogenicity and non-carcinogenic effects of PCBs. Lead can affect almost every organ and system in the human body. The main target for lead toxicity is the nervous system, in both adults and children.

Contaminants such as PCBs and lead can persist in Site sediments over long periods of time. Direct exposure results from contact with contaminated Site sediment. Indirect exposure

results from contact with contaminants that have been transferred from Site sediments to another exposure medium, such as water or biota. Relevant exposure pathways to both humans and ecological receptors include:

- *Direct contact with contaminated sediment.* Exposure to contaminants occurs when external surfaces (e.g., skin) comes in direct contact with the contaminated sediment.
- *Ingestion of contaminated sediment.* Exposure to contaminants occurs incidentally during exposure by ingesting bay water with suspended contaminant sediments.
- *Exposure via the Food Web.* Indirect exposure pathways include ingestion of food/prey that has become contaminated through direct or incidental exposure to sediment contaminants. For example, human receptors potentially exposed at the Site include persons who fish and/or collect shellfish at the Site and/or consume the sea products that they obtain.

For humans and avian/mammalian wildlife, health risks resulting from exposure to contaminants via dermal contact with sediments is typically considered minor compared to the ingestion pathway. However, both external contact and ingestion of contaminated sediment can be important for fish and aquatic invertebrates. Bioconcentration and biomagnification are processes that affect exposure, especially in aquatic-based food webs. Bioconcentration is the increase in concentration of a chemical in an organism resulting from tissue absorption levels exceeding the rate of metabolism and excretion. Metals and organic compounds may bioconcentrate. Biomagnification occurs when concentrations of a chemical in biota increase with successive trophic levels. Biomagnification is best known with regard to persistent organic chemicals, such as PCBs, but can also occur for organically transformed metals.

Studies conducted by the City of San Francisco demonstrated that tissue results from bentnose clams, *Macoma nasuta*, exposed for twenty-eight days to surface sediments from the Site were elevated in PCBs and certain pesticides compared to tissues of the same clams grown in non-contaminated reference area sediments from elsewhere in the San Francisco Bay. The results concerning uptake of PCBs in the clam tissue are presented below (see Table 3).

Table 3: Bentnose Clam Tissue Study Results for PCBs

	PCB Concentrations in Clam Tissue (nanogram of PCB/gram of dry tissue). PCBs are the sum of 20 PCB congeners.		
	Minimum	Maximum	Mean
Bentnose Clams from Yosemite Slough Sediment	381.4	1039.9	591.5
Bentnose Clams from Reference Sediment	10.5	36.7	27.0

(Reference: *Sediment Investigation at Yosemite Creek; prepared by Battelle Inc., May 5, 2004)*

The presence of elevated levels of PCBs in bentnose clams demonstrates the threat of exposure to Site ecosystems and to human populations and the food chain from contaminants at the Site.

In 1994, the California Office of Environmental Health Hazard Assessment (OEHHA) issued a fish consumption advisory for the entire San Francisco Bay due to elevated levels of PCBs, mercury, and other chemicals in popular sport fish at concentrations that posed potential human health risks. Sport fish monitoring in the Bay has been conducted on a five year cycle since 1994. Based on this recurrent monitoring in San Francisco Bay, the fish consumption advisory remains in place.

C. High Levels of Hazardous Substances (e.g., PCBs) in Sediments Largely At or Near the Surface That May Migrate

Contaminants at the surface of the Site sediments can be resuspended and released during natural process (e.g., major storm events, wind chop, and bioturbation). Releases occur when the contaminants are transferred from sediment pore water and sediment particles into the water column. Resuspended contaminated sediment disperses into the overlying water and then resettles elsewhere within the Site or is potentially transported via tidal currents for subsequent resettling in adjacent areas. Based on hydrodynamic modeling conducted in 2005, the western portion of the Site has the least sediment scouring and wave climate is mild. Middle and eastern portions of the Site experience the strongest flood and ebb tides. Although this hydrodynamic study generally concluded that noticeable resuspension of sediment bed or bed scouring is low, limited scour in these portions of the Slough is present. In addition, recent wetland restoration along the borders of the Site may have changed the scour and sediment migration potential within the Site. Therefore, the actual hydrodynamics of the Site in its final post-wetlands configuration are unknown and represent a concern for increased potential resuspension, erosion/scour, migration and redeposition within the Site and in Site-adjacent areas. In addition, based on the current configuration of the combined sewer overflows (CSO) at the Site, it is possible that severe rain events may cause uncontrolled CSO overflow into the Site and thereby cause hazardous substances at the Site to scour and migrate to areas elsewhere within the Site or to adjacent areas.

IV. ENDANGERMENT DETERMINATION

The information presented in this AM indicates that actual or threatened releases of hazardous substances from the Site may present an imminent and substantial endangerment to public health or welfare, or the environment.

V. SELECTED ACTIONS AND ESTIMATED COSTS

A. Selected Actions

1. Selected action description

Removal Action Objectives

The removal action objectives (RAOs) for the selected removal action are as follows:

- **Protect Current and Future Beneficial Uses.** Remediate COCs in a manner that provides protection of human health and the environment based on reasonably anticipated current and future beneficial uses of Yosemite Slough, including those described in the Regional Water Quality Control Board's Basin Plan[2] and the California State Parks General Plan for the CPSRA[3];
- **Protect Human Health.** (a) Limit or reduce the potential risk to human health from the exposure to COCs through consumption of shellfish; (b) limit or reduce the potential for biomagnification of COCs to higher trophic levels in the food chain to reduce the risk to human health from consumption of sport fish; and (c) limit or reduce the potential risk associated with direct contact with sediment contaminated by COCs, including contact by workers and the general public; (d) Limit or reduce the potential risk to human health by achieving sediment remediation goals identified in Table 4 of this AM;
- **Protect Wildlife.** (a) Limit or reduce the potential risk to benthic feeding and piscivorous birds from exposure to COCs, including risk associated with consumption of contaminated prey and incidental ingestion of sediment; (b) Limit or reduce the potential risk to ecological receptors by achieving sediment remediation goals identified in Table 4 of this AM;
- **Support and Protect Healthy Aquatic and Benthic Communities.** (a) Limit or reduce the potential risk to aquatic and benthic communities; and (b) establish post-remedial slough bottom conditions that support slough habitat;
- **Prevent Site Recontamination and Prevent Contaminant Migration to Adjacent Areas.** Provide a remedy that (a) prevents, to the extent practicable, the migration of resuspended sediment during or following any removal operations to adjacent areas (e.g., California Parks wetland restoration areas, other wetland restoration areas, and South Basin), and; (b) ensures that the Yosemite Slough is not re-contaminated following remediation (i.e., permanence of the remedy);

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[2] Comprehensive Water Quality Control Plan for the San Francisco Bay Basin (as required by the Porter-Cologne Water Quality Control Act, Cal. Water Code Section 13240), Chapter 2 - Beneficial Uses and Chapter 3 – Water Quality Objectives for turbidity, dissolved oxygen, and toxicity (see Basin Plan Tables 3-3 and 3-3B).

[3] Candlestick Point State Recreational Area Final General Plan and Program Environmental Impact Report dated January 2013.

- **Protect local properties, residents, workers, and natural resources during sediment remediation.** Provide a remedy that limits or reduces, to the extent practicable, potential impacts on the surrounding community and environment during cleanup action activities (e.g., traffic, safety, dust, air emissions, odor, noise, potential for spills, carbon footprint, and business disruption); and,
- **Provide a Cost Effective Remedy.** Provide a remedy that provides the greatest value (i.e., cost-effectiveness) while still meeting the above RAOs.

Sediment cleanup levels

The Site RGs presented in Table 4 are the sediment cleanup levels for the Site. The Site RGs must be achieved upon completion of the construction phase of the selected removal action. The Effectiveness Monitoring Plan (see section on Selected Removal Action) will establish a testing protocol to determine if Site RGs and RAOs are being achieved.

The Site RGs for PCBs in sediment are based on human health and ecological risk assessments conducted by the U.S. Navy for HPS Parcel F and EPA understanding of the Navy's response to regulatory comments on the Parcel F feasibility study. The relevant exposure pathways and receptors at Site (as described in Section III) are similar to pathways and receptors evaluated for HPS Parcel F. The Navy's risk assessment studies for HPS Parcel F considered both bioconcentration and biomagnification when developing RGs protective of both human and ecological receptors. Based on the human health risk assessment for HPS Parcel F, preliminary remedial goals for PCBs in sediment ranged from 135 µg/kg to 13,500 µg/kg for cancer risks of 1 X 10^{-6} to 1 X 10^{-4}, respectively. A level of 1,350 ug/kg PCB which corresponds to a 1 X 10^{-5} cancer endpoint was initially selected for the protection of human health. The ecological risk assessment for HPS Parcel F derived a Not-to-Exceed (NTE) PCB concentration of 1,240 µg/kg PCBs as protective of ecological receptors assuming an ecological Site Use Factor[4] (SUF) of 0.5. The Navy's feasibility study ultimately selected a NTE value of 1,240 µg/kg PCB as the sediment remedial goal for Parcel F. In response to Regulatory Agency comments on the Parcel F feasibility study, the Navy presented additional data indicating that application of this NTE RG in Parcel F would create a post-remedial area-weighted average (AWA) of 386 µg/kg PCB in the top foot of sediment which in turn provides protectiveness to ecological receptors at a SUF of 1.0 and human health risk at approximately 3x10^{-6}. The PCB cleanup goal for sediment in Parcel F was based on the protection of ecological receptors that were determined also to be protective of human health. As explained in the Yosemite Slough EE/CA, Section 4.2.2.1, EPA determined that application of both the 1,240 µg/kg PCB NTE RG and the 386 µg/kg PCB AWA RG are essential for a protective cleanup at Yosemite Slough.

[4] Site Use Factor means the fraction of which an ecological receptor's total exposure occurs at a site.

A sediment remedial goal for lead was not determined at HPS because lead was determined to be co-located with PCBs. The Site RGs for lead are based on NOAA effects range median (ERM) for ecological receptors. EPA has determined that the Site RGs for lead based on the protection of ecological receptors are also protective of human health receptors because the lead RGs are consistent with EPA Region 9's Regional Screening Level (RSL) for lead in residential soil of 400 mg/kg and human receptors would be exposed to lead in Site sediment to a much lesser extent than under the typical residential scenario. In summary, EPA has determined that the Site RGs for PCBs and lead constitute fully protective standards to address Site-related risks to human health and the environment.

Table 4: Remedial Goals (RGs) for sediment at the Yosemite Slough Site

Contaminant	Remedial Goals	Reference
Total PCBs	1,240 µg/kg or less at a given location and an overall Sitewide area-weighted average of 386 µg/kg or less	HPNS F Parcel F FS and Yosemite Slough EE/CA
Lead	436 mg/kg or less at a given location and an overall Sitewide area-weighted average of 218 mg/kg or less	NOAA ERM and Yosemite Slough EECA

Notes: The remedial goals for PCBs at Yosemite Slough are based on exposure point concentrations to ecological receptors within the biological active zone (BAZ). As described in the Yosemite Slough EE/CA, EPA determined the Site BAZ to be the top 6-inches of sediments with an additional 18 inches for a conservative margin of safety. Therefore the RGs in Table 4 apply only to the top 2 feet of Site sediment and are not directly applicable to sediment beneath 2 feet to predict an unacceptable risk. These RGs shall be applied as not-to-exceed (NTE) and an area-weighted average (AWA) Sitewide within the BAZ throughout the Site.

Key:
ERM = effects range median
NOAA = National Oceanic and Atmospheric Administration
mg/kg = milligrams per kilogram
PCB = polychlorinated biphenyl
FS = Feasibility Study

The Selected Removal Action

The selected removal action is described as Alternative 5 in Section 8.2.5 of the Final EE/CA and consists of a combination of dredging, an engineered cap, Enhanced Monitored Natural Recovery and Monitored Natural Recovery (EMNR/MNR), Institutional Controls (ICs), effectiveness monitoring, and all the common removal action components identified in the Final EE/CA Section 8.1. The selected removal action for the Site consists of the following key components listed below in this section. If any differences between the selected removal action in the Final EE/CA and this AM are identified in the future, the description of the selected removal action is controlled by this AM.

- **Sediment Dredging and Debris Removal:** All Site sediment from 0 to 1 feet below sediment surface (BSS) that exceed Site RGs and sediment up to 2 feet BSS that exceed Site RGs in both the 0- to 1-foot BSS and 1 to 2 feet BSS shall be removed by dredging. The dredge aerial footprint, dredge depth, the need for isolation structures, dredge type (i.e., one or a combination of dredging "in the dry" or "in the wet") and exact dredge technologies (i.e., one or a combination of mechanical dredging equipment, hydraulic dredging equipment, long-reach excavators) will be determined in the design phase. The preliminary dredge layout is shown in Final EE/CA Figure 8-6 and Figure 3 of this AM. Based on the remedial criteria described in the Final EE/CA, a dredge volume of 9,900 CY is assumed with the understanding that the final dredge volume may be reduced or increased during the design stage. The 9,900 CY dredge volume estimate does not consider the additional volume from sloughing, establishing the dredge slope factors and any over-dredge requirements, and volume associated with Site debris removal. It is assumed that the exact dredge location and dredge volumes will be revised during the design phase once an updated understanding of the dredge boundaries is established based on design-stage technical studies. For example, the dredge volume may be reduced if EMNR/MNR is applied in areas of the Site where it is shown to be effective in reducing COC concentrations in the BAZ to below RGs. In addition, the dredge volume may be revised during the design phase once an updated understanding of the dredge boundaries, cap properties, Site hydrodynamics, and other design parameters are established and approved by EPA. Reductions of the cap thickness will be allowed by EPA only after evaluation of pre-design studies and only if it is determined that all required Site RGs and Site RAOs can still be maintained with a high degree of effectiveness in the long term. In addition to sediment dredging described above, certain debris located within the Site boundaries will be removed from the Site. In the Project design phase, protocols for removing debris within the Site boundaries will be defined. At this time, the EPA anticipates debris removal to include debris within the active excavation/construction zone and any observable debris (e.g., concrete, metal objects, and shopping carts) elsewhere within the Site boundaries whose removal would not create unacceptable short-term risk and contaminant migration.

- **Controls for sediment re-suspension:** Construction best management practices (BMPs), such as operational controls and specialty equipment, will be used during the dredging activities to reduce potential contaminant release and migration. To minimize the potential for sediment re-suspension, silt curtains will be installed during sediment removal activities. Due to bidirectional flows from tidal fluctuations, challenges to minimizing the migration of sediment may arise. The exact locations of the sensitive

areas to be protected (e.g., state parks wetlands restoration areas, HPS Parcel F, HPS Parcel E-2 wetlands restoration area, and remediated zones within the Site), and final layout of the silt curtains and other methods to be used to reduce migration of potential sediment suspension will be assessed and determined during the design phase.

- **Sediment and debris processing:** The selected removal action includes upland activities associated with the selected removal action, including sediment dewatering, sediment and debris processing, and sediment and debris storage prior to transport to off-site landfills. The location(s) of the sediment and debris processing area(s) will be determined during the design phase. A potential sediment processing area, the overflow parking lot for Candlestick Park (owned by CDPR), is shown in Final EE/CA Figure 7-1 and Figure 4 of this AM. An alternative sediment processing area, the Pier 96 area facility (owned by San Francisco Port Authority), is shown in Final EE/CA Figure 7-2. The final, selected sediment processing area will be determined during the design phase. The property or properties used for sediment and debris processing and project staging area(s) would need to be leased for access. The footprint of the sediment and debris processing area and project staging area(s) depend on the method of sediment/debris removal, total volume of sediment/debris removed, and sediment dewatering method. The dewatering method (i.e., mechanical dewatering or passive dewatering) and the appropriate use of additives (e.g., polymers) to facilitate the sediment dewatering process will be determined during the design phase.

- **Water treatment:** Water collected through Site dewatering (if any), sediment processing, and debris processing activities will be contained and treated as determined during the design phase. The treated water will likely be discharged to the SFPUC sewer system. Compliance with the substantive requirements of ARARs for this action along with the permits, if any, required for the disposal of treated water into the sewer system (any other appropriate disposal location) will be developed during the design phase.

- **Off-site transport, treatment, and disposal of contaminated sediments:** Dredged sediment and debris will be segregated based on the in-situ chemical properties of the materials. Prior to off-site transport, dredged materials will be tested and transported to off-site landfill(s) in accordance with ARARs (see Attachment 2). All wastes disposed off-site will be managed in accordance with EPA's Off-Site Rule. Based on testing conducted during the EE/CA, dredged sediment will likely be segregated into two groups: sediment classified as non-hazardous by the state of California and sediment

classified as hazardous by the state of California based on lead concentrations. To reduce the sediment disposal costs associated with handling and disposing sediment classified as California hazardous waste due to elevated lead concentrations, the lead-impacted sediment may be treated using a stabilization product to convert it into non-hazardous sediment prior to off-site disposal. The stabilization process may include the addition of a chemical treatment product to stabilize the metal contamination. After stabilization, the sediment will be sampled to determine the appropriate disposal location, and subsequently shipped off-site for disposal. Bench-scale studies may be necessary during the design phase to identify the appropriate chemical treatment product needed for treating the metal concentrations in the sediment.

- **Engineered Cap:** An engineered cap will be installed within the footprint of the Site sediment removal areas. The depth of the sediment removed will be dependent upon the final dredge depth and other design factors of the engineered cap determined during the design phase. The purpose of the cap is to isolate impacted sediment left in place from likely receptors. Standard of practice for cap design has been developed by the U.S. Army Corps of Engineers and will be followed. Selected methodology for designing cap thickness, known as the Palermo algorithm, includes evaluation of physical and chemical properties of native sediment and cap material. The Palermo algorithm states that total cap thickness is determined as the sum of the thickness of the following individual cap components:

  - **Bioturbation** – Bioturbation depth is the zone through which benthic organisms mix and disturb sediment. The cap thickness for bioturbation is determined based on the sediment depth associated with organisms that live or feed in the BAZ at the Site to be capped.

  - **Consolidation** – Consolidation in a capping context results from both the compression of the underlying sediment on which the cap is placed as well as the settlement and compression of the cap material itself for a period of time after placement. The cap thickness for consolidation is determined based on geotechnical parameters associated with the cap material and/or underlying native sediment.

  - **Erosion** – The cap thickness for erosion as a result of long-term continuous processes is determined based on site-specific hydrodynamics.

- **Operational Considerations** – Operational considerations include limitations of the equipment used to place the cap material, the water depth through which the material is placed, the specified tolerances to which the cap must be placed, and even the cap thickness itself (as thinner layers of material are more difficult to place). Long-term Site use must also be considered and accounted for, such as the potential for anchoring within the footprint of the cap, which could result in disturbances. The cap thickness for operational concerns is determined based on additional protective measures required for these types of considerations.

- **Physical/Chemical Isolation** – The necessity of a cap to provide physical and/or chemical isolation beyond what is accounted for in the layers discussed previously is determined based on advection and/or molecular diffusion flux of contaminants through the cap materials to the water column, and whether that flux requires a more significant thickness than is already designed for in the layers listed above.

Depending on the specifics of the Site, the in situ sediment, the COCs, and the sediment stability, many of these layers can serve multiple functions, reducing the overall thickness of the cap. To maintain current bathymetry within the Site, the cap thickness will not extend above the current bathymetry elevation, so sufficient sediment will need to be removed to allow for cap placement. A preliminary evaluation of cap thickness was completed using the Palermo algorithm, and for purposes of the EE/CA the required cap thickness is assumed to be 1 foot. However, cap thickness and associated dredge volumes will likely be revised during the design phase once an updated understanding of the dredge boundaries and cap properties are established. For example, it may be determined by the EPA that cap thickness may be increased or decreased based on new information collected during the design stage to ensure that the Site RGs and Site RAOs are maintained with a high degree of effectiveness.

- **Cap Source Materials:** Clean dredge material excavated from the San Francisco Bay will likely be used to construct the cap, assuming available sources and results of material testing showing that the material is suitable for capping and restoration of the Site marine mudflat habitat. The type, location, and placement of habitat features within the Site BAZ will be decided during the design phase.

- **Enhanced Monitored Natural Recovery and Monitored Natural Recovery (EMNR/MNR):** As a supplementary, optional component to this selected removal

action, EMNR/MNR may be implemented as needed in portions of the Site where the COC concentrations in the BAZ are marginally above RGs as determined by the EPA. MNR uses ongoing, naturally occurring processes to contain, destroy, or reduce the bioavailability or toxicity of contamination in sediment. EMNR includes placement of an appropriately designed clean thin sand layer to advance the natural sedimentation process and shorten the duration to achieve Site RGs and RAOs. Use of EMNR/MNR at the Site will be subject to EPA pre-approval, based on EPA risk management principles, and only in locations where technical design evaluations indicate EMNR/MNR will provide short-term and long-term effectiveness. Use of the EMNR/MNR, if any, will be determined during the design phase.

- **Institutional Controls (ICs):** The selected removal action requires ICs. ICs are non-engineered controls, such as administrative and legal (deed) restrictions, that help minimize the potential for human and ecological receptor exposure to contamination and protect the integrity of the remedy. ICs shall be applied across the entire Site to protect current and reasonable anticipated land uses at the Site. Current and reasonable anticipated land uses at the Site include marine wetlands with adjacent uplands ecological restoration and habitat including non-water contact recreation (e.g., walking, bike riding, bird watching and picnicking). The final set of ICs including protocols for the management and enforcement of ICs will be developed in an IC Management Plan developed during the design phase. All ICs will be generally consistent with the General Plan for the CSPRA. ICs likely to be included in the IC Management Plan include Site use restrictions, such as restrictions on use of boats with propellers, restrictions on the use of anchors at the Site, and limitations on public use of the Site (i.e., restrictions on fishing, shellfishing, and wading into the slough within the Site boundaries). Other potential ICs include public education warning signs covering topics such as Site history, the Site response action, fish advisories for San Francisco Bay, or other effective methods for informing and limiting human exposure to shellfish and fish taken from a particular water body historically known contain potentially unsafe levels of contaminants. These advisories can be issued in several forms, including a comprehensive Site-specific consumption guide or a general listing of state waterbodies and their associated consumption advice. Advisories can be issued to either the general population or focused sensitive subpopulations potentially at greater risk (e.g., children, pregnant or nursing women, environmental justice communities with multiple exposures to contaminants) to restrict or avoid consumption of specific species of fish and other wildlife caught locally. EPA may request that CDPR distribute information contained in the IC Management Plan to the general public concerning acceptable

activities at the CPSRA, including activity restrictions at Yosemite Slough. EPA may also request that Site IC surveillance patrols be staffed by CDPR CPSRA staff, who could routinely check for compliance with the use and activities restrictions ultimately selected for the Site in the IC Management Plan.

- **Slough bank stabilization:** The selected removal action requires shoreline stabilization along all shoreline areas within the Site boundaries. Shoreline stabilization refers to actions and materials placed along the landside edge of the dredge activities to prevent shoreline soils from becoming unstable and entering the dredge area during and after remedy construction activities. Prior to dredging activities, a shoreline survey will be completed to document the existing conditions along the shoreline. The survey will document locations of features and locations where existing bank erosion or failure has occurred, is occurring or may likely occur. Shoreline stabilization activities during dredging activities will be accomplished using multiple methods such as, but not limited to, placement of coir logs, wooden planks, armor stone, or similar materials. After dredging work is complete, the selected removal action requires all shoreline areas within the Site boundaries to be stabilized using both engineered methods (e.g., cutting back the slope of the Slough bank followed by placement of sand with underlying rock armor or articulated concrete mats) and natural methods (e.g., sand, mud, planting vegetation) in compliance with ARARs to maximize bank stability and minimize erosion for the long term. In coordination with the CDPR and the RWQCB, the post-dredging long-term slough bank stabilization activities may also include the design and construction of storm water best management features, and the restoration (e.g., plantings, walking trail) in coordination with CDPR's Yosemite Slough Wetlands Restoration Project. Details regarding the pre-dredging and post-dredging slough bank stabilization plans and techniques will be developed during the design phase.

- **CSO outfall apron modification:** Three CSO outfalls (see Figure 2) have the potential to discharge into the Site during heavy rainfall events. The selected removal action requires evaluation of the need for CSO apron modification and, if determined to be necessary by the U.S. EPA, design and construction of CSO outfall apron modifications at each of the three CSO outfalls. To ensure compliance with the Site RGs and RAOs, these three outfalls must not threaten the physical integrity and chemical quality of the selected response action, including the BAZ throughout the Site. Modifications to the CSO aprons will occur on an as-needed basis to ensure the chemical quality and velocities of the water flowing out of these outfalls and into the Site do not threaten the

protectiveness of the selected removal action. Other potential options, such as diversion of the CSO outfalls, will be evaluated during the design phase.

- **Post-removal site control and effectiveness monitoring**: Following the construction phase of the selected removal action, monitoring is required to evaluate the effectiveness of the selected removal action. A Post Removal Site Control and Effectiveness Monitoring Plan will be developed during the design phase and implementation of this Plan shall commence immediately following completion and demobilization of the construction components (i.e., dredging, engineering cap installation). Effectiveness monitoring will involve developing a baseline monitoring event of the BAZ, and regular inspections and sampling events of the Site to ensure that the selected response action performs as designed and RGs and RAOs are being achieved. The Post Removal Site Control and Effectiveness Monitoring Plan shall also include reasonable upland source control efforts to protect the effectiveness of the removal action and to ensure that compliance with Site RGs and RAOs are not threatened by upland sources of contaminants. As described in the EE/CA, upland source control efforts include, but are not limited to, Sewer Pre-Treatment Enforcement, Stormwater Management in the Yosemite Creek Watershed, and Prevention of Illegal Dumping in and near the Slough. The goals, content, frequency, and target analytes for monitoring, together with the content and the frequency of reporting, will be determined during the design stage. Target analytes will likely include Site COCs, Site potential COCs identified in the Final EE/CA, chemicals associated with the Site CSO overflows, and typical contaminants found in urban stormwater.

- **Odor, noise, dust, and traffic management**: Implementation of the selected response action, including but not limited to dredging, staging, and dewatering of contaminated sediments, may create construction-related impacts (e.g., air quality, odor, dust, noise and traffic) for the local community.

  - *Air Quality*. A project air quality management plan will be developed during the design phase and implemented during the course of the selected removal action. This plan may include the assessment and modeling of potential air quality impacts (including potential odor, dust, noise, and air toxics) and identification of air quality monitoring, mitigation, and contingency action measures to be used during removal action activities.

    Local City of San Francisco ordinances will apply to noise generating equipment and activities during the implementation of the selected removal action. Dredged

sediments are wet and generally remain damp throughout the de-watering process, which reduces the risk of dust generation. The primary potential for dust during the selected removal action derives from truck traffic on dirt roads, which will need to be maintained (e.g., through use of gravel and/or regular wetting). Site sediments are often rich in natural organic matter and its decomposition after removal may create unpleasant odors. During the remedy design stage, tests of Site sediments will be conducted to evaluate the potential for odor generation and the associated need for odor mitigation measures. In addition, dredging or sediment dewatering activities have the potential to release toxic chemicals into the air, creating a potential risk to site worker safety and the nearby community. The air quality management plan will identify measures to minimize odor and air toxics and dust emissions. The plan will also identify action levels under which contingency actions must be activated to order to protect site worker safety and the nearby community.

- *Traffic.* A traffic management plan will be developed during the design phase and implemented at the Site during the course of the selected removal action. The plan will specify the allowable truck haul routes to and from the Site and shall generally be restricted to the roads identified in Figures 7-1 and Figure 7-2 of the Final EE/CA. In addition, the plan will specify how the removal action work will comply with the local traffic regulations and will include protecting existing nearby road features, such as curbs, pavement, and utilities; maintaining access for fire-fighting equipment and access to fire hydrants; minimizing disturbance to public travel; and coordinating traffic routing with others working in the same areas. Traffic management will be analyzed in the plan during the design stage and methods to reduce or minimize each impact will be developed and integrated into the Plan.

- **Preliminary list of design studies:** Technical studies required to support the development of the design documentation for the selected response action include, but are not necessarily limited to, the following:
  - Physical and chemical characteristics of sediment resuspension;
  - Engineered cap design details;
  - Groundwater quality and flow;
  - Backfill and cap material assessment and testing;
  - Site-specific evaluation of BAZ to support cap design;
  - Hydrodynamic study and potential cap scouring effects to assist design with the armoring details of the engineered cap ;
  - Sediment odor generation potential;

- EMNR/MNR evaluation;
- Remediation effectiveness evaluation;
- Sediment dewatering system design details;
- Wastewater treatment system design details;
- Lead in sediment pre-treatment alternatives and disposal design details;
- Upland source control planning;
- Geotechnical evaluation of sediment and wastewater treatment areas; and
- CSO flow quality and flow rate study to evaluate the need for CSO modifications to ensure the response action protectiveness.

Additional design studies may be identified during the design process.

Rationale for the selected removal action

Of the seven alternatives evaluated in the EECA, the selected removal action offers the best opportunity to achieve all project goals and sediment cleanup goals in a timely, efficient, and permanent fashion while minimizing short-term impacts to the Site ecology and local community. The selected removal action provides sufficient certainty that long-term effectiveness will be achieved so that human health and environment will be protected.

2. Contribution to remedial performance

Based upon available information, the selected removal action is anticipated to be a final response action under CERCLA. No further responses action under CERCLA will be required if the selected removal action is implemented and successfully achieves RAOs and RGs.

3. Engineering Evaluation/Cost Analysis (EE/CA) and community involvement

The draft EE/CA dated July 2013 evaluated seven alternatives providing a broad range of effectiveness and cost. The draft EE/CA was released for 30-day public comment period from August 7 to September 6, 2013. Upon request from a member of the public, EPA extended the comment period for one week until September 13, 2013. EPA's recommended alternative in the Draft EE/CA was Alternative 5 and is generally the same as Alternative 5 in the Final EE/CA. The final EE/CA is dated December 2013. Alternative 5 in the Final EE/CA is EPA's selected response action for the Yosemite Slough Site and is described in Section V of this AM.

EPA engaged in extensive public outreach to encourage community involvement during development of the Draft EE/CA. On August 1st, 2013, EPA staff presented on overview of EPA's upcoming proposed plan to the Alice Griffith Tenant's Association, a large housing complex located approximately 3 blocks from the Site. On August 5th, EPA published Public Notices in the San Francisco Examiner Newspaper (a newspaper of record for San Francisco County) and in the Bayview Footprints E-Newsletter. EPA also published a public notice in the August edition

of the San Francisco Bayview National Black Newspaper. EPA issued an 8-page Proposed Plan factsheet summarizing the draft EE/CA and explaining how the general public can provide comments to EPA. The Proposed Plan factsheet was mailed in hardcopy to several hundred addressees of people who have expressed interest in the Yosemite Slough project. The factsheet was also distributed widely via email to hundreds more recipients who have a general interest in projects and activities in the Hunters Point and Bayview neighborhoods. In addition, EPA staff hand-delivered copies of the Proposed Plan factsheet to businesses within approximately 2 blocks of the Yosemite Slough Site. On August 7th, EPA issued a press advisory regarding EPA's proposed cleanup plan for the Site and a story about the project was broadcast on San Francisco's ABC television news affiliate on August 15th. On August 14th, the Bayview Footprints published an article entitled "Tide of Change Rises on Yosemite Slough," and on August 15th, the San Francisco Examiner published an article entitled "Yosemite Slough on EPA's Agenda." From 6pm to 8pm on August 21st, EPA held a formal public meeting at the Bret Harte Elementary school in the Bayview neighborhood. EPA's presentation and a full transcript of that public meeting are available in the administrative record for this AM. EPA received a total of 88 comments on the Draft EE/CA. EPA's responses to comments can be found in Appendix H (Responsiveness Summary) of the Final EE/CA and in Attachment 1 of this Action Memorandum.

Administrative Record. Upon issuance of the Draft EE/CA and Proposed Plan factsheet, EPA made available an administrative record of all associated supporting documentation concerning the Site and development of the Draft EE/CA. The administrative record for the Draft EE/CA was located at the following locations:

- Arc Ecology Inc, 1331 Evans Avenue, San Francisco, CA 94124
- U.S. EPA Record Center, 95 Hawthorne Street, 4th Floor, San Francisco, CA 94105
- San Francisco Bayview Library, 5075 3rd Street, San Francisco, CA 94124

The Final EECA, including EPA's written response to all comments on the Draft EECA received during the public comment period, and all other supporting documentation associated with this Action Memorandum can be found in the administrative record file for the Site. The administrative record file for this AM can be found at the same locations listed above.

4. Applicable or Relevant and Appropriate Requirements (ARARs)

The EPA has identified potential applicable or relevant and appropriate requirements (ARARs) for the selected removal action described in Section V of this Action Memorandum. The EPA's document "Guidance on Consideration of ARARs during Removal Actions" was considered during the development of ARARs for this removal action.

Applicable requirements are cleanup standards, standards of control, and other substantive requirements, criteria, or limitations promulgated under federal environmental or state environmental or facility siting laws that specifically address a hazardous substance, pollutant, contaminant, remedial action, location or other circumstances found at a CERCLA site. Relevant and appropriate requirements are cleanup standards, standards of control, and other substantive requirements, criteria, or limitations promulgated under federal environmental or state environmental or facility siting laws that, while not "applicable" to a hazardous substance, pollutant, contaminant, response action, location or other circumstances found at a CERCLA site, address problems or situations sufficiently similar to those encountered at the CERCLAsite and are well-suited to the particular Site. Other information to be considered generally falls within three categories: health effects information with a degree of credibility, technical information on how to perform or evaluate site investigations or response actions, and policy.

For the Yosemite Slough Site, ARARs were presented in Appendix F of the Draft EE/CA and in Appendix F of the Final EE/CA. Final ARARs selected for the selected response action can be found in Attachment 2 of this Action Memorandum. Pursuant to 40 CFR 300.415(j), removal actions shall, to the extent practicable considering the exigencies of the situation, attain ARARs.

5. Project schedule

The following presents the current anticipated schedule for the selected removal action:

2014: Commence technical design studies for the selected removal action.

2016: Complete design studies and commence design documentation.

2017: Completed design documentation. Commence and complete construction-related activities for the selected removal action.

2018: Commence long-term Post-Removal Action Site Control activities.

B. Estimated Costs

A detailed cost estimate of the selected removal action is provided in Table G-8 of the Final EE/CA. The 2013 present worth cost estimate for the selected removal action is $15,478,000. This cost estimate does not include estimates of other costs such as EPA intramural direct labor, EPA travel, and EPA indirect costs, and subsequent enforcement costs that are recoverable under Section 107 of CERCLA.

VI. EXPECTED CHANGE IN THE SITUATION SHOULD ACTION BE DELAYED OR NOT TAKEN

Based on current information, should the selected removal action be delayed or not taken, the threats to public health, welfare, and the environment will continue unabated. In addition, if an extreme weather event occurs, including an intense prolonged rainfall event, the Site CSOs may discharge to the Site in a manner that may cause Site contamination to migrate into the CDPR wetlands project area or the Navy's HPS Parcel F.

VII. OUTSTANDING POLICY ISSUES: None.

VIII. ENFORCEMENT

The purpose of an AM is to document the threats posed to public health, welfare, and/or the environment and document the decision to undertake the selected removal action. For administrative purposes, the enforcement strategy is included as an addendum to this AM. The enforcement strategy addendum is considered U.S. EPA attorney work product and shall not be released under the Freedom of Information Act (FOIA) or during civil discovery or included in the Administrative Record.

IX. RECOMMENDATION

This decision document represents the selected removal action for the Yosemite Slough Site (aka Yosemite Creek Sediment Site), in San Francisco, CA, developed in accordance with CERCLA as amended, and is not inconsistent with the NCP. This decision is based on the administrative record for the Site. Conditions at the Site meet the NCP section 300.415(b) criteria for use of removal authority under CERCLA and I recommend your approval of the selected removal action. At this time, EPA anticipates the Site potentially responsible parties will pay for and perform the selected removal action. EPA future response costs will consist of action to perform oversight of the PRP performance of the selected removal action.

Approved by: _____ Date: 3/17/14

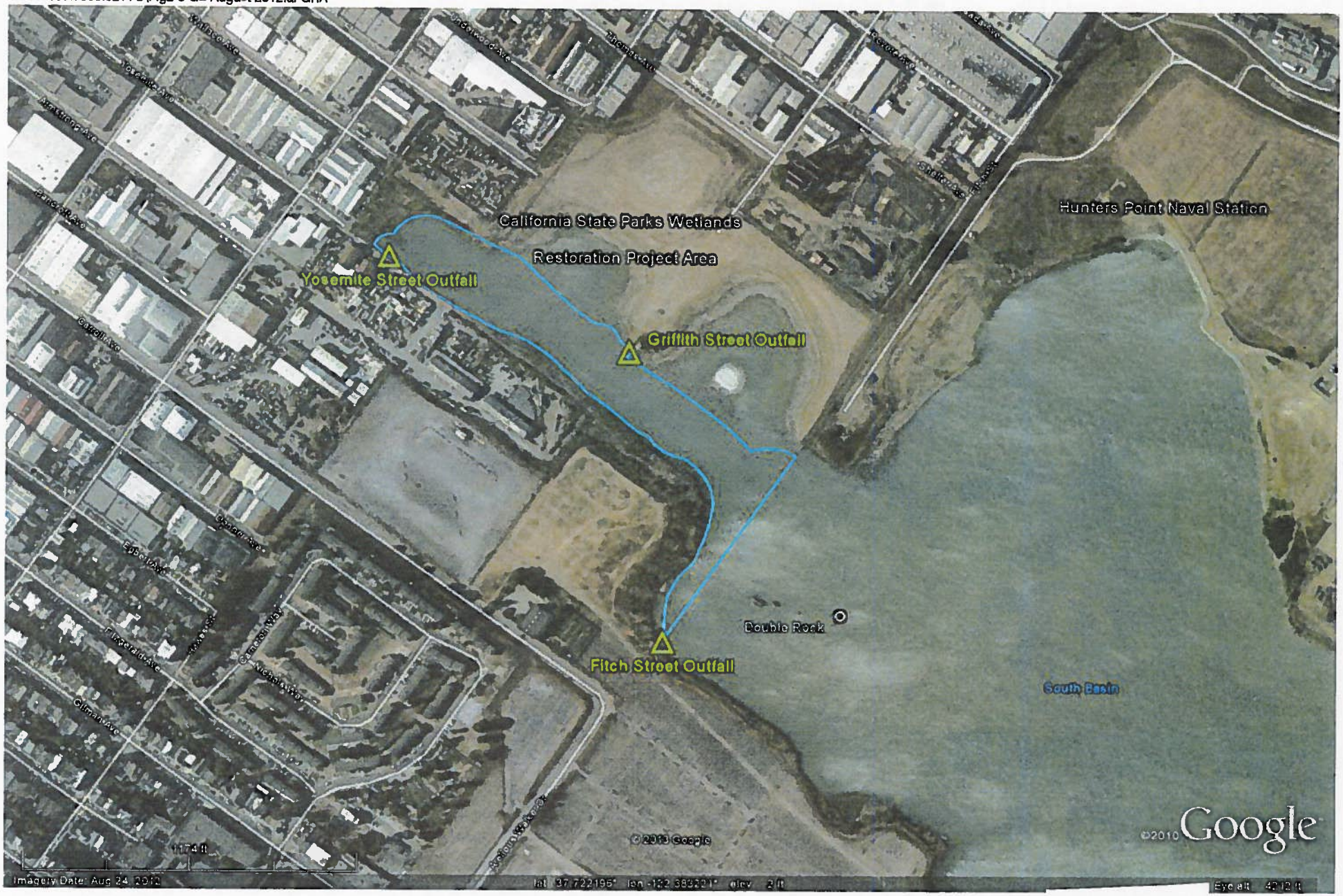
Angeles Herrera
Assistant Director, Superfund Division

Attachments:

- Attachment 1: EPA responses to comments on the Draft EE/CA
- Attachment 2: Final ARARs for the selected response action
- Attachment 3: Final EE/CA for the Yosemite Slough Site dated December 2013 [Note: Due to the large file size of this document, it is not physically attached to this AM. The Final EE/CA can be found in the Site administrative record.

M:\Oakland\Creek\Maps\MXD\Report\2012_December\Site_Location.mxd Figure 1-1 Site Location Map
Source: Esri 2011, 2011 National Geographic Society
CALIFORNIA
Sacramento
Area of Detail
San Francisco
Fresno
Las Vegas
Los Angeles
NEVADA
San Francisco Bay
Site Location
Candlestick Park
Site Boundary
N
0 0.25 0.5 1 Miles
Figure 1
Site Location Map
Yosemite Slough
San Francisco, California
ecology and environment, inc.

02:002693.7008.02TTO\Fig2-3 GE August 2012.ai-GRA

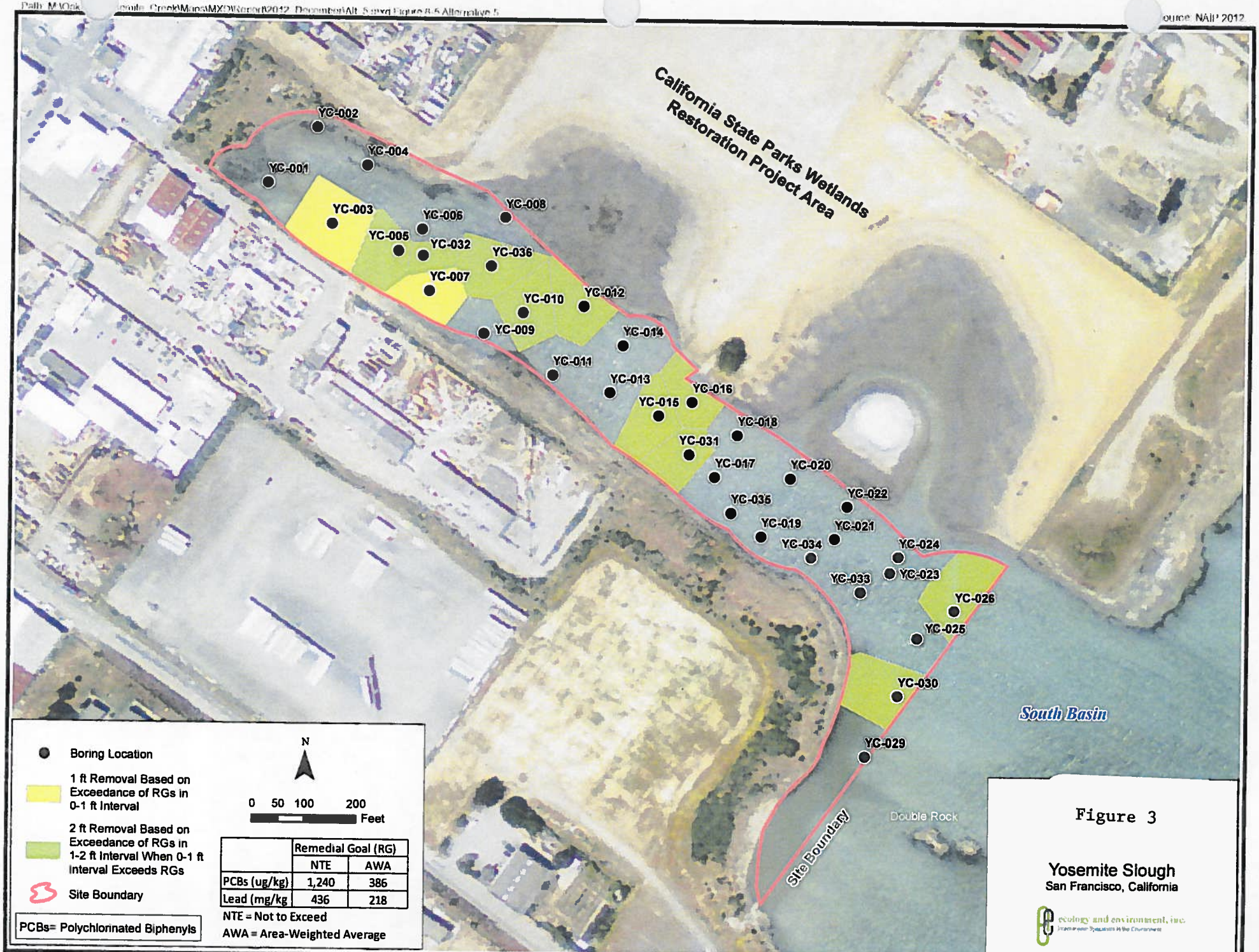


Site Boundary

N

Figure 2

August 2012 Aerial Photograph
Yosemite Slough
San Francisco, California


California State Parks Wetlands Restoration Project Area
YC-002
YC-004
YC-001
YC-003
YC-006
YC-008
YC-005
YC-032
YC-036
YC-007
YC-010
YC-012
YC-009
YC-014
YC-011
YC-013
YC-016
YC-015
YC-018
YC-031
YC-017
YC-020
YC-035
YC-022
YC-019
YC-021
YC-034
YC-024
YC-033
YC-023
YC-026
YC-025
YC-030
YC-029
South Basin
Double Rock
Site Boundary
Boring Location
1 ft Removal Based on Exceedance of RGs in 0-1 ft Interval
2 ft Removal Based on Exceedance of RGs in 1-2 ft Interval When 0-1 ft Interval Exceeds RGs
Site Boundary
PCBs= Polychlorinated Biphenyls
N
0 50 100 200
Feet
Remedial Goal (RG)
NTE
AWA
PCBs (ug/kg) 1,240 386
Lead (mg/kg 436 218
NTE = Not to Exceed
AWA = Area-Weighted Average
Figure 3
Yosemite Slough
San Francisco, California
ecology and environment, inc.

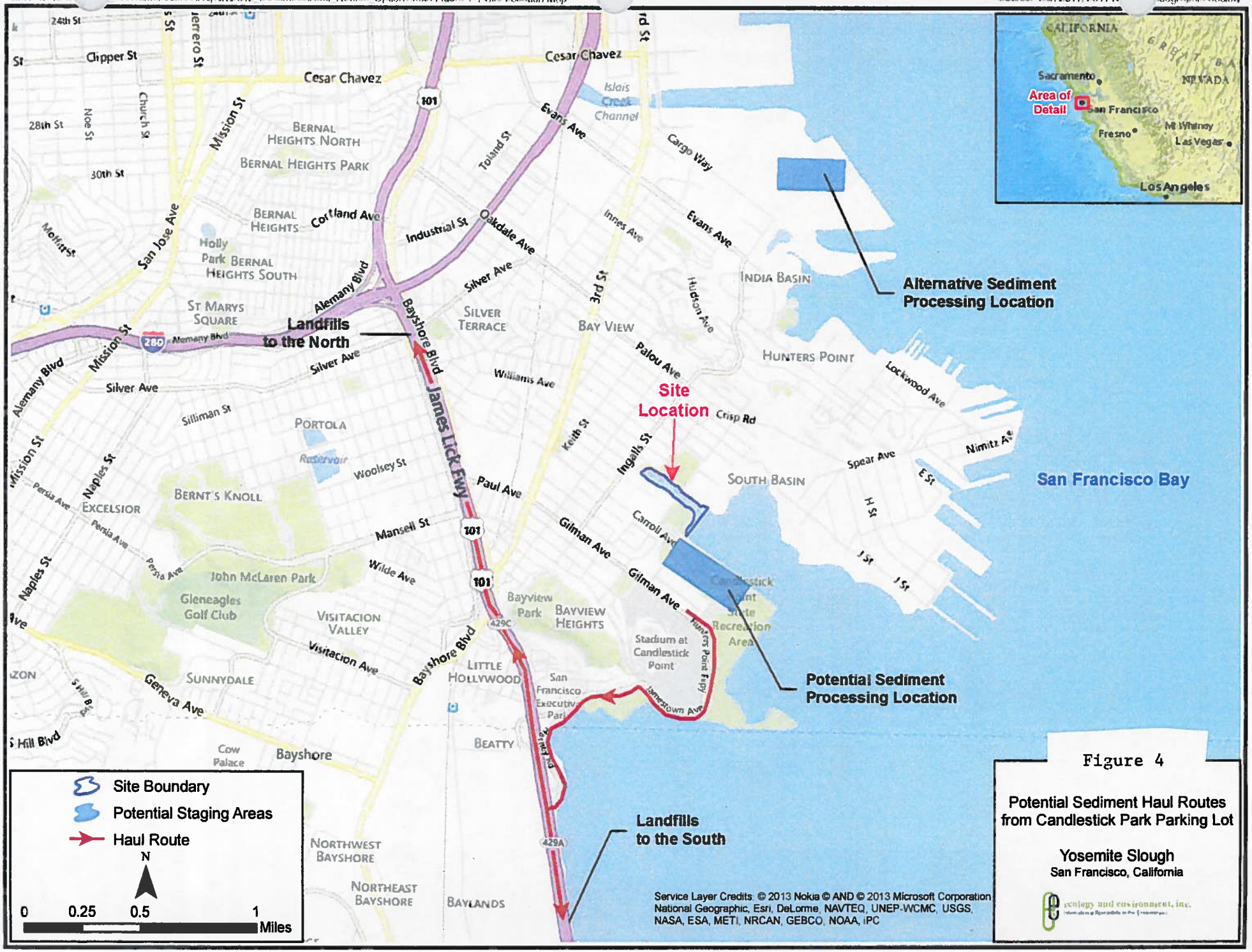


Figure 4

Potential Sediment Haul Routes from Candlestick Park Parking Lot

Yosemite Slough
San Francisco, California

ecology and environment, inc.

Attachment 1: RESPONSIVENESS SUMMARY

EPA Response to Public Comments on the Draft Engineering Evaluation/Cost Analysis

YOSEMITE SLOUGH, SAN FRANCISCO, CALIFORNIA

No.	*Page*	*Line/Para/Sec*	*Comment*	*EPA Response*
Spoken Comments at U.S. EPA Public Meeting on August 21, 2013				
1.			One of my concerns has nothing to do with our neighborhood. It has to do with the fact the natural cleanup of our environment for some of the PCBs is not happening. So it's always been my problem that we are taking our problem, putting in a landfill that a hundred years from now somebody's going to build on it. What --? Is there any --? On the land deed, is there anything that will notice folks a hundred years from now that this is contaminated material that was dumped in your area?	Yes, all authorized waste disposal facilities (i.e., landfills) in California and throughout the country are required to put a notice on their property deeds regarding the type of facility that is operating or has operated at the property. These notices are intended to prevent future redevelopment on the property and development that is not compatible with the historical uses of the property.
2.			The sewer pipes. Do those have a possibility of recontaminating later on?	Yes, the three combined sewer overflows (CSOs) at Yosemite Slough present a threat of re-contamination after the cleanup action is complete. However, the EPA is fully aware of these three CSOs and we will ensure that appropriate steps are taken to prevent the CSOs from re-contaminating the Yosemite Slough Site in the future. The EPA intends to have the San Francisco Public Utility Commission (SFPUC) conduct technical studies regarding the chemical mass loading and volumetric flowrate coming from their CSOs to determine if these loadings will threaten the selected response action's (Alternative 5) capacity to comply with the site removal action objectives (RAOs) and site remedial goals (RGs). The SFPUC has previously conducted preliminary tests of these CSOs and the results are encouraging (O'Neil 2011 and SFPUC 2009). However, now that the final response action has been selected for the Site, the EPA will require additional tests and an evaluation of the CSOs during the remedy design stage. As a result of these tests and evaluation, the EPA will integrate appropriate

No.	Page	Line/Para/Sec	Comment	EPA Response
				mitigation measures into the response action design to ensure the CSOs do not threaten success of the Yosemite Slough Site cleanup.
3.			I have a question pertaining to not the slough, but the area that's being -- has already been repaired. What is the contamination level of that ground, or does this not concern --?	Yes, there is some contaminated land surrounding the Yosemite Slough Site. During the remedy design stage, the EPA will consider the importance of this contamination with respect to the success of the Yosemite Site Cleanup. For example, the selected response action, Alternative 5, requires several technical studies and actions (e.g. CSO studies, Slough Bank Stabilization, Reasonable Upland Source Control, and groundwater monitoring) to better identify, evaluate, and mitigate threats to cleanup success. In addition, the State of California Department of Parks and Recreation (CDPR) has already begun cleaning up contaminants and restoring wetlands plants and habitat on its property immediately around Yosemite Slough. The CDPR has completed its Phase 1 project on the north side of the slough and subsequent cleanup and phases are being planned. The CDPR is doing this under an order from the California State Water Resources Control Board (Water Board). The Water Board's Order requires soil cleanup standards that must be achieved (Water Board 2011).
4.			My name is Jose Jimenez, To start off my presentation, I think it's great to see that we're cleaning up Monsanto's mess, the company that creates all the pesticides and insecticides that were used in the past couple decades. National -- National Geographic released an article in 2008, five years ago, about lead-tolerant worms that changed the chemistry in the meadows such that it becomes inert, and it allows plants to process it much easily. I believe that can also be of great use to the marshland, knowing that the lead levels are above average. And I believe that as like a -- a process before about dredging the water, it might be useful maybe to put those worms out there and get that lead to become inert. That way the plants can process it much easily. And also, I did some research, and I found out that vitamins, B12s, are nucleophiles, and they're also reducing catalyst, which means that	Thank you for your interest in innovative methods using natural processes such as earth worms to render toxic substances less toxic. The EPA shares your interest in this important topic. At this point, the EPA is not aware of aquatic marine-based worms that can cause a beneficial remediation result. The earthworms described in the National Geographic article live in soil and would not survive the salt water environment of Yosemite Slough. The earthworms described in the article remove metals from soils in conjunction with terrestrial plants growing in the soils and

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			they reduce the time between chemical reactions and that they are -- they're also -- they can potentially dechlorinate polychlorinated biphenyl, PCBs. So it may also help in doing that process. So that's what I got to say.	would not likely be effective in removing PCB contamination. During the remedy design phase, the EPA will search the research literature on this topic further to determine if there are marine invertebrates that do exist that exhibit similar resistance to, and mobilization of, metals. However, even if such marine invertebrates exist, birds and fish would prey on these invertebrates and likely uptake the contaminants into the food web.
5.			Greetings. Anthony Khalil, A-n-t-h-o-n-y, K-h-a-l-i-l. Greetings. Thank you, Jose, for kind of start the public comment of this. I want to kind of put -- I want to be cogent, but I also want to thank Mr. Cooper for the presentation, kind of the framework for this cleanup. Something I think that was omitted was the fact that -- you know, that probably gleaned from the paper that came out was the fact that this is the first official cleanup of Yosemite Slough in its history. And we have quite an opportunity here, okay. With that opportunity, I feel we have to conduct and invest to prevent recontamination. That's the piece to focus that I would like to highlight because we are making the investment in the southern shoreline. As you can see, it's transforming. I've been part of this transformation personally for close to 15 years now in the southern shoreline in ecological restoration work. But I come here as, you know, someone who's part of this community. I don't live here, but I've been working here for close to 15 years, and it's a part of my great community that I feel is -- is integral of being an urban resident, my ability to access open space, my ability to nourish and steward our ecological treasures like Yosemite Slough. So I want to highlight that as well. And I appreciate Mr. Cooper giving this -- this picture that it is a watershed that connects to McLaren Park. And it is quite a living classroom. I facilitated, you know, thousands of students to access the shoreline as a community park but with a state park. And something of interest to me is this opportunity for a living shoreline approach. And it's taken the perspective that the shoreline will evolve over time. And we have this potential maybe to not just rid it of toxins, but bring in what we do want to see, and that is increasing wetland habitat, that is increasing the next generation's potential to engage with their natural environments. And here we are in this -- in this area, Bret Harte, right, which is literally a stone's throw from the slough. So we do have to make	The EPA agrees that there is an important connection between the health of the Bayview community and the long-term success of the Yosemite Slough Site cleanup and other shoreline cleanup programs in eastern San Francisco County. The EPA also agrees that preventing exposures to toxic chemicals and the restoration of the shoreline (i.e. re-planting and encouraging the return of healthy natural processes) are essential to the long-term health of Yosemite Slough. In addition, as described in the EE/CA, Section 3.2, the EPA understands that upland source controls measures must be undertaken to address the threats of slough recontamination. The EPA's selected response action, Alternative 5, includes slough bank stabilization to prevent recontamination via erosion of the slough banks. The EPA will collaborate with state agencies, the City of San Francisco, and local non-profit groups to identify and implement appropriate upland source control measures needed to protect the success of the Yosemite Slough Site cleanup.

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			this -- you know, take this opportunity and really plan for the future. And what I mean by that is creating a living shoreline through means of -- I am a scientist, you know, by training. And so my approach is say sure, let's go into subtidal restoration and really start thinking about oyster beds and how they filter our waters and how -- and then how they process contaminate. And then I start thinking about the approach of, of course, terrestrial restoration, you know, restarting our wetlands, what these areas once were. But again, we're in a urban setting, and we have to -- we have to think about price. We have to think about, of course, the techniques; and we have to also think about what is the investment that future generations would pay. So without getting into those complexities, I want to recommend is -- is taking a living shoreline approach, and I hope to do influence that with a formal recommendation, writing it and continuing this dialogue through -- through multiple means, this kind of hybrid approach that is valuing people's connection to their local environs, which is in my opinion an inalienable right. It's everyone's right to get access to open space that is adjacent to their doorways or not and in this urban kind of quandary of saying, well, how do we rid of these contaminants now, but how do we enhance and increase our connection and our general comfort with our environment? You know, we're sitting here, and to me I think of mud as sediment, okay. But also for some I also have a humility to understand that yeah, it's just mud. Who cares about that? But if we understand and we're informed and there's -- there's groups that I work with professionally that want to disseminate this information and not just say, hey, it's polluted. But no, here is the opportunity on how we can kind of reverse this legacy. So I really want to stress this approach, and I hope to make a formal recommendation on how to prevent the recontamination and how to actually increase it ecologically but socially as well. So thank you all.	
Written Comment from David Froehlich transmitted via email dated August 14, 2013				
6.			I have briefly skimmed the PDF about the cleanup and hope to attend the meeting on 8/21 but a quick concern that came up was how they were going to truck the contaminated soil from the site out of the city and what will prevent it from being deposited along the truck route through our neighborhoods? Thanks in advance for your response and hope to be at the meeting!	Figures 7-1 and 7-2 present preliminary truck routes to be used to haul away sediment from a potential sediment processing area at the Candlestick Park Overflow Parking Lot or the Pier 96 facility area respectively. In either scenario, the preliminary truck routes would minimize use of roads within residential areas of the Bayview neighborhood. In addition, the EE/CA, Section

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				8.5.1, states that a Traffic Management Plan will establish Project criteria for minimizing truck travel in residential areas, covering loaded trucks so that contaminated soil, mud or dust is not released, spilled or tracked onto public streets in the Bayview neighborhood. At the Project design phase, specific details regarding the mud drying locations, final truck, rail or barge haul routes, and transportation protocols will be described in the Project specifications and the Traffic Management Plan.
Written Comments from Keith Foreman, U.S. Navy BRAC Environmental Coordinator, Hunters Point Naval Shipyard, transmitted via email dated September 12, 2013				
7.		General Comment	EE/CA does not adequately address the implications of the new configuration of Yosemite Slough. The changes in hydrodynamic conditions resulting from the construction of a wetland on the north side of the slough is described in the EE/CA as a data gap that will be addressed during pre-design. It is questionable whether evaluating the changes in hydrodynamic conditions and potential impacts of wetland construction on contaminant distribution should be postponed to pre-design. All of the alternatives are based on the contaminant distribution prior to the wetland construction project. The removal footprint shown in the EE/CA for each alternative could be different as a result of the new configuration. In addition, the new configuration may have resulted in increased polychlorinated biphenyl (PCB) flux between the Slough and the South Basin resulting in potential for greater dispersion of PCBs out of Yosemite Slough. The text states that preventing site recontamination and contaminant migration to adjacent areas is one of the removal action objectives, yet recontamination may have already occurred as a result of the wetland construction project.	The EPA acknowledges that the actual hydrodynamics of the Yosemite Slough Site will be influenced by recent and upcoming changes to the configuration of the slough shoreline. The EE/CA, Section 2.6, states that based on a modeling study by Noble Consultants, Inc., the CDPR Yosemite Slough Wetlands Restoration Project design is expected to result in most of the restoration area being inundated by water from the San Francisco Bay less than 20% of the time, with maximum tidal current velocities less than 0.05 m/sec. This report concludes that weak tidal currents in the restoration area will not likely induce any resuspension of sediment or induce any noticeable erosion in the Yosemite Slough. Nevertheless, the EE/CA, Section 9.3, identifies the need for limited sediment contaminant data gap testing event at the Yosemite Slough Site to support the configuration of the dredging component in the remedy design. Barring any unusually significant storm events prior to implementation of the selected response action, the EPA believes that actionable sediment contaminant concentrations within the Yosemite

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				Slough Site are now and will continue to be generally stable within the Site. The Noble Consultants Study states that wave action induced by the 10-year to 50-year storm events could induce erosion at the mouth of the Slough with greater erosion potential east of the Site in South Basin. During periods of wave action, sediment deposition will also occur; therefore, the actual net erosion during the extreme storm events may be less than the estimated erosion potential. Because this concern represents a data gap with regards to the potential for deposition, erosion, or scour, the EE/CA, Section 9.3, also requires hydrodynamic modeling of the Yosemite Slough Site during the design stage to better estimate net erosion potential within the Site based on the current and future projected geometries of the slough to ensure the long-term protectiveness of the selected response action for the Site.
8.		General Comment	The Parcel F remedial goals are misrepresented. The EE/CA text states that the removal action objectives and remediation goals for Yosemite Slough were developed to be consistent with the Parcel F remediation goals. The EE/CA is not completely accurate and misrepresents the remediation goals for Parcel F. The EE/CA states that Parcel F has a remedial goal for PCBs based on an area weighted average of 386 micrograms per kilogram (µg/kg), which is not accurate. The 386 µg/kg value is the calculated post-remediation area weighted average concentration in South Basin after the 1,240 µg/kg not-to-exceed remediation goal has been applied. It is not a preliminary or a final remediation goal. During the development of the remediation goals for Parcel F, the regulatory agencies requested that field-collected tissue data be considered. The Navy and regulatory agencies agreed on a risk management approach of using the field-collected tissue data results to bound the range of site use factor (SUF) used to develop the preliminary remediation goals. It was agreed that a SUF of 0.5 to a SUF of 1.0 would be evaluated which resulted in a corresponding range of preliminary remediation goals (See Table 2-2 of the Parcel F FS).	In response to this comment, the EPA revised the EE/CA to clarify the following: (1) the Navy's current position is that the sediment remediation goal (RG) for PCBs in Hunters Point Naval Shipyard Parcel F (Parcel F) is only the not-to-exceed (NTE) standard of 1,240 micrograms per kilogram (µg/kg) PCBs; (2) the 386 µg/kg area weighted average (AWA) remediation goal PCBs is based on the EPA's understanding of the Navy's response to regulatory agency comments on Parcel F documentation. As explained in the EE/CA, Section 4.2.2.1, with respect to cleanup of PCBs in Yosemite Slough, it is EPA's position that both the 1,240 µg/kg NTE RG and the 386 µg/kg AWA RG are essential for a protective cleanup. The EPA believes both standards are appropriate for contaminated sediment in Parcel F as well. The EE/CA will continue to adopt both the NTE and AWA sediment remediation goals for PCBs at the

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			Ultimately, the remediation goals were defined as "do-not-exceed" values reflecting a SUF of 0.5 to result in an area weighted average for the COCs representing the ecological preliminary remediation goal based on a SUF of 1.0 (PCB concentration of 620 µg/kg). The final remediation goal for PCBs in Parcel F is 1,240 µg/kg, which the Navy and agencies agreed to apply as a not-to-exceed value (See Table 2-3 of the Parcel F FS).	Yosemite Slough Site. The EPA will coordinate with the Navy and state agencies to ensure that protective standards are ultimately adopted in Parcel F as well.
9.	2-2	2.2	"Hunters Point Shipyard Superfund Site" should be changed to "Hunters Point Naval Shipyard".	The EE/CA was edited to make this change.
10.	3-9	3.4.2	This section reports that the distributions of lead and PCBs are similar, and that remediation based on PCBs will also address risks due to lead and reduce concentrations of other contaminants. How was co-occurrence of PCBs and lead established?	During the development of the EE/CA, the EPA mapped PCB and lead contaminant data Site-wide. The EE/CA, Section 3.4.2, was edited to add additional information regarding the general co-occurrence of PCB and lead exceedances. As stated in Section 3.4.2, out of the 36 sediment sample locations Sitewide, only two sample locations (YC-017 and YC-024) show concentrations of lead above the screening level when PCB concentrations are less than the screening level.
11.	3-7	3.3.2	The total PCB concentrations for Yosemite Slough sediments are calculated as either the sum of detected Aroclor concentrations, or the sum of 28 PCB congeners X 2.3. The site-specific PCB remediation goal for HPNS Parcel F is based on the sum of the NOAA National Status and Trends (NS&T) 18 congeners X 2. The EE/CA should calculate total PCB concentrations for Yosemite Slough sediments using the same method that was used for the Parcel F remediation goal to provide consistent comparison of site data to the remediation goal. Alternatively, the EE/CA could provide an analysis demonstrating that the various methods of calculating total PCB concentrations provides sufficiently comparable results.	The EPA conducted a cursory review of its PCB analytical laboratory data set for Yosemite Slough and found that PCBs detections were focused on less than 15 congeners. Therefore, total PCB concentrations based on 18 congeners times 2 (as used by the Navy in Parcel F) or 28 congeners times 2.3 (as used by the EPA in Yosemite Slough) would result in essentially the same total concentration within a 10% error range. Although minor edits were made to the EE/CA, Section 3.3.2, to clarify the EPA's method to calculate total PCB concentrations, the EE/CA was not edited to present total PCB concentrations based on 18 x 2 as such calculations are un-necessary as both the Navy and EPA total PCB concentrations for Parcel F and Yosemite Slough respectively are considered accurate and representative of PCB contamination at both sites.

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12.	4-6	4.2.2.1	This section should describe the human health preliminary remedial goals for HPNS Parcel F. The human health preliminary remedial goals for PCBs in sediment ranged from 135 µg/kg to 13,500 µg/kg for cancer risks of 1 X 10^{-6} to 1 X 10^{-4}, respectively. Additionally, as noted in the General Comments, the area weighted average of 386 µg/kg is not a remediation goal for Parcel F. Applying the do-not-exceed remediation goal of 1,240 µg/kg, which corresponds to the ecological preliminary remedial goal based on a SUF of 0.5, should result in a post-remediation area weighted average of 386 µg/kg. This area weighted average is below the more protective ecological preliminary remediation goal based on a SUF of 1 (620 µg/kg).	See the EPA's response to Navy General Comment Number 2 above. The EE/CA, Section 4.2.2.1, was edited to clarify the Navy's human health preliminary remedial goals for Parcel F. However, it continues to be the EPA's position that both the NTE and AWA RGs for PCBs in sediment are needed at the Yosemite Slough Site for protection of both human health and ecological receptors.
13.	4-7	4.2.2.2	The text states, "The Navy found that surf scoters may be at risk from . ingested doses of copper, lead, mercury, and PCBs, if the birds obtain more than 50% of their daily food intake from the South Basin." Copper and mercury were not found to pose a risk to benthic-feeding birds in South Basin.	The EE/CA, Section 4.2.2.2, was edited to remove reference to copper and mercury as posing a risk to benthic-feeding birds in the South Basin.
14.	4-8	4.2.2.2	The text states, "The Navy concluded that the cleanup goals for PCBs in Parcel F sediment that were developed for the protection of human health were also protective of current ecological receptors." This sentence should be revised to indicate that the reverse was the case - the Navy concluded that the PCB cleanup goals based on the protection of ecological receptors were also protective of human health.	The EE/CA, Section 4.2.2.2, was edited as requested.
15.		Table 6-1	As described under General Comments, the 386 µg/kg is not a remediation goal for Parcel F; the reference for the PCB remediation goal of 1,240 µg/kg should be the Parcel F FS (April 2008).	See the EPA's response to Navy General Comment number 2. Table 6-1 in the EE/CA was edited to clarify that the EPA's selected sediment RGs for PCBs are based on the Navy Parcel F feasibility study (FS) and the EPA's understanding of the Navy's response to regulatory agency comments on the Parcel F FS.
16.	6-3	6.2	The text states, "This goal was derived from human health and ecological risk assessment work …" The remediation goal of 1,240 µg/kg is based on the protection of benthic-feeding birds (ecological risk) only. This remediation goal was found to be protective of human health.	The EE/CA, Section 6.2, was edited as requested.
17.	7-4	7.1.3	The text states, "The May 2, 2005, HPNS Parcel F Validation Study Report estimates approximately 6 to 8 cm/yr of sediment accumulation based on radioisotope data from two locations within the Slough. However, the Navy later modified this estimate by stating that the dates and sediment	The EE/CA, Section 7.1.3, was edited as requested.

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			accumulation rates determined for the cores from Yosemite Slough should be considered unreliable given the disrupted radioisotope profiles." Both the estimates of the sediment accumulation rates in Yosemite Slough and the assessment of their reliability were reported concurrently in Appendix M of the Parcel F Validation Study Report (2005).	
18.	7-4	7.1.3	The correct references for sediment accumulation rates in South Basin are Appendix M of the Parcel F Validation Study Report (2005) and Appendix E of the Parcel F FS Data Gaps Technical Memorandum (2007).	The EE/CA, Section 7.1.3, was edited as requested.
19.	7-4	7.1.3	A decrease in organochlorine pesticide concentrations in sediment between 1998-2000 and 2009-2012 is cited as evidence of natural recovery. Other lines of evidence should also be developed and considered. Do concentrations of other contaminants show a similar decline in the same time frame? Multiple lines of evidence indicate that natural recovery is occurring in South Basin due to progressive burial by relatively cleaner sediment from San Francisco Bay. Most of the 2009 sediment cores from Yosemite Creek have similar profiles as the cores from South Basin, with a distinct subsurface peak in PCB concentration, typically between 1-2 or 2-3 feet below the sediment surface.	The EE/CA, Section 3.3.3, states that the concentrations of organochlorine pesticides have naturally attenuated and the frequency of detections are statistically low enough to no longer be considered as contaminants of concern (COCs). For purposes of the EE/CA, lead and PCBs are the only COCs carried through to the alternatives analysis. The EE/CA, Section 7.1.3, states that some evidence of natural recovery via progressive burial is observed in the Yosemite Slough Site. However, progressive burial processes have not consistently addressed PCBs and lead detections in several locations in the biologically active zone of the Site. During the remedial design stage, a data gap sediment sampling program of COC and COPCs (including organochlorine pesticides) will be investigated at specific areas of concern Sitewide to support the final remedy design.
20.	7-7	7.1.4	In situ treatment with activated carbon was not retained for further consideration because it is considered experimental in nature. However, this technology has advanced beyond the experimental phase. The EE/CA should summarize and consider the results of the activated carbon pilot testing performed in South Basin as part of the technology screening evaluation, and the information provided in EPA's "Use of Amendments for In Situ Remediation at Superfund Sediment Sites" (OSWER Directive 9200-2-128FS (April 2013).	The EE/CA, Section 7.1.4, was edited to remove the term "experimental" when describing in situ treatment using activated carbon.
21.	7-9	7.1.6	The site-specific evaluation of dredging should more specifically consider potential recontamination of the adjacent areas such as the planned wetland in Parcel E-2 at Hunters Point Naval Shipyard.	The EE/CA, Section 7.1.6, was edited to clarify that excavation near the eastern portion of the Yosemite Slough Site poses a potential risk of recontamination in adjacent areas.

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22.	8-10	8.3	The text states that the MNR/EMNR may be implemented in areas where chemical concentrations are marginally above the remedial goals. These areas may also be candidates for in situ treatment with activated carbon.	For the reasons provided in the EE/CA, Section 7.1.4, in situ treatment was screened out due to concerns regarding long-term effectiveness of this technology for both PCB and lead contamination in the biologically active zone. However, it should be noted that the EPA edited the EE/CA Section 8.1.10 to allow design flexibility to allow the potential integration of activated carbon into a layer of the engineered cap.
Written Comments from Bridgette DeShields, Principal Scientist, Integral Consultant, Inc. dated September 12, 2013				
23.		Introductory Section of Comment Letter	This letter provides comments on the Draft Engineering Evaluation/Cost Analysis, Yosemite Slough, San Francisco, California, Public Comment Draft dated July 2013 (the EE/CA) prepared by the U.S. Environmental Protection Agency (EPA) and Ecology and Environment, Inc. It is apparent that EPA has spent significant time and effort in evaluating site conditions, conducting technical evaluations, and reaching out to stakeholders throughout the development of the EE/CA. Considerable progress has been made in the last few years. In all, the document provides well-founded technical assessments, utilizes a multi-technology approach, which is appropriate, and includes a set of alternatives that is appropriate for evaluation in an EE/CA. EPA recognizes that additional work is necessary in the design process to further refine the preferred alternative prior to implementation, and we generally concur with this recommendation. However, as explained more fully below, we believe that Alternative 2 is the most appropriate and supportable remedy for this site. The comments below address both overarching issues in the document as well as more detailed comments on specific portions of the EE/CA.	The EE/CA selected Alternative 5 for the Site. Because Alternative 5 assumes a dredge volume deeper than the assumed protective engineered cap depth of 1 foot, cap thickness and associated dredge volumes under this alternative may be revised during the design phase once an updated understanding of the dredge boundaries, cap properties, Site hydrodynamics, and other design parameters are established and approved by the EPA. Reductions of the cap thickness under Alternative 5 will be allowed by the EPA only after evaluation of all pre-design studies and determination that all required Site RGs and RAOs can still be maintained with a high degree of long-term effectiveness.
24.		General Comment	The EE/CA mentions the need for source control (Section 3) and provides a brief summary on "Reasonable source control efforts underway or under consideration for the Site . . . ." No.1 on EPA's list of eleven "Risk Management Principles Recommended for Contaminated Sediment Sites" is "Control sources early." Contaminated Sediment Remediation Guidance for Hazardous Waste Sites at 1-5 (U.S. EPA 2005 OSWER 9355.0-85) ("2005 EPA Contaminated Sediment Guidance"). However, we are not aware of site-specific efforts under way for any of the listed items. Based on the observed quality of the surface sediments, it is likely that there are	The EPA agrees with this comment. The EE/CA, Section 3.2, discusses the scope of upland source control measures that are needed to be in place to protect the slough after the cleanup is complete. Slough bank stabilization (Section 8.1.1), CSO outfall modification (Section 8.1.2) and upland source control (Section 8.1.3) are integrated as part of Alternative 5, the selected response action for the Yosemite Slough Site. The EE/CA, Section

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			ongoing sources of contamination to the slough. These may be due, in part, to inputs from stormwater drainage and combined sewer overflow ("CSO") events, as well as potential run-off from uncontrolled erodible sources, which are a potential source of contamination, at upland properties abutting the slough. Efforts in the near term should be undertaken to completely document the inputs from the sewer system and show scientifically, through careful evaluation of the loadings from the outfalls and modeling of the potential for recontamination, that the outfalls will not cause recontamination of the slough after the removal action. Equally important potential sources include local industries, erodible bank soils, and groundwater. These potential sources must be evaluated in the near term and if ongoing sources are confirmed, appropriate source control measures must be implemented before the start of any removal action. We are particularly concerned about the erodible bank soils, which are the responsibility of the particular property owners, because the banks of the slough are composed of the same industrial fill that likely present beneath in the slough and is a likely source of original contamination. Aside from the need for near-term efforts to confirm that adequate source control is in place to protect the investment in the removal action, additional efforts are warranted to coordinate the schedules of the other planned activities in the immediate vicinity including cleanup of the adjacent State Parks parcel and coordination with the U.S. Navy for the Hunters Point Parcel F cleanup.	8.1.2, was edited to clarify those both chemical and physical impacts of the CSO outfalls may not be allowed to undermine the protectiveness of the selected response action. The EE/CA, Section 9.3, identifies the need for pre-design studies on these three elements plus a Site groundwater quality and flow study. In addition, land under control of the California State Lands Commission and CDPR located adjacent to the Site is now undergoing cleanup and restoration by the CDPR. During the Project design stage, the EPA will continue its efforts toward upland source control development and implementation. In addition, the EPA will work with its partners at the State (e.g. the Regional Water Quality Control Board [RWQCB]) to ensure appropriate Project sequencing and coordination between remediation work at the Yosemite Slough Site and adjacent areas (i.e. California State Parks Wetland Restoration and U.S Navy remediation of Parcel F-South Basin.
25.		General Comment	Costs presented in the EE/CA are inconsistent with those presented in the Fact Sheet and at the Public Meeting. Moreover, the costs presented are likely low due to optimistic assumptions and uncertainty about how the removal action would actually be conducted. It is acknowledged that the relative ranking of the alternatives in terms of cost is not likely to change and therefore, the selection process described in the EE/CA, in which cost is one factor, is not likely to change (but see General Comments 6–8 below). Nevertheless it is critical for EPA, the parties expected to fund the cleanup, and the public to have a reasonably accurate (for this stage in the process) idea of the anticipated cost of the removal action. Our independent estimate for Alternatives 2 and 5 suggests that the costs for these alternatives are likely to be at the higher end of the range presented, perhaps about $13,000,000 and $17,000,000, respectively. See Specific	Based on these comments and all other comments concerning cost estimation, the EPA made several edits to the EE/CA's cost estimates for each alternative. Alternative 5, the EPA's selected response action, is now estimated to cost between $15.1M and $15.5M.

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			Comment 7 for more detail with respect to the estimate.	
26.		General Comment	All of the alternatives evaluated, with the exception of the no-action alternative, meet the remedial action objectives (RAOs) provided in Section 6. Thus, any of the alternatives provide adequate protection of human health in the environment. The following are comments on the various alternatives: a. As demonstrated by the post-remedial calculations, most of the remedies are expected to achieve the numeric remedial goals immediately following remedy implementation with the exception of Alternatives 3 and 4, which rely on subsequent natural recovery processes. These alternatives likely would be equally effective to the preferred alternative, but we understand that EPA did not favor them due to current uncertainties associated with natural recovery processes in Yosemite Slough. However, EPA has retained some consideration of natural recovery processes in the selected alternative and we agree that this is appropriate. Natural recovery processes are likely to occur at some level at least for portions of the slough and should be more thoroughly considered in the design process. See also General Comments 5 and 8 below. b. Alternatives 6 and 7 result in post-remedial concentrations well below the remedial goals; actions at this level are not warranted and also would have significant impacts on the surrounding community if implemented (e.g., truck traffic, noise, air quality, and other impacts). We agree that these alternatives should not be considered further. c. Alternatives 2 and 5 are both predicted to result in post-remedial concentrations below the remedial goals and thus are equally protective. In addition, following remedy implementation, the concentrations are likely to be even lower where natural recovery occurs. Alternatives 2 and 5, as discussed below, both rank similarly and are simply variations of the same alternative with differences in the depth of excavation tied to a conservative "margin of safety" beyond the biologically active zone (BAZ). The use of the margin of safety may result in an unnecessary	The EPA has retained monitored natural recovery (MNR)/enhanced MNR (EMNR) in Alternative 5 for the reasons explained in the EE/CA. Although dredging and removal of exceedences of RGs remain an essential work element of Alternative 5, the EPA anticipates a complete evaluation and appropriate implementation of the other work elements included in Alternative 5 to maximize the timely and long-term protectiveness of each work element. Alternatives 6 and 7 were not selected by the EPA for the reasons provided in the EE/CA, Section 9. The EPA selected Alternative 5 for the reasons explained in the EE/CA (see the EE/CA, Section 9.2.2). As stated in several places in the EE/CA, the final dredge depth in the portions of the Site where the biologically active zone exceeds remedial goals will be determined during the design phase and will be based on engineering factors, Site RGs and RAOs, and data developed during the design phase.

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			increase in the cap thickness at a significantly higher and potentially unnecessary cost and additional community impacts. The thickness of the cap should instead be determined by the engineering and other design work that will be done prior to implementation of the remedy. The design work will determine the appropriate cap thickness and capping materials required to achieve a robust barrier that would provide any necessary margins of safety and meet the RGs. See General Comments 6 through 8 below.	

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27.		General Comment	The EE/CA utilizes site-specific data and risk evaluations conducted for Hunter's Point Naval Shipyard (Parcel F, South Basin) sediments in developing remedial goals that meet the RAOs. We concur with this approach given that site-specific sediment characteristics are expected to be similar between South Basin and Yosemite Slough. In addition, habitat, exposure pathways, and receptor types are similar between the two areas. The site-specific evaluation of special status species provided in Appendix A of the EE/CA substantiates that the remedial goals for PCBs are also protective of species that may be present in the slough in the future (i.e., the California clapper rail). Furthermore, the Hunters Point risk assessment was reviewed by multiple stakeholders and regulatory agencies and approved by EPA through a rigorous multi-year process. Finally, the remedial goals are in the range of values used in the San Francisco Bay Area and nationwide. The following are some examples: a. The lead remedial goal is the effects range median (ERM) value and has commonly been used as a remedial goal in San Francisco Bay and other sites within California, such as at the G&R Metals site in Eureka, California: http://geotracker.waterboards.ca.gov/profile_report.asp?global_id=T0602393235. b. The PCB remedial goal is consistent with other cleanup goals in San Francisco Bay, such as Seaplane Lagoon with a cleanup goal for PCBs of 1.13 ppm: http://www.envirostor.dtsc.ca.gov/public/profile_report.asp?global_id=01970005&site_id=2002640. c. The PCB remedial goal is also consistent with other goals used at other sites in the U.S., including the Koppers Pond Operable Unit of the Kentucky Avenue Wellfield Superfund Site in New York State (Draft Feasibility Study is currently in review with a cleanup goal for PCBs of 1 ppm). Other sites such as the Fox River and Housatonic River specify 1 ppm as the cleanup goal for PCBs.	The EPA agrees that similarities between the two sites support using data and risk evaluations from HPNS to develop remedial goals in this EE/CA. Please see the EPA's response to Navy General Comment No. 2 for the EPA's position regarding PCB RGs for the Yosemite Slough. However, the EPA notes that sediment RGs, including RGs for PCBs, can vary widely nationwide based on site-specific characteristics including habitat, exposure pathways, and receptor types.

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28.		General Comment	We understand that EPA has concerns about Monitored Natural Recovery (MNR) as a remedial technology on the grounds that currently there are insufficient data in the record to demonstrate that natural recovery is occurring now such that one could confidently model future rates of MNR in the Slough. However, analyses of the data from 1998 and 2009, as limited as the data might be, indicated that the concentrations of PCB and lead appear to have been reduced, in some cases up to about 70%, by ongoing natural recovery processes in the Slough. Just as EPA plans to gather additional data during the design phase to enable proper cap design - and, in effect, a choice between Alternatives 2 and 5—we recommend that EPA also collect data relevant to measuring rates of natural attenuation. If such data are gathered and one is able to model future rates of MNR with confidence, then it may well be appropriate to reconsider Alternatives 3 and 4 during the design phase. As pointed out in EPA's 2005 Contaminated Sediment and mentioned in Section 7.1.3 of the EE/CA, MNR is less disruptive to site ecology and has fewer short term impacts to the community than technologies that rely on sediment removal to achieve RAOs.	As described in the EE/CA, Section 9.2.1, Alternative 5, the selected response action, identifies the opportunity to integrate MNR/EMNR into the response action design. As described in the EE/CA, Section 9.2.1, the MNR/EMNR will be considered to address portions of the Site where the biologically active zone is only marginally above RGs. As the commenter points out, Alternative 5 effectively integrates MNR/EMNR into the selected response action for significant portions of the Site where the biologically active zone already meets RGs. Alternative 5 requires monitoring of the BAZ Site-wide to ensure RAOs and RGs are achieved immediately after the construction phase of the Project and in the long-term. The final scope and role of MNR/EMNR will be determined during the response action design phase.
29.		General Comment	Alternatives 2 and 5 both have an overall "high" score in Table 9-1. This is based on the fact that both alternatives meet all RAOs and achieve the same post-removal action area-weighted averages (AWAs) of 123 mg/kg for lead and 315 µg/kg for PCBs. The functional difference between the alternatives is in dredging volume (5,900 CY vs. 10,700 CY), and, of course, the related differences in cost, duration, and short-term negative impacts. Assuming, as we should at this point, that an effective cap can be designed to isolate the sediments below 1 foot as would be needed for Alternative 2, there is no compelling reason to select Alternative 5, particularly because its selection will not achieve any greater effectiveness in achieving the RAOs over Alternative 2. Moreover, because of its additional dredging volume, Alternative 5 will impose greater short-term impacts on the community because it will generate double the number of trucks and result in a longer construction duration than Alternative 2.	The EPA generally agrees with this comment with some important exceptions. The EE/CA, Section 9.2.2, explains that Alternatives 2 and 5 obtain the best overall ranks compared to the other alternatives. The EPA recommends the selection of Alternative 5 due to its potential to provide more certainty with respect to long-term effectiveness compared to Alternative 2. However, these alternatives are similar, varying mostly in the assumed thickness of the engineered cap. As described in Section 8.6, Alternative 5 assumes a deeper dredge depth than the assumed protective engineered cap thickness of 1 foot in Alternative 2. Thus, cap thickness and associated dredge volumes under Alternative 5 may be revised during the design phase once updated understandings of the dredge boundaries, cap properties, site hydrodynamics, and other design parameters are established and approved by the

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				EPA. Reductions of the cap thickness under Alternative 5 will be considered by the EPA after evaluating pre-design studies and determining that required Site RGs and RAOs can be attained and maintained with a high degree of certainty for long-term effectiveness.
30.		General Comment	The selection of Alternate 5 is contrary to the requirement that a remedy be cost effective. Section 121(a) of the Comprehensive Environmental Response, Compensation, and Liability Act ("CERCLA"), concerning cleanup standards, states as follows: > The President shall select appropriate remedial actions . . . which provide for cost-effective response. In evaluating the cost effectiveness of proposed alternative remedial actions, the President shall take into account the total short- and long-term costs of such actions, including the costs of operation and maintenance for the entire period during which such activities will be required. 42 U.S.C. § 9621(a); see also 42 U.S.C. § 9621(b)(1) ("The President shall select a remedial action . . . that is cost effective."). EPA's Guidance on Conducting Non-Time-Critical Removal Actions under CERCLA (PB93-963402, August 1993) ("Removal Action Guidance") cites the cleanup standards set forth in CERCLA Section 121. See Removal Action Guidance at 44. The Removal Action Guidance recognizes that "[a]n EE/CA serves an analogous function, but is more streamlined than the RI/FS conducted for remedial actions." *Id.* at 20. Thus, it is appropriate to look to the requirements for a Remedial Investigation/Feasibility Study ("RI/FS") when evaluating an EE/CA for a removal action. That is especially the case when considering the factor of cost; after all, the name of the operative document is "Engineering Evaluation/Cost Analysis." The National Contingency Plan (the "NCP") is quite clear on this point. Section 300.430 of the NCP requires that each remedial action selected through an RI/FS be cost-effective. See 40 CFR 300.430(f)(1)(ii)(D). Cost effectiveness is determined by comparing overall effectiveness to	The EPA disagrees that Alternative 2 is more cost-effective than Alternative 5. The EE/CA, Section 9.2.2, provides information that explains why Alternative 5 provides greater certainty in achieving long-term effectiveness than Alternative 2. Without first ensuring effectiveness, cost-effectiveness cannot be ensured. Alternative 5 also contains the flexibility to attain maximum cost-effectiveness during the design phase. The commenter must remember that the EPA places great importance on long-term effectiveness in this EE/CA and will continue to do so in the design phase. Alternative 2 does not include the flexibility to confirm optimum long-term effectiveness to achieve maximum cost-effectiveness during the design phase.

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			cost. *Id.* The NCP further states that "[a] remedy shall be cost-effective if its costs are proportional to its overall effectiveness." *Id.* Based on EPA's own evaluation as summarized in Table 9-1, both Alternatives 2 and 5 have an overall "high" score based on effectiveness and implementability. However, EPA's cost estimates for Alternate 5 are more than $4 million more (or 40% to 50% more, depending on dredging method), than the cost estimates for Alternate 2, without a corresponding increase in effectiveness, and thus under the NCP standard quoted above, Alternate 5 is not as cost effective as Alternative 2.	
31.		General Comment	Based on General Comments 6 and 7 above, we disagree with EPA's preference for Alternative 5 and suggest that Alternative 2 is the more appropriate alternative based upon the EE/CA and NCP selection criteria. We further suggest that EPA, at a minimum, clearly state the similarity of Alternatives 2 and 5 and make clear that Alternative 5 has higher cost and community impact with no commensurate benefit in effectiveness. Given the selection of a capping remedy, the design process should dictate the final decision on the cap material and thickness, and thus removal volume, as well as the shape and size of the polygons for removal and methods for remediation. Furthermore, if natural recovery processes are favorable, based on additional studies conducted during design, Alternatives 3 and 4 could be reconsidered or MNR/EMNR could be more significantly relied upon for the selected alternative and in refining the areas subject to dredging and capping, as discussed in General Comment 5.	Comment Noted. Alternatives 3 or 4 cannot be implemented at the Site without formal EPA modification to the EE/CA and associated Action Memorandum.
32.		Specific Comment, Section 2.1	While the general description of the Site provided here is sufficient to orient the readers of the EE/CA, this language should be clarified. We recommend inserting language following the first sentence in the second paragraph of Section 2.1 that states as follows: "Thus, the western and southern boundaries of the Site are defined by the current MHWL, while the northern and eastern boundaries of the Site exclude the CDPR's restoration areas. These boundary lines will be properly surveyed as a part of future work." We also concur that the definition of the Site includes suitable areas in proximity to the Site where it is necessary to implement the cleanup	The EE/CA, Section 2.1, was modified to address this comment and other comments concerning Site ownership.

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			response action. See 40 CFR 300.5. These areas could include sediment dewatering and other areas necessary for remedy implementation.	
33.		Specific Comment, Section 2.4	Description of geology in Yosemite Slough is inaccurate because it does not clearly state that fill exists within the slough as well as on the banks. As written, the draft EE/CA implies that the contamination came to exist within the slough as a result of water transport and typical sedimentary processes, which is inconsistent with the site conceptual model. Rather, it should explain that the site geology includes a layer of industrial fill placed in the 1940s. This layer, rather than any truly sedimentary layer, likely contains the majority of the inventory of the constituents of interest.	The EPA believes that the EE/CA, Section 2.4, adequately identifies potential mechanisms for Site contamination. No changes were made to the EE/CA due to this comment. However, the Site conceptual model will continue to be modified as additional Site data is evaluated during the remedy design phase.
34.		Specific Comment, Section 3.2	The cleanup planned for the State Parks property should be listed as source control measure. Fill soils containing contaminants are present on the State Parks property south of the slough. Also, all available data for that property should be added as an appendix to the EE/CA, including all data submitted to the Regional Water Quality Control Board.	The EE/CA, Section 3.2, lists the State Park Wetlands Restoration Project as an on-going source control effort in relation to the Site cleanup selected in the EE/CA. The EPA disagrees that data generated for State Parks under the RWQCB Order for the Wetlands Restoration Project should be added as an appendix to the EE/CA. Please direct your request in this matter to the RWQCB as they are the lead regulatory agency for the State Parks project at Yosemite Slough.
35.		Specific Comment, Section 4.2.2	In the second full paragraph on page 4-4, the third sentence states that an 18-inch margin of safety may be needed to protect bat rays. However, the remedial goals are designed to be protective of all aquatic life. Nonetheless, based on the second part of that sentence that discusses burrowing marine animals, it is assumed that the issue being addressed is bioturbation. We agree that bioturbation and the depth of the BAZ should be addressed in the design of the cap. We also understand that the 18-inch margin of safety was added to allow for uncertainties associated with the depth of bioturbation as well as other factors, including erosion and scouring. It is, therefore, recommended that this sentence be deleted and replaced with the following sentence after the sentence beginning "During the design stage…" "A number of factors will be considered in design, including the depth of bioturbation, erosion, and scouring within the slough, and other types of disturbance that could impact the long-term performance of the selected remedy."	The EPA believes the current text about the potential for bat ray burrows is appropriate. The EPA disagrees that the 18-inch margin-of-safety is overly conservative at this point in the response action development process (i.e. pre-design). The EPA inserted the suggested sentence in the EE/CA, Section 4.2.2.

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			Furthermore, as discussed in General Comment 3, the margin of safety is a conservative relatively arbitrary designation and is driving the selection of Alternative 5 over Alternative 2. The design performed in advance of the implementation of the remedy will dictate the necessary thickness and composition of the cap, including accounting for a margin of safety, at various locations at the site.	
36.		Specific Comment, Section 6.2	In the third sentence of the last paragraph, delete the words "where exposure and risk may occur." Exposure and risk would only occur in the BAZ, which is currently defined as 6 inches.	The EE/CA, Section 6.2, was edited as suggested.
37.		Specific Comment, Figure 8-3 and 8-6	Polygon YC-018 is included in the remedy for Alternatives 2 and 5, but it does not meet the criteria for inclusion. The lead and PCB concentrations in the 0- to 1-foot interval are below the not-to-exceed remedial goals. Either this point should be excluded from the remedy or a reason provided for its inclusion.	Polygon YC-018 was found to be below the NTE RGs and was removed from the dredging volume of Alternatives 2 and 5.
38.		Specific Comment, Table 9-1	Cost estimates presented in this table do not match those presented in EPA's Fact Sheet. The costs in Appendix G, which form the basis of Table 9-1, should be rechecked for applicability and accuracy and a consistent set of costs developed for the EE/CA and Fact Sheet. One particular concern is the cost for hydraulic controls presented for the mechanical and hydraulic dredging variations in each alternative. In the case of the mechanical dredging variation, a cost of $1,818,000 for a cofferdam is described as follows: "Soldier beams & lagging H piles with 3" wood sheeting horizontal between piles, including removal of wales and braces, no hydrostatic head, 36' – 45' deep with 4 lines of braces, 14" H. Includes Material, Labor and Equipment Costs. Depth needed is based on the Geotechnical study results. Assume length needed is 1000' across the mouth of the Slough and a depth of 36 feet." However, the text in Section 7.1.6 states that: "Mechanical dredging 'in the dry' involves excavation of sediment after isolating the sediment from the water column using water control structures, such as berms or steel sheet pile walls to divert the water from the excavation area. The area would be isolated using one or more of the following	The EE/CA has been revised so that the cost estimates referred to in the text match the cost estimates identified in the cost tables. The cost estimates for several line items were adjusted to address this comment and other comments concerning the costs estimates presented in the EE/CA. Ultimately, the relative cost difference among alternatives did not change significantly and the rationale for the selection of Alternative 5 is provided in the EE/CA, Section 9.2.2.

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			technologies: sheet piling, earthen dams, cofferdams, geotextile tubes, and inflatable dams. The feasibility and cost of hydraulic isolation of the dredging area during remediation is a major factor in selection of dredging in the dry. Once isolated, standing water within the excavation area would be removed by pumping. Any continuing inflow due to seepage from groundwater or through the water control structures must be managed throughout the process, typically by automated pumping systems." These two descriptions are in conflict because the description in Section 7 calls for hydraulic control but the text in Appendix G disclaims the ability to allow achievement of a differential hydraulic head. Similarly confusing is the fact that the hydraulic dredging estimates in Appendix G do not include the same $1,818,000 cofferdam line item as in the mechanical dredging estimates, but rather a $410,000 line item for a cofferdam of unspecified type and dimensions (based upon an unsupported quote from JND Thomas). We believe that hydraulic dredging would have as much, if not more need for hydraulic control within the slough during the work. Perhaps most importantly, the feasibility of any cofferdam to control the water level in the slough was put in question by ARCADIS's May 2012 Geotechnical Data Report[1]. The variable thickness of the sediment layers and the presence of bedrock at highly variable depths led the authors of that report to conclude: "A relatively simple cofferdam may consist of a cantilever sheet pile structure. Cantilever sheet pile structures rely on embedment into subsurface materials for stability. Because sheet piles cannot be driven into bedrock, a minimum thickness of sediment or soil is required above bedrock to achieve stability. The required thickness of sediment/soil depends on the strength of the subsurface material and the loading conditions. A cantilever sheet pile	

[1] http://yosemite.epa.gov/r9/sfund/r9sfdocw.nsf/3dc283e6c5d6056f88257426007417a2/b1e773eba9c0667188257abb006c57d8/$FILE/Geotech%20Data%20Report_Yosemite%20Slough.pdf

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			structure may be feasible if the following conditions exist: • Relatively small lateral loading from earth pressures, hydrostatic pressure, and wave loading • Sufficient sediment/soil thickness above bedrock to allow for sufficient embedment of the sheet piles to develop lateral resistance • Subsurface sediment/soil that consists of sufficiently competent material and that is not too dense/hard to allow for penetration of the sheet piles during driving. Based on the geotechnical subsurface information presented herein, at least the latter two of the above conditions will present significant challenges in some areas of the site. More specifically, the following conditions present significant challenges for the design and installation of a cantilever sheet pile cofferdam: • Highly variable bedrock surface elevation (sheet piles cannot be driven into the bedrock) and associated highly variable sediment thickness available for sheet pile embedment • Significant thickness of low-strength material in the upper sediment profile As a result of the above conditions, a cantilever wall may only be feasible in some areas (i.e., in the areas where the bedrock surface is relatively deep below the sediment surface along the entire wall alignment). The feasibility and challenges of installing a sheet pile cofferdam will depend greatly on the location of the cofferdam. Shallow bedrock (approximately 20 feet below sediment surface at boring location AUS-B-05) exists near Double Rock in South Basin (refer to Figures 2 and 4). A cofferdam alignment relatively close to Double Rock	

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			likely would require a combination of a cantilever system and a laterally supported system (e.g., a sheet pile structure laterally supported by drilled batter piles embedded in the bedrock). A relatively short cantilever sheet pile cofferdam directly at the mouth of the slough, where the depth to bedrock is much deeper (refer to Figure 3) or within the slough may be possible. Cofferdam structures other than a sheet pile structure (e.g., gravity structures or earthen berm) have not been evaluated but may also be affected by the presence of very soft to soft, highly compressible Young Bay Mud. For relatively small removal areas, it may not be necessary to install an elaborate cofferdam structure. For small areas, excavation at low tide may be feasible or a Portadam structure (www.portadam.com), which can be used in open water up to 10 feet deep, could be considered to keep water out of the excavation. Based on the water depths at the site, this approach may be feasible for a variety of potential cofferdam alignments." Given the fundamental feasibility questions surrounding a cofferdam and the ability to control water level in the slough, we believe that EPA should consider dredging and capping approaches that can be accomplished without complex or excessively expensive hydraulic/turbidity controls. For the purpose of cost estimating, we suggest use of a $1,000,000 uniform placeholder for hydraulic/turbidity controls. If a cofferdam is actually required to perform the work, which we do not believe is the case, costs could approach $3,000,000 for this item alone. In addition, the costs for design and construction management have likely been underestimated. Construction management should be closer to 10% (5% is assumed now). Pre-design studies, design, and other studies and work plans to support compliance with ARARs and implementation are likely to range between $1,500,000 and $2,000,000.	
39.		Editorial Comment, Section 2.1	Please revise the second sentence of the first paragraph to add "when irregular/margin areas are included in the total square footage." Please	The EE/CA, Section 2.1, was edited to address this comment and other comments concerning Site

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			provide a citation/reference for the quotation in the 3rd paragraph. In the 4th paragraph, revise the first sentence to read "In addition, there are areas in proximity to the Site that are suitable for use as staging areas, materials handling areas, and other activities necessary to implement the cleanup response action." In the second sentence of the 4th paragraph, delete the words "to be considered." Additionally, please add an acknowledgement that a formal survey will be needed to establish the official boundaries of the site.	ownership.
40.		Editorial Comment, Section 2.11	Please provide literature citations for the information provided in this section.	The EE/CA, Section 2.11, was supplemented with a literature citation.
41.		Editorial Comment, Table 3-1	Please add definitions of all acronyms to the table.	Table 3-1 of the EE/CA was modified as requested.
42.		Editorial Comment, Table 3-2	The title of the 7th column of the table should be "Maximum Site Concentration (2009-2012)." Please add definitions of all acronyms to the table.	Table 3-2 of the EE/CA was modified as requested.
43.		Editorial Comment, Section 3.3.1	Please make the following changes: a. Second full paragraph: "BPTCP" is misspelled. Please correct. b. Third full paragraph: insert "for all COPCs" after the word "calculated" in the last sentence. c. Second bullet after third full paragraph: please rewrite to read "The 95% upper confidence limit (UCL) of the mean is defined as the 95% upper confidence limit on the average as calculated using ProUCL 4.1.00 (EPA, 2010); and . . . ."	The EE/CA, Section 3.3.1, was modified as requested.
44.		Editorial Comment, Section 3.3.3	Add the word "sitewide" before 95% UCL in the first sentence.	The EE/CA, Section 3.3.3, was modified as requested.
45.		Editorial Comment, Figure 8-8	Alternative 7 includes removal of sediments up to 4 feet below sediment surface). Figure 8-8, however, has a label for a 5-foot removal. This label should be deleted from the legend.	Figure 8 of the EE/CA was modified as requested.
46.		Editorial Comment, 9.3	In addition to the design studies listed in Section 9.3, various surveys, work plans and implementation plans (including but not limited to site surveys, air/dust/community monitoring plans, traffic management plans, soil management plans, etc.) will be required. Some text should be added	The EE/CA, Section 9.3, was modified as requested.

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			regarding the need for these components.	
47.		Editorial Comment, Appendix B	Please include all available aerial photos.	Appendix B already includes all aerial Site photos appropriate for this EE/CA. No changes were made.
Written Comments from Amy Brownell, San Francisco Department of Public Health dated September 13, 2013				
48.		Comments on the Proposed Plan Fact Sheet	Table One: The heading states that the units are parts per billion but the lead concentrations are listed in parts per million. Please revise. Table Two, Sediment Dredging, Summary of EPA Conclusions Concerning the Use of Technology at Yosemite Slough, second to last sentence: Please remove the phrase "which would likely be located in the Candlestick Park overflow parking lot" since the dewatering location will be decided in the Remedial Design. If you prefer to keep the phrase then change from "would likely" to "may".	The EPA agrees that there was a typographic error concerning the units listed in Table 1 of the Proposed Plan. However, the EPA believes that this error did not significantly impact the general public's understanding of the EPA's Proposed Plan. This error did not occur in the EE/CA. Regarding the comment concerning Table Two of the Proposed Plan, the EE/CA was modified to clarify the two location options for sediment processing: the Candlestick Park Overflow Parking Lot immediately southeast of the Site and the SF Port facility about 2 miles north of the Site.
Comments on the Draft EE/CA				
49.		General Comment	Dewatering locations and transportation to landfills: Please add figure(s) similar to the ones used for the Proposed Plan and public meeting that illustrate the dewatering locations and truck haul routes to landfills. The attached are two versions that might be appropriate. Figure 3 from the Proposed Plan could also be used. The text will need to point out that the rail transportation option will be different and follow the existing rail lines.	The EE/CA, Figures 7-1, 7-2, and 8-2, were modified to clarify the locations and haul routes to/from the potential sediment processing locations.
50.	7-12 and 7-13	7.1.7	Management and/or Treatment of Contaminated Material bottom of pages: Please change the reference from "Pier 96" to "SFPort Facilities". There are several piers in that area that might be used and the exact location won't be decided until the Remedial Design or Remedial Action Phase.	The EE/CA, Section 7.1.7, was modified as requested by this comment.
51.	7-12 and 7-13	7.1.7	Management and/or Treatment of Contaminated Material: The text at the bottom of 7-12 and 7-13 describes the possibilities for the two potential dewatering locations and transportation to and from those locations. Additional text should be added to Transportation/Disposal on 7-13 to continue to emphasize these possibilities. Here is some possible wording – please edit as necessary. Pipeline: you could add a sentence as follows: The pipeline from the	The EE/CA, Section 7.1.7, was modified as requested by this comment.

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			hydraulic dredging barge to the Candlestick Park Parking Lot would be approximately X feet long. Alternatively, a pipeline from the hydraulic dredging barge to SFPort Facilities would have to be placed underwater and extend around the Hunters Point Shipyard property and be Y feet long. Truck: Before the last sentence please add: "To transport dried sediments from the Candlestick Park Parking Lot dewatering area,". Then add another sentence: "Trucks would travel on roads shown on Figure X to travel from SFPort Facilities to off-site disposal landfills." Barge: Please modify the second sentence or add another sentence: "Dredged sediments could be placed in barges and transported to either the nearby Candlestick Park Parking Lot facility or the barge could travel around Hunters Point to the SFPort Facilities." Railcar: Suggest modifying to read: Rail spurs could be constructed to link the Candlestick Park Parking Lot staging area to the existing rail network. Operational rail access already exists at the SFPort Facilities to transport sediments to off-site disposal landfills.	
52.		8.5, Alternative 4	Remove Sediment in the Top 1-foot Interval Where COCs Exceed Three Times RGs (with two exceptions): EMNR/MNR, Engineered Cap or Backfill, and ICs – third sentence: Shouldn't the sentence start with "Two" not "Three"?	The EE/CA, Section 8.5, was modified as requested.
53.		Appendix G	Appendix G Cost Estimates, General Comments: Please see the attached spreadsheets that provide specific comments on the cost estimates for each alternative. In general, the comments on the spreadsheets were written once (usually for Alternative 2) and should be applied as appropriate to all the alternatives. In addition some summary observations are: • The production rates are greatly overestimated, creating a much shorter schedule and lower overall price. The production rates are based on a terrestrial project with open space, without dewatering, without waste management, a long haul road, a detailed cap placement, etc. Please consider a complexing factor, or scaling factor where all RS Means production rates are cut to 15%. • The dewatering component is underestimated. An example is a comparison of the dewatering plan for the full excavation vs.	The EPA modified the EE/CA, Appendix G, to address these comments and other comments concerning cost estimates for each alternative. As a result, costs estimates for each alternative increased. The cost estimate for Alternative 5, the selected response action, now ranges between $15.1M and $15.5M.

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			Alternative 2. They are within 15% of each other. We think the water volume will probably be 5 to 50 times the volume currently listed. • The Hydraulic Dredge assumes ALL of the Slough will be dredged. There is an area in the north where we think the dredge will never be able to enter. The costs for hydraulic dredging should include a component of hydraulic dredging and mechanical excavation for these inaccessible areas. • Overall, considering these issues, an increase in cost estimates of 20 to 30% may not be unreasonable.	
54.		Appendix G	Appendix G Cost Estimates, Contaminated Sediment Removal and Transportation and Disposal of non-hazardous sediment: The pipeline, truck, barge and railcar costs associated with the SFPort Facilities do not appear to be included in the cost estimates. The pipeline and/or barge cost should be significantly higher for the SFPort Facilities option. However, the transportation to off-site disposal landfills by railcar should be significantly less expensive than transportation by truck. It might be advisable to include two different set of costs depending on which staging/dewatering area is chosen. Alternatively, since the most significant cost in these categories is the approximately $920,000 cost of transportation, if you went ahead and calculated the difference between using the two dewatering locations and found it to only reduce the overall cost of this subset of items by less than half (this is a guess) then you could add footnotes to the cost estimate pages stating that the costs shown are calculated for the Candlestick Park Parking Lot site and therefore the EE/CA is illustrating the highest "worst-case" scenario (for these subset of tasks) and any reduction in cost because of selection of the SFPort Facilities would still be within the minus 30% margin allowed for the EE/CA. If you chose this footnote option then you might want to add a footnote to all the summary cost tables to this effect.	The EPA did not modify the cost estimates in Appendix G to account for cost differences if the alternative sediment processing area (SF Port Facility) is ultimately selected. At this time, the EPA agrees that the increased costs to transport dredged sediment to the SF Port facility will be offset to some degree due to access to rail facilities. The exact cost impact of processing sediments at the SF Port facility and using the associated rail facilities are unknown at this time. If the alternative sediment process area is selected during the design stage, the EPA will re-assess the cost implications of such a decision and modify the CERCLA decision documentation, if necessary, in compliance with CERCLA regulations.
55.		Appendix G	Appendix G Cost Estimates, Miscellaneous comments • Mobilization construction kick-off meetings should include a comprehensive site safety review • What is a normal construction day? Excavate during low tide and	The EE/CA cost estimates in Appendix G do assume mobilization kick-off meetings and daily safety meetings. The prime contractor will be responsible for establishing a site health and safety plan prior to field activities, and all subcontractors will be required to adhere to that health and safety

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			backfill during rising tide? • We could not identify any work tasks or project costs or contingency events for EMNR. Can you clarify if EMNR unit costs are included in any tasks?	plan. Ten-hour days are assumed for each construction day and tidal cycles were not considered. This level of Project planning and cost estimation will occur during the Project design phase. For purposes of this EE/CA, the EPA did not include an increment for the thin layer cover element of the EMNR. Alternative 5 includes MNR/EMNR and the scope of this technology will be determined during the design phase. At this time, adding a cost increment for the EMNR was determined unnecessary as the scope and associated costs for a thin layer cover, if any, is not considered to be significant.
56.		YOSEMITE SLOUGH EE/CA COMMENTS ON COST ESTIMATING SHEETS; G6:Alternative 4	Cut and chip trees: The task has 2 acres, where most other tasks use a quantity of only 1 acre. Grub Stumps and remove: The task has 2 acres, where most other tasks use a quantity of only 1 acre. Strip Topsoil: The task has 807 cubic yards, while the other alternatives uses only 404 cubic yards Gravel for Haul roads: The task has 807 cubic yards, while the other alternatives uses only 404 cubic yards Bank Treatment Backfill: The task has 928 cubic yards, while the other alternatives uses only 465 cubic yards	The EPA modified the EE/CA, Appendix G, so that estimated quantities were consistent for all alternatives as appropriate.
57.		YOSEMITE SLOUGH EE/CA COMMENTS ON COST ESTIMATING SHEETS; G8: Alternative 5	Dewatering: I would like to challenge the dewatering assumption that the amount of additional water is directly proportional to the amount of additional sediment removed. In this scenario, excavation of portions of the Slough will extend to 2 feet. I believe there should be a higher multiplier factor in these isolated excavation areas. The general dewatering task is almost identical to the 1-foot excavation plan. Dewatering: Also, I recommend additional temporary sheeting or shoring	Thank you for providing detailed comments concerning specific individual line items in the cost estimates. The EPA did not modify the cost estimates in Appendix G based on this comment. For the purposes of the EE/CA, the EPA determined that addressing these comments would not significantly change the cost range of each alternative or change the EPA's selection of

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			boxes to isolate the limited vertical excavation areas and to minimize cave-in of the sidewalls. Treatment of the Dewatering Water: The water treatment task is almost identical to the 1 foot excavation, which exemplifies an underestimation of the volume of water.	Alternative 5. Additional details and refinement of the costs will occur during the design phase.
58.		YOSEMITE SLOUGH EE/CA COMMENTS ON COST ESTIMATING SHEETS; G10: Alternative 6	Cut and chip trees: The task has 2 acres, where most other tasks use a quantity of only 1 acre. Grub Stumps and remove: The task has 2 acres, where most other tasks use a quantity of only 1 acre. Strip Topsoil: The task has 807 cubic yards, while the other alternatives uses only 404 cubic yards Gravel for Haul roads: The task has 807 cubic yards, while the other alternatives uses only 404 cubic yards Bank Treatment Backfill: The task has 928 cubic yards, while the other alternatives uses only 465 cubic yards	The EPA modified the EE/CA, Appendix G, so that estimated quantities were consistent for all alternatives as appropriate.
59.		YOSEMITE SLOUGH EE/CA COMMENTS ON COST ESTIMATING SHEETS; G3: Alternative 2	Overlapping tasks: The majority of the comments associated with task G-3 may be derived from Task G-2. Overlapping tasks: The hydraulic dredge option assumes the work will proceed faster and save at least 1 week. I would like you to review the assumptions and project plan to confirm this is true. The dredging will remove material faster, and allow easier access in the deeper water. However, in the northwestern portion of the Slough, you will probably have to go with mechanical excavation and dewatering without an extensive bulkhead. This work will increase time and costs. Surveying Crew: The surveying will integrate both standard terrestrial surveying and hydrographic surveying for the dredge operator. It will be crucial for the dredge operator to include the correct water elevation and the sediment surface to avoid over dredging. Site Prep: Dredge mobilization appears high. Can you expand in your assumptions the size of the dredge, the power system for the dredge and the	The EPA did not modify the cost estimates in Appendix G based on this comment. For the purposes of the EE/CA, the EPA determined that addressing these comments would not significantly change the cost range of each alternative or change the EPA's selection of Alternative 5. Additional details and refinement of the costs will occur during the design phase

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			location guidance system? I would believe a 6-inch cutter head dredge with an 8-inch discharge pipe would be sufficient for the project. Sediment Removal: I understand the hydraulic dredge is based on a quote, however it seems out of place that mobilization will be more expensive than hydraulic dredging. Sediment Removal: The volume of hydraulic dredge material is over estimated. The estimate assumes ALL of the material will be removed with a hydraulic dredge, which is impractical. At least 15% of the material will be mechanically excavated because the area dries out so frequently. Cofferdam Construction: I recommend you expand the description and definition of the smaller coffer dam. The costs are approximately 1/4 of the comparable costs for the Mechanical removal but I would assume the alternate coffer dam would be shorter and shallower with a possibly greater cost deduction. Assumptions: Assumption 12 assumes the coffer dam will be 36-feet deep x 1,000 feet long. I believe this is a typo and should be substantially shorter and potentially more shallow. Sediment Dewatering: The fully saturated dredge material may have a water content as high as 75%. The sediment dewatering costs do not include a larger fluid management plan. The wet solids from the 8-inch discharge pipe need to be routed to a wet sludge collection system that may include several additional frac tanks or a larger modutank system. Treatment System Dewatering: The water treatment system for the hydraulic alternative must be substantially larger. An 8-inch hydraulic dredge will maintain a constant flow over 300 gpm, in order to maintain the solids in a fluidized state. This is substantially larger than the mechanical dewatering system. Batch Discharge: The Hydraulic Dredging option adds only 70,000 cubic feet of water to the discharge plan. This does not correspond with the assumptions of 267% more water, nor does it agree with my evaluation that the volume of water will be orders of magnitude greater.	

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			Capping Installation: The capping plan must be amended to account for the hydraulic dredge area. The unit price assumes dumped installation and spreading with a dozer. Construction Management: I recommend you add an additional 1% of the project for marine management and marine communication for the hydraulic dredging activities. This will include hydrographic surveying during the hydraulic dredge operation. Equipment Demobilization/ Decontamination and Project closeout: I recommend we define if we are going to decon the 8-inch plastic discharge pipe, or if we are going to dispose of the material. Also we should review and describe how to decon the dredge, which will take additional time and costs. Timber Crane Mat Rental AND Relocation: I believe Timber Crane mats will be required for the northwestern section of the Slough and I would recommend 50% of the materials for the mechanical dredging. I recommend you dedicate 1 operator and 2 laborers for the entire project period for the crane mat movement. Construction Mobilization and Demobilization: If you agree at least a portion of the Slough must be mechanically excavated, we need to add back mechanical soil handling and trucking under this task.	
60.		YOSEMITE SLOUGH EE/ CA COMMENTS ON COST ESTIMATING SHEETS; G4: Alternative 3	Overlapping tasks: The majority of the comments associated with task G-4 may be derived from Task G-2. Monitored Natural Attenuation: I recommend you add a description of the MNA tasks in the assumptions. Monitored Natural Attenuation: I recommend we include some contingency plan and contingency costs within any alternative that includes MNA.	The EPA did not modify the cost estimates in Appendix G based on this comment. For the purposes of the EE/CA, the EPA determined that addressing these comments would not significantly change the cost range of each alternative or change the EPA's selection of Alternative 5. Additional details and refinement of the costs will occur during the design phase
Written Comments from Cy R. Oggins, Chief, Division of Environmental Planning and Management, California State Lands Commission dated September 13, 2013				
61.			Thank you for the opportunity to review the subject EE/CA for the Yosemite Slough removal action for contaminated sediment (Project). The California State Lands Commission (CSLC) staff supports the planned	Thank you for your comment and support of the EPA's selected response action alternative.

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			removal action for contaminated sediment in Yosemite Slough, also known as the "Yosemite Creek Sediment Superfund Site" (Site). The CSLC is a trustee agency for projects that could directly or indirectly affect sovereign lands and their accompanying Public Trust resources. CSLC staff has reviewed the draft EE/CA and has the following comments.	
62.	2-1	Figure 2-1	Site Location and Description Page 2-1 of the EE/CA states the following: "As shown on Figure 2-1, the south, west and north sides of the Site are contiguous with the Candlestick Point State Recreational Area (CPSRA), which is owned or operated by the California Department of Parks and Recreation (CDPR) and the California State Lands Commission (CSLC)." This sentence is inaccurate and should be revised for the following reasons: (1) Figure 2-1 lacks sufficient detail to identify the property contiguous to the Site. (2) At the present time, the CPSRA does not completely surround the north, south, and west sides of the Site. (3) Whether the CPSA will completely surround the north, south, and west sides of the Site in the future depends on the occurrence of future land conveyances. (4) The CSLC is not an operator on any of the land contiguous to the Site and has no plans to be an operator on such land in the future. CSLC staff requests that the EE/CA be revised to further clarify the jurisdiction of the CSLC both in the text and on Figure 2-1.	The EE/CA, Section 2.1, was modified to address this comment and other comments concerning CPSRA and Site ownership.
63.	8-17	8.6	Recommended Alternative Please provide the correct assumed dredge volume for Alternative 5 (the EE/CA provides two different volumes). • In Section 8.6 (page 8-17), the EE/CA states: "For purposes of evaluation of Alternative 5, a dredge volume of 10,700 CY [cubic yards] will be assumed with the understanding that the final dredge volume may be reduced or increased during the design stage." This dredge amount is also reflected in Table 9-1.	Sections 8.6 and 9.0 of the EE/CA were modified so that the revised estimated dredge volume was consistently presented for Alternative 5.

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	9-5	9	• In Section 9 (page 9-5), the EE/CA states: "Alternative 5 includes a dredge volume of 14,400 CY, the final dredge volume may be reduced or increased during the design stage."	
64.			Cost Analysis As noted above, CSLC staff supports the planned removal action for the Site; however, due to budgetary constraints of both State and Federal agencies, staff is concerned that the estimated costs for the Project will render the Project infeasible. For this reason, staff suggests that the EE/CA include a discussion of how the Project will be funded to provide a realistic approach to moving forward.	Comment acknowledged and noted. The EPA has selected Alternative 5 which is estimated to cost between $15.1M and $15.5M. EPA believes that Project funding can be obtained with the full participation of the potentially responsible parties identified for the Site.
Written Comments from Elizabeth Goldstein, President, California State Parks Foundation, dated September 13, 2013				
65.			On behalf of the California State Parks Foundation and our 130,000 members statewide, I am writing to comment on the above referenced EPA plan to clean up Yosemite Slough. The California State Parks Foundation is the only statewide non-profit membership organization dedicated to protecting, enhancing and advocating for California's 280 natural, cultural and historic state parks. Over our 40-year history, we have supported the stat park system by raising more than $186 million to support park programs and projects and have worked to protect countless natural, cultural and historical treasures found within our parks. On behalf of our members, we are committed to ensuring that state parks continue to provide recreation, adventure, renewal, and inspiration to all Californians. In partnership with California State Parks, we have been the project lead to raise the $30 million needed to help transform Candlestick Point State Recreation Area (CPSRA) into a model urban park. CSPF secured $14.3 for the first and most ambitious phase of this project, restoration of the north side of Yosemite Slough at CPSRA, which broke ground in June 2011 and was completed in 12 months. Key project elements included: ▪ Removal of existing structures on the north side of Yosemite Slough canal along with debris and contaminated soils. ▪ Creation of seven new acres of tidal wetlands. ▪ Re-vegetation with native plants to increase local biodiversity	Thank you for your comment. The EPA appreciates the work of the California State Park Foundation. For the reasons provided in Section 9.2.2 of the EE/CA, the EPA believes that Alternative 5 is the best response action to address the hazardous substance contamination at the Site. With respect to the CPSRA wetlands restoration project, the EE/CA, Section 6.1, has the following removal action objective to guide in the Site cleanup process: • **Prevent Site Recontamination and Prevent Contaminant Migration to Adjacent Areas.** Provide a remedy that (a) prevents, to the extent practicable, the migration of resuspended sediment during or following any removal operations to adjacent areas (e.g., California Parks wetland restoration areas, other wetland restoration areas, and South Basin), and; (b) ensures that the Yosemite Slough is not re-contaminated following remediation (i.e., permanence of the remedy).

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			▪ Creation of a nesting island for shorebirds, isolated by a tidal channel to protect nesters from feral animals and human disturbance. ▪ Reduction in the amount of polluted runoff as a result of restored seasonal wetlands catching and filtering water. ▪ Completion of a segment of the Bay Trail. Phase II of the restoration project will include construction on the south side of Yosemite Slough to remove contaminated soils and rock fill, re-grading to restore the land to tidal influence including the creation of 3 new wetlands acres, the creation of a second isolated bird nesting island and, re-vegetation with native species. Phase III will complete the project by enhancing the local park so that its educational and recreational potential can be fully realized. We have reviewed the proposed EPA cleanup plan of Yosemite Slough including the cost alternatives. We appreciate the inclusion of our comments to –date including your requirement for additional hydro modeling as part of the design phase. We feel that it is essential that the EPA insure that dredge depth and cap depth reinforce the ecological gains achieved through the Yosemite Slough wetlands restoration project. As a champion for Candlestick Point State Recreation Area and key fundraiser for the Yosemite Slough Wetlands restoration, we *urge* you to adopt a cleanup plan that is respectful of the already completed cleanup effort and specifically maintains the biological and environmental integrity of the restored site and wetlands.	
Written Comments from Danita Rodriguez, District Superintendent, California State Department of Parks and Recreation, dated September 13, 2013				
66.			State Park's land and improvements [Candlestick Point State Recreation Area (CPSRA)] adjacent to the Yosemite Slough including wetland restoration and bird island should be protected to the State's satisfaction during cleanup, including mud removal, dewatering, and transporting processes.	With respect to the CPSRA wetlands restoration project, the EE/CA, Section 6.1, has the following removal action objective to guide the Site cleanup process: • **Prevent Site Recontamination and Prevent Contaminant Migration to Adjacent Areas.**

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				Provide a remedy that (a) prevents, to the extent practicable, the migration of resuspended sediment during or following any removal operations to adjacent areas (e.g., California Parks wetland restoration areas, other wetland restoration areas, and South Basin), and; (b) ensures that the Yosemite Slough is not re-contaminated following remediation (i.e., permanence of the remedy). In its role as the lead regulatory agency for the response action, the EPA will make determinations concerning short-term and long-term protectiveness. These determinations will be incorporated in response action design and in implementation of Alternative 5.
67.			If clean-up activities prevent daily tidal flow from reaching the wetland plants on State Park property or if the water course is redirected away from the wetland area, then wetland plants shall be irrigated as part of the project.	Appendix F of the EE/CA contains federal and State ARARs concerning wetlands protection that the Yosemite Slough cleanup project must address. No changes were made to the EE/CA due to this comment.
68.			If State Park's wetlands and upland cover is damaged in any way by Yosemite Slough cleanup efforts, areas affected should be restored to original condition without cost to State Parks.	Appendix F of the EE/CA contains federal and State ARARs concerning wetlands protection that the Yosemite Slough cleanup project must address. No changes were made to the EE/CA due to this comment.
69.			All construction debris/brick ruble on beach should be removed above and below the mean high tide elevation, as part of this Yosemite Slough clean-up effort.	The Site boundaries for the EPA's Yosemite Slough clean-up project are defined in the EE/CA, Section 2.1. In the Project design phase, protocols for removing debris within the Site boundaries will be defined. At this time, the EPA anticipates debris removal to include debris within the active excavation/construction zone and any observable debris (e.g., concrete, metal objects, and shopping carts) elsewhere within the Site boundaries whose

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				removal would not create unacceptable short-term risk and contaminant migration. .
70.			State Parks is concerned with the EPA's use of a six inch biological active zone (BAZ) West of Griffith outfall which is too shallow for this area, as the area is a mudflat for a majority of a 24hour period. EPA should substantiate its BAZ findings and provide at least 12" to 18" of "Clean Bay Mud" to the West of Griffith outfall.	For the purposes of the alternative analysis in the EE/CA, the EPA set the BAZ to be 6 inches deep with an 18-inch margin of safety. The EPA's selected response action, Alternative 5, allows for the margin of safety to be re-evaluated during the design phase.
71.			All dewatering of lead- and PCB-contaminated mud processes should have engineering controls in place to prevent the contaminants of concern compromising the area staging area is placed on.	The EPA agrees with this comment. The engineering controls for the sediment processing area will be developed during the Project design phase.
72.			The Yosemite Slough area is a windy area and prevailing winds blow over CPSRA and into the San Francisco Bay. EPA should have engineered controls in place to prevent any contaminated material to be airborne, whether during the removal, dewatering, or transporting phases. There should be wind protection devices in place to protect CPSRA visitors and adjacent areas.	The EPA agrees with this comment. The EE/CA, Section 8.1.5, states that a Project air quality protection program will be developed during the Project design phase.
73.			EPA should ensure there are no impacts to existing adjacent land during the dewatering process.	The EPA agrees with this comment. The engineering controls for the sediment processing area will be developed during the Project design phase.
74.			EPA should have engineered controls in place to ensure that odors are strictly controlled during dewatering process so that no offensive odors affect CPSRA visitors or the adjacent residents. EPA should establish a protocol for eliminating the odors should they become a nuisance during the dewatering phase and an EPA contact for complaints while dewatering is taking place.	The EPA agrees with this comment. The EE/CA, Section 8.1.5, states that a Project air quality protection program will be developed during the Project design phase.
75.			As the dewatering site may be an attractive nuisance, the dewatering site should be fenced and have adequate security personnel with an EPA placard/sign with an EPA 1-800 contact number for an EPA point-of-contact.	The EPA agrees with this comment. The sediment processing area will be staffed with security personnel and a placard sign will be posted with contact information for the EPA along with other Project information.
76.			EPA should recommend geo tubes and not mud piles.	The EE/CA, Section 8.1.7, states that the specific method of sediment dewatering will be determined during the design stage, and based on the type of

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				dredging method chosen, the amount of upland space available for dewatering, and the quantity of material to be removed. The EPA has successfully used the geotube technology for sediment dewatering at many sediment cleanup sites nationwide.
77.			If State Park property is requested for use for dewatering the mud (in the geo tubes), then State Parks will be reimbursed for the fair market value rent for the use of the land and the appropriate State Right of Entry Permit or other land use document (as determined by State Parks) will need to be executed with associated processing fees paid and related State Park's CEQA performed. Final staging and dewatering area footprints should not impact the pending expansion of the community garden and should be coordinated with the State Parks District Superintendent or designee. Additionally, because a portion of the State Park property, noted as a potential dewatering site, is a part of land transfer agreement, then other party's acceptance of the temporary use may be required.	The EE/CA, Section 8.1.7, states that the property or properties used for Project staging and sediment processing would be leased for access and use during response action implementation. Details concerning lease agreements will be determined during the Project design phase.
78.			If EPA's clean-up of the Yosemite Slough and "dewatering of the mud" timing is such that the condition of the State Park property that is requested for use has changed as such that the area is no longer a feasible location for the dewatering, than a Plan B should be utilized; or if the requested use of the portion of State Park property is no longer under our ownership, than EPA will need to coordinate with new owners or revise its plan.	The EPA agrees with this comment based on its understanding that State Parks will not compromise the feasibility of the dewatering area requested for use. The EPA expects to coordinate with State Parks or other relevant owners when making a determination regarding feasibility.
79.			State Parks requests EPA to incorporate aesthetic bank stabilization using the Bay Trail and bio swales that are consistent with CPSRA's general plan and the vision for the development of this area within CPSRA.	Park-related site improvements (e.g., Bay Trail) are not within the scope of Alternative 5, the selected response action. However, the EE/CA, Section 8.1.3, presents a framework of upland source controls to protect the quality and protectiveness of the response action. The EPA looks forward to coordinating with State Parks on the EPA cleanup project and State Parks wetlands restoration project at Yosemite Slough and working together to the benefit of both projects.

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80.			There is a potential for listed species to be in the Yosemite Slough and adjacent areas, so EPA should obtain appropriate permits from State and Federal agencies. Additionally, EPA should use measures to avoid and minimize impacts to those species and measures should be implemented in consultation with US Fish and Wildlife Services and CA Department of Fish and Wildlife.	The EE/CA, Appendix F, identifies the Applicable or Relevant and Appropriate Requirements (ARARs) that will apply to the planning and implementation of the selected response action at the Site. Appendix F identifies both federal and State ARARs for natural resources at the Site.
81.			Based upon the modeling that was done, the Slough is generally depositional. The most critical location would be at the mouth of the slough. It would be appropriate that the design show that 1-foot is sufficient, and if not, the cover depth should be increased. It is suggested to use 1-foot of cover only in the most protected areas at the upper end of the basins.	The EPA agrees with this comment. The EPA will require additional hydrodynamic modeling of Yosemite Slough during the design stage to better estimate net erosion potential within the Site based on the current and future projected geometries of the slough to ensure the long-term protectiveness of the response action selected for the Site.
82.			It is assumed that EPA's post remediation bathymetry would be similar to existing. It is conceivable that the final bathymetry will be lower than existing. If so, this could change the hydraulics not only for the slough but for our basins as well, especially at the interface with the slough.	The EE/CA, Section 6, identifies the RAOs and RGs that the selected response action must achieve. RAO No.4 states the following: *Support and Protect Healthy Aquatic and Benthic Communities. (a) Limit or reduce the potential risk to aquatic and benthic communities; and (b) establish post-remedial slough bottom conditions that support slough habitat (i.e., tidal mudflat) and a healthy benthic ecology.* Based on RAO No.4, the design of the selected response action will be directed to maintain existing bathymetry so that this RAO can be achieved.
83.			Any modeling that EPA does should include our plans for the South Basin, or possibly include both with and without South Basin bathymetry.	The EPA generally agrees with this comment. Hydrodynamic modeling for the Site to be conducted during the design stage should consider current and future anticipated bathymetry for South Basin. In addition, please see the EPA's response to U.S. Navy General Comment No.1.
84.			The biological suitability of sand depends on what the ultimate goals are for the area that contains the sand. Sand can be good substrate for eelgrass and other sub-tidal species, and sandy areas are in relatively short supply in	The EPA agrees with this comment. The EPA will coordinate with State Parks and other interested parties concerning important Project details and

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			our muddy Bay. Imported/engineered sand is typically not the ideal substrate. Salt marsh establishment can be affected due to sand's low concentration of organic material coupled with the compaction that is required for a cap. There are many areas with relatively sandy soils where tidal marsh vegetation does just fine. State Parks requests EPA to provide communication and allow State Parks' input during the design phase for the design specifications for the cap (depth-thickness, material, and compaction being key components).	specifications that will be determined during the Project design phase.
85.			State Parks requests that the Yosemite Slough's remediation be consistent with the ecological goals of the California State Parks Foundation/State Park's remediation/restoration project. State Parks requests to be included in the design phase to contribute to design specifications. (i.e., to determine the dredge and cap thickness), and to select the final capping materials. It appears the EPA will be requiring additional hydro modeling as part of the design to ascertain the scouring/depositional environment.	The EE/CA, Section 6, RAO No. 1 states the following: o *Protect Current and Future Beneficial Uses.* Remediate COCs in a manner that provides protection of human health and the environment based on reasonably anticipated current and future beneficial uses of the Yosemite Slough including those described in the Regional Water Quality Control Board's Basin Plan and the California State Parks General Plan for the CPSRA. The EPA plans to coordinate the Project design, including additional hydrodynamic modeling with State Parks and other interested parties.
86.			State Parks requests that EPA consider the clean-up goal closer to the goal determined by RWQWB for the California State Parks Foundation/State Parks' remediation/restoration project as it is in closer proximity and a better comparison than the Hunter's Point Shipyard remediation goal.	The EPA carefully considered sediment cleanup goals throughout the EE/CA development process. The EPA believes the sediment RGs established in the EE/CA, Section 6.2, are protective of human health and environment at the Site.
87.			EPA should ensure regular communications with State Parks at all stages of the Yosemite Slough clean-up by having the District Superintendent, or designee, at all meetings during design and implementation.	The EPA agrees with this comment.
88.			EPA should continue its outreach and communication about this project to all residents and businesses in the area.	The EPA agrees with this comment.

Attachment 2: Applicable or Relevant and Appropriate Requirements (ARARs)
Yosemite Slough Site, San Francisco, California

This attachment identifies federal and state of California applicable or relevant and appropriate requirements (ARARs) for the selected removal action concerning the Yosemite Slough Site (Site) located in San Francisco, California. These ARARs were developed and evaluated in the Site Engineering Evaluation/Cost analysis (EE/CA) and included: (1) an initial determination of whether potential ARARs actually qualify as ARARs; and (2) a comparison for stringency between the federal and state regulations to identify the controlling ARARs.

In accordance with Sections 104 and 106 of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), as amended, the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), Title 40 Code of Federal Regulations (CFR) § 300-415(j) states that removal actions must attain ARARs to the extent practicable. Section 300.5 of the NCP defines applicable requirements as cleanup standards, standards of control, and other substantive environmental protection requirements, criteria, or limitations promulgated under federal environmental or state environmental, or facility citing laws that specifically address a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance at a CERCLA site. Section 300.5 of the NCP defines relevant and appropriate requirements as cleanup standards, standards of control, and other substantive requirements, criteria, or limitations promulgated under federal environmental, or state environmental, or facility citing laws that, while not "applicable" to a hazardous substance, pollutant, or contaminant, remedial action, location, or other circumstance at a CERCLA site, address problems or situations sufficiently similar to those encountered at the CERCLA site and are well suited to the particular site.

Because CERCLA on-site response actions do not require permitting, only substantive requirements are considered as possible ARARs. Administrative requirements, such as approval of or consultation with administrative bodies, issuance of permits, documentation, reporting, recordkeeping, and enforcement are not ARARs for CERCLA actions confined to the site.

ARARs must be identified on a site-specific basis from information about specific chemicals at the site, specific features of the site location, and actions that are considered removal actions.

As the lead federal agency, the EPA has primary responsibility for identifying federal ARARs at the Site. In October 2011, the EPA sent notification letters to federal and State Natural Resource Trustees (i.e., National Oceanic and Atmospheric Administration [NOAA], United States Fish and Wildlife Service [USFWS] and the California Department of Fish and Game [CDFG]), and State of California regulatory agencies (i.e., the Department of Toxic Substances Control [DTSC], the San Francisco Bay Regional Water Quality Control Board [Water Board], and the San Francisco Bay Conservation and Development Commission [BCDC]), requesting assistance to identify potential ARARs relevant to Yosemite Slough.

An applicable federal requirement is an ARAR. An applicable state requirement is an ARAR only if it is more stringent than a similar federal ARAR. If the requirement is not legally applicable, then the requirement is evaluated to determine whether it is relevant and appropriate.

Relevant and appropriate requirements are those cleanup standards, standards of control, and other substantive environmental protection requirements, criteria, or limitations promulgated under federal or state law that, while not applicable, address problems or situations similar to the circumstances of the proposed response action and are well suited to the conditions of the site. A requirement must be determined to be both relevant and appropriate to be considered an ARAR.

The following criteria for determining relevance and appropriateness are listed in Title 40 Code of Federal Regulations (CFR) § 300.400(g)(2).

- The purpose of the requirement and the purpose of the CERCLA action;
- The medium regulated or affected by the requirement and the medium contaminated or affected at the CERCLA site;
- The substances regulated by the requirement and the substances found at the CERCLA site;
- Any variances, waivers, or exemptions of the requirement and their availability for the circumstances at the CERCLA site;
- The type of place regulated and the type of place affected by the release or CERCLA action;
- The type and size of structure or facility regulated and the type and size of structure or facility affected by the release or contemplated by the CERCLA action; and
- Any consideration of use or potential use of affected resources in the requirement and the use or potential use of the affected resources at the CERCLA site.

The substantive provisions of the requirements were identified as potential federal and state chemical-, location-, and action-specific ARARs for the Site. The potential ARARs for this EE/CA are presented in Tables F-1, F-2, and F-3. The potential ARARs in Tables F-1, F-2, and F-3 apply to all removal action alternatives that underwent a detailed evaluation in the EE/CA with the exception of the No Action alternative which has no ARARs.

Each potential ARAR is assigned with a determination of status (i.e., applicable or relevant and appropriate). For the determination of relevance and appropriateness, the pertinent criteria were examined to determine whether the requirements addressed problems or situations sufficiently similar to the circumstances of the release or response action contemplated, and whether the requirement was well suited to the Site.

To qualify as a California State ARAR under CERCLA and the NCP, a state requirement must be:

- A state law;
- An environmental or facility siting law;
- Promulgated (of general applicability and legally enforceable);
- Substantive (not procedural or administrative);

- More stringent than the federal requirement;
- Identified in a timely manner; and
- Consistently applied.

To constitute an ARAR, a requirement must be substantive. Therefore, only the substantive provisions of requirements identified as ARARs in this analysis are considered to be ARARs. Permits are considered to be procedural or administrative requirements. Provisions of generally relevant federal and state statutes and regulations that were determined to be procedural or not environmental, including permit requirements, are not considered to be ARARs. CERCLA §121(e)(1) (42 United States Code § 9621[e][1]), states that, "No Federal, State, or local permit shall be required for the portion of any removal or remedial action conducted entirely on-site, where such remedial action is selected and carried out in compliance with this section."[1] The term "on-site" is defined for purposes of this ARARs discussion as "the areal extent of contamination and all suitable areas in very close proximity to the contamination necessary for implementation of the response action" (40 CFR § 300.5). Pursuant to the definition of the term "on-site" in 40 CFR § 300.5, the EPA determined that "on-site" at the Site is considered to be within the Site boundaries as defined in Figure 2-1 of the EECA and further described in Section 2. In addition, EPA has determined the following areas to also be considered "on-site":

- The banks of Yosemite Slough as needed to construct bank stability aspects of the selected removal action;

- Those areas identified by the EPA in need of improved stormwater management for purposes to prevent potential re-contamination of the Site;

- Project staging areas needed to implement and oversee the response action work identified in the EE/CA and finalized during the response action design; and,

- The dredged materials stockpile areas including sediment dewatering locations tentatively identified in the EE/CA and finalized during the response action design.

Nonpromulgated advisories or guidance issued by federal or state governments are not legally binding and do not have the status of ARARs. However, such requirements may be useful, and are "to-be-considered" criteria (40 CFR § 300.400[g][3]). To-be-considered criteria complement ARARs, but do not override them. They are useful for guiding decisions on cleanup levels or methodologies when regulatory standards are not available.

Federal and State Chemical-Specific[a] Applicable or Relevant and Appropriate Requirements

Action Memorandum, Yosemite Slough, San Francisco, California

Requirement	Prerequisite	Citation[b]	Preliminary ARAR Determination	Comments
Sediment				
Federal Requirements				
Resource Conservation and Recovery Act (42 USC, ch. 82, §§ 6901 through 6991[i])[c]				
Defines RCRA hazardous waste. A solid waste is characterized as toxic, based on the toxicity characteristic leaching procedure, if the waste exceeds the toxicity characteristic leaching procedure maximum concentrations.	Waste	California Code of Regulations (CCR) title 22, § 66261.100	Applicable	Applicable for determining whether waste is hazardous.
Toxic Substances Control Act (15 USC, ch. 53, §§ 2601 through 2692)				
Regulates storage and disposal of PCB remediation waste found in sediments.	Sediments located in marine ecosystems contaminated with PCBs	40 CFR § 761(c)	Relevant and appropriate	EPA must approve any plans requiring sampling, cleanup, disposal, or storage of PCB contaminated sediments in marine ecosystems. PCB remediation cleanup methods and standards set based upon risk and approved by EPA.
State Requirements				
State and Regional Water Quality Control Boards[c]				
Definition of "non-RCRA hazardous waste"	Waste	CCR title 22, § 66261.101	Applicable	Applicable for determining whether a waste is a non-RCRA hazardous waste.
Definitions of designated waste, nonhazardous waste and inert waste	Waste	CCR title. 27, §§20210, 20220, and 20230	Applicable	Potential ARAR for classifying waste. These soil classifications determine state classification and siting requirements for discharging waste to land.

Federal and State Chemical-Specific[a] Applicable or Relevant and Appropriate Requirements

Action Memorandum, Yosemite Slough, San Francisco, California

Requirement	Prerequisite	Citation[b]	Preliminary ARAR Determination	Comments
Surface Water				
Federal Requirements				
Discharges to waters of the United States	Impact to surface water	Water Quality Standards, National Toxics Rule and California Toxics Rule 40 CFR §§ 131.36(b) and 131.38	Applicable	Potentially applicable to the discharge of contaminants to surface water expected during dredging. Water quality criteria under this potential ARAR together with the State's existing water quality standards shall be used when controlling pollution in inland waters and enclosed bays and estuaries.
Discharges to waters of the United States	Impact to surface water	National Pollutant Discharge Elimination System permits. 33 USC § 1342 (a) and (q); 40 CFR Part 122, Subpart C	Relevant and Appropriate	Discharges of municipal combined sewer overflows into the Slough are potentially relevant and appropriate to the design of the remedy and to maintain the integrity of the remedy.
State and Regional Water Quality Control Boards[c]				
Beneficial use of surface water in San Francisco Bay. Establishes water quality objectives including narrative and numerical standards.	Impact to surface water	Comprehensive Water Quality Control Plan for the San Francisco Bay Basin (as required by the Porter-Cologne Water Quality Control Act, Cal. Water Code § 13240) Chapter 2 Beneficial Uses, Chapter 3 Water Quality Objectives for turbidity, dissolved oxygen, and toxicity (see Basin Plan Tables 3-3 and 3-3B.	Applicable	Substantive requirements pertaining to beneficial uses and water quality objectives for turbidity, dissolved oxygen and toxicity are potentially applicable during dredging activities. Beneficial uses for Yosemite Slough include: commercial and sport fishing; estuarine habitat; contact and noncontact water recreation; and wildlife habitat.

Notes:

[a] Many potential action-specific ARARs contain chemical-specific limitations and are addressed in Table E-2, Potential Action-Specific ARARs.

[b] Only the substantive provisions of the requirements cited in this table are potential ARARs.

[c] Statutes and policies, and their citations, are provided as headings to identify general categories of potential ARARs for the convenience of the reader; listing the statutes and policies does not indicate that the EPA has determined that the entire statutes or policies as potential ARARs; specific potential ARARs are addressed in the table below each general heading; only pertinent substantive requirements of specific citations are considered potential ARARs.

Key:

§ = Section
ARAR = Applicable or relevant and appropriate requirement
CCR = California Code of Regulations
CFR = Code of Federal Regulations
ch. = Chapter
mg/kg = milligram per kilogram
PCB = polychlorinated biphenyl
ppm = part per million
RCRA = Resource Conservation and Recovery Act
USC = United States Code

Federal and State Location-Specific Applicable or Relevant and Appropriate Requirements

Action Memorandum, Yosemite Slough, San Francisco, California

Location	Requirement	Prerequisite	Citation[a]	Preliminary ARAR Determination[b]	Comments
Biological Resources – Federal Requirements					
Migratory bird area	Protects almost all species of native migratory birds in the United States from an unregulated "take," of designated migratory birds, nests, eggs and young.	Presence of migratory birds	Migratory Bird Treaty Act of 1972, 16 USC §703	Relevant and appropriate	The substantive portions are relevant and appropriate as migratory birds have been observed at the site. Response actions will be designed to avoid "take".
Marine mammal area	Protects any marine mammal in the United States except as provided by international treaties from an unregulated "taking.	Presence of marine mammals	Marine Mammal Protection Action 16 USC §§ 1362(13) and 1372(a)(2)	Relevant and Appropriate	Marine mammals are known to be present near Yosemite Slough, thus substantive provisions are relevant and appropriate if the selected response action constitutes a taking.
Federally protected species area	Prohibits "take" of Federal Endangered Species Act protected species. Requires Federal Agency review of actions. Allows for either formal or informal consultation with USFWS	Presence of Federally protected species	Endangered Species Act 16 USC §§ 1531 - 1543	Applicable	California Clapper Rail and the Green Sturgeon are two federally protective species that have not been identified at the Site but they may visit or inhabit the Site in the future.
Coastal Resources – Federal Requirements					
(Title 16 USC §§ 1451 through 1464)					
Within coastal zone	Conduct activities in a manner consistent with approved state management programs	Activities affecting the coastal zone, including lands there under and adjacent shore land	Coastal Zone Management Act 16 USC § 1456(c), 15 CFR Part 930	Relevant and appropriate	Potentially relevant because response actions at the Site may affect a coastal zone.

Federal and State Location-Specific Applicable or Relevant and Appropriate Requirements

Action Memorandum, Yosemite Slough, San Francisco, California

Location	Requirement	Prerequisite	Citation[a]	Preliminary ARAR Determination[a]	Comments
Hydrologic Resources – Federal Requirements					
Navigable waters	Permits required for structures or work in or affecting navigable waters.	Activities affecting navigable waters	Rivers and Harbors Act of 1899 33 USC § 403, 33 CFR Part 322	Relevant and appropriate	The substantive provisions of this requirement are relevant and appropriate requirements for dredging and capping that may affect navigable waters.
Water Protection – Federal Requirements					
Navigable waters	Action to prohibit discharge of dredged or fill material into waters of the United States without a permit.	Waters of the United States, including a mudflat as described in 40 CFR §230.42	Clean Water Act of 1988, as Amended, Section 404, 33 USC § 1344, 33 CFR § 320.4 and Part 323, 40 CFR §§ 230.10, 230.11, 230.20 - 230.32, and 230.42	Applicable	The substantive provisions are applicable for the discharge of dredged or fill material to a waters of the United States. EPA will notify USFWS of plans and actions taken to comply with these potential ARARs.
Biological Resources – State Requirements					
California Endangered Species Act	Protection of State listed or proposed threatened or endangered species.	Presence of a State listed species	CCR title 14, §§ 670.1, 670.2 and 670.5	Applicable	Prohibits the "taking" of listed and proposed threatened or endangered State species except as otherwise provided in State law.
Habitat for bird nests and eggs	Prohibits the take, possession or needless destruction of the nest or eggs of any bird	Nests and eggs	Cal. Fish and Game Code § 3503	Applicable	The substantive provisions of this requirement are potential ARARs.
Habitat for Nongame birds	Prohibits the take of nongame birds	Nongame birds.	Cal. Fish and Game Code § 3800	Applicable	The substantive provisions of this requirement are potential ARARs.
Nongame mammals	Prohibits the take or possession of nongame mammals.	Nongame mammals	Cal. Fish and Game Code § 4150	Applicable	The substantive provisions of this requirement are potential ARARs.
Habitat for mollusks crustaceans, and invertebrates	Prohibits the take or possession unless expressly permitted, of mollusks, crustaceans, and invertebrates.	Mollusks, crustaceans, and invertebrates	Cal. Fish and Game Code § 8500	Applicable	The substantive provisions of this requirement are potential ARARs.

Federal and State Location-Specific Applicable or Relevant and Appropriate Requirements

Action Memorandum, Yosemite Slough, San Francisco, California

Location	Requirement	Prerequisite	Citation[a]	Preliminary ARAR Determination[a]	Comments
Coastal Resources – State Requirements					
Within the San Francisco Bay coastal zone	Reduce fill and disposal of dredged material in San Francisco Bay, maintain marshes and mudflats to the fullest extent possible to conserve wildlife, abate pollution, and protect the beneficial uses of the bay.	Activities affecting San Francisco Bay and 100 feet of the shoreline	San Francisco Bay Plan at CCR title 14, §§ 10110 through 11990	Relevant and appropriate	The remedial alternatives will comply to the extent possible with the substantive purposes of the San Francisco Bay Plan.
Tidelands or submerged lands adjacent to San Francisco Bay	Establishes a permit requirement to fill, extract, or to make any substantial change in use of any water, land or structure in or near San Francisco Bay.	Filling or extracting materials in tidelands (land lying between mean high tide and mean low tide) and submerged lands (land lying below mean low tide) in or near San Francisco Bay.	McActeer-Petris Act Cal. Gov. Code title 7.2, § 66632	Applicable	The substantive provisions of this requirement are potential ARARs.

Federal and State Location-Specific Applicable or Relevant and Appropriate Requirements

Action Memorandum, Yosemite Slough, San Francisco, California

Location	Requirement	Prerequisite	Citation[a]	Preliminary ARAR Determination[a]	Comments
Wetlands Protection – State Requirements					
Waters of the State	Prohibits depositing in, permitting to pass into, or placing where the following can pass into waters of the state: petroleum, acid, coal or oil tar, aniline, asphalt, bitumen, residuary products of petroleum, carbonaceous material or substance, or any substance or material harmful to fish, plant life, mammals or bird life.	Deposit of material harmful to fish, plant, or bird life	Cal. Fish and Game Code § 5650(a)	Relevant and appropriate	The substantive provisions of § 5650(a) are relevant and appropriate

Notes:

[a] Only the substantive provisions of the requirements cited in this table are potential ARARs.

Key:

§ = Section
ARAR = Applicable or relevant and appropriate requirement
Cal. = California
CFR = Code of Federal Regulations
Regs. = Regulations
TBC = to-be-considered
USC = United States Code

Federal and State Action-Specific Applicable or Relevant and Appropriate Requirements

Action Memorandum, Yosemite Slough, San Francisco, California

Action	Requirement	Prerequisite	Citation[a]	Preliminary ARAR Determination	Comments
Dredging and Excavation					
Federal Requirements					
Resource Conservation and Recovery Act (42 USC, ch. 82, §§ 6901 through 6991[i])[b]					
On-site generation of waste	Person who generates waste shall determine if the waste is a RCRA hazardous waste.	Generator of waste	CCR title 22, §§ 66262.10(a) and 66262.11	Applicable	These regulations are applicable to any operation that generates waste. A determination whether the waste is RCRA hazardous waste will be made at the time it is generated.
On-site generation of waste	Requirements for analyzing waste for determining whether waste is hazardous.	Generator of waste	CCR title 22, § 66264.13(a) and (b)	Applicable	These regulations are applicable to any operation that generates waste. A determination whether the waste is RCRA hazardous waste will be made at the time it is generated.
Stockpiling and dewatering of sediment for off- site disposal	Allows generators to accumulate solid remediation waste in an EPA-designated pile for storage only up to 2 years during response actions without triggering land disposal restrictions.	RCRA hazardous waste temporarily stored in piles	40 CFR § 264.554(a), (d), (g), (h), (i), (j), and (k)	Relevant and appropriate	The response action work will temporarily stockpile debris, sediment and soil for Yosemite Slough in staging piles on land parcels in close proximity to the Site (e.g. property owned by the California State Parks located south of the Site). Stockpiled sediment will be dewatered and treated as described in the EE/CA. EPA has determined that the real property used for these staging piles shall be considered "on-site" as defined by CERCLA and NCP. The EPA does not anticipate that the stockpiled materials will be RCRA hazardous waste; however, the EPA has determined that these requirements are relevant and appropriate for all stockpiled soil, debris and sediment.

Federal and State Action-Specific Applicable or Relevant and Appropriate Requirements

Action Memorandum, Yosemite Slough, San Francisco, California

Action	Requirement	Prerequisite	Citation[a]	Preliminary ARAR Determination	Comments
Clean Water Act of 1988, as Amended, Section 404 (33 USC § 1344)*					
Discharge of water	Owners and operators of construction activities must be in compliance with discharge standards	Discharge of water	40 CFR Part 122, Subpart C	Relevant and appropriate	The substantive requirement of 40 CFR Part 122 Subpart C will be followed in addressing discharges during the response action and from any land-based stockpiles areas used to support or stage the response action.
Discharge to surface water	Monitor the mass for each pollutant limited in the permit; the volume of effluent discharged from each outfall. Monitor according to test procedures approved under 40 CFR Part 136 for the analyses of pollutants having approved methods	Permit requirements under CWA 301(b)	40 CFR §122.44(i)(1)(iv)	Relevant and appropriate	Substantive provisions are relevant and appropriate for the discharge of dewatering effluent. Specific discharge requirements will be provided in the response action design.
Discharge to surface water	Technology-based treatment requirements for permits	Permit requirements under CWA 301(b)	40 CFR §125.3	Relevant and appropriate	Substantive provisions are relevant and appropriate for the discharge of dewatering effluent. Specific discharge requirements will be provided in the response action design.
Toxic Substances Control Act (15 USC ch. 53, §§ 2601-2692)*					
Storage of PCB remediation waste	Establishes requirements for storage of PCB remediation wastes released into the environment.	Storage of PCBs	40 CFR §§ 761.65(c)(4) and (c)(9)	Relevant and appropriate	Excavated sediment that contains PCBs may be stored on site up to 180 days. The storage area must have a liner, cover, and run-on control system.
Decontamination standards for water containing PCBs	Establishes standards for the disposal of water used for decontamination of equipment used in excavation, storage, and treatment of PCB remediation waste.	Decontamination of water	40 CFR § 761.79(b)(1)	Relevant and appropriate	The decontamination standard for PCBs is less than 3 micrograms per liter (µg/L) for water discharges to a publicly owned treatment works or to navigable waters or less than or equal to 0.5 µg/L PCBs for unrestricted use.

Federal and State Action-Specific Applicable or Relevant and Appropriate Requirements

Action Memorandum, Yosemite Slough, San Francisco, California

Action	Requirement	Prerequisite	Citation[a]	Preliminary ARAR Determination	Comments
State Requirements					
Stormwater discharge	Establishes the state stormwater permit program and sets forth substantive conditions for construction sites larger than 1 acre	Stormwater discharge	Construction General Permit Order 2009-0009-DWQ adopted pursuant to 40 CFR Part 122, Subpart C; 40 CFR §122.44(s)	Applicable	Construction General Permit Order 2009-0009-DWQ applies to excavation activities that affect at least 1 acre. Pursuant to the substantive permit requirements, best management practices will be taken to prevent construction pollutants from contacting storm water and keep erosion products from moving off site. Substantive permit requirements include the development of a Storm Water Pollution Prevention Plan.
Dredging and Excavation	Requires that dredge and fill activities in navigable water under CWA Section 404 achieves state water quality standards	Mudflat alteration	Clean Water Act Section 401, 33 U.S.C. 1341 – State Water Quality Certification	Applicable	EPA will coordinate with California Regional Water Board to ensure substantive requirements are met during response action.
Creation of visible emissions	Limits visible emissions and particulate emissions	Creation of visible emissions	Bay Area Air Quality Management District (BAAQMD) Regulation 6	Applicable	Applicable to any response action which may discharge air contaminants as defined by this rule.
Creation of Odors	Limits odorous emissions and places maximum concentration limits on certain organic emissions	Creation of Odors	BAAQMD, Regulation 7	Applicable	Applicable to any response action which may odors as defined by this rule and establishes measures to address complaints received about odors.
Transportation of hazardous waste	Prior to transport, establishes for container packaging and labeling in accordance with RCRA and Department of Transportation requirements.	Transportation of hazardous waste	CCR title 22, §§ 66262.30 thru 66262.34	Applicable	Applicable to hazardous wastes that is stored temporarily onsite prior to offsite disposal.
Use and Management of Containers of hazardous waste	Ensures appropriate treatment, storage, and removal of hazardous waste	Treatment, storage, and removal of hazardous waste	22 CCR title 22, §§ 66264.171 thru 66264.178	Relevant and Appropriate	Use of compatible containers, container inspections, provisions for secondary containment, closing containers during transport, and removal of all hazardous material at completion of response action.

Federal and State Action-Specific Applicable or Relevant and Appropriate Requirements

Action Memorandum, Yosemite Slough, San Francisco, California

Action	Requirement	Prerequisite	Citation[a]	Preliminary ARAR Determination	Comments
Land Disposal Restrictions (LDRs)	Scope, Management and Applications of LDRs	Land disposal of hazardous waste	CCR title 22, §§66268.1 - 66268.5, 66268.30 - 66268.35, and 66268.50	Relevant and Appropriate	If hazardous waste is land disposed within the meaning of the LDRs, the hazardous waste will be managed in accordance with the standards stated in these sections of the regulation.
Dredging and Excavation	Actions taken by or at the direction of public agencies to clean up or abate conditions of pollution or nuisance resulting from unintentional or unauthorized releases of waste or pollutants to the environment are exempt from State Water Resources Control Board (SWRCB) regulation of discharges of solid waste to land under 27 CCR §§ 20005-20090, provided that: 1) wastes, pollutants, or contaminated materials removed from the immediate place of release shall be discharged according to the SWRCB-promulgated sections 20200 - 20230; and 2) remedial actions intended to contain the wastes at the place of release shall implement applicable SWRCB-promulgated provisions of CCR Title 27, Division 2, Solid Wastes, to the extent feasible.	Action taken by or at the direction of a public agency to cleanup release of pollutant which may result in discharges of solid waste to land for treatment, storage or disposal.	CCR title 27, §§ 20090(d) and 20200-20230.	Relevant and appropriate	This is a potential ARAR for the selected response action.
Dredging, Excavation and Backfilling	Interim testing procedures for evaluating dredged material disposed of in San Francisco Bay	Placement of dredge materials in San Francisco Bay	USACE, Public Notice 92-7	Applicable	Reassures that any wetland creation, uplands disposal, or dredging projects complete certain notification and listings.

Federal and State Action-Specific Applicable or Relevant and Appropriate Requirements

Action Memorandum, Yosemite Slough, San Francisco, California

Action	Requirement	Prerequisite	Citation[a]	Preliminary ARAR Determination	Comments
California Civil Code[a]					
Institutional controls	Provides conditions under which land use restrictions will apply to successive owners of land.	Transfer property from the current Site owner to any subsequent Site owner.	Cal. Civil Code §1471	Relevant and Appropriate	Substantive provisions are the following general narrative standard: "to do or refrain from doing some act on his or her own land... [where] (a)(3) each act relates to the use of land and each act is reasonably necessary to protect present or future human health or safety or the environment as a result of the presence of hazardous materials, as defined in § 25260 of the Cal. Health & Safety Code." This narrative standard would be implemented through incorporation of restrictive covenants in the deed at the time of transfer.
California Health and Safety Code[a]					
Institutional controls	Allows DTSC to enter into an agreement with the owner of a hazardous waste facility to restrict present and future land uses	Hazardous waste permitted facility where restrictive land use is necessary to protect present or future public safety.	Cal. Health and Safety Code § 25202.5	Relevant and Appropriate	The substantive provisions of this section are the general narrative standards to restrict "present and future uses of all or part of the land on which the facility ...is located" to protect present or future public safety.
Institutional controls	Provides a streamlined process to be used to enter into an agreement to restrict specific use of property in order to implement the substantive use restrictions of Cal. Health and Safety Code § 25232(b)(1)(A)–(E)	Property requires restricted use to limit exposure to hazardous wastes.	Cal. Health and Safety Code §§ 25222.1 and 25355.5(a) (1)(C)	Relevant and Appropriate	Cal. Health & Safety Code § 25222.1 provides the authority for the state to enter into voluntary agreements to establish land-use covenants with the owner of the property. The substantive provision of Cal. Health and Safety Code § 25222.1 is the general narrative standard: "restricting specified uses of the property."

Federal and State Action-Specific Applicable or Relevant and Appropriate Requirements

Action Memorandum, Yosemite Slough, San Francisco, California

Action	Requirement	Prerequisite	Citation[a]	Preliminary ARAR Determination	Comments
Institutional Controls	Provides a process for obtaining a written variance from a land use restriction	Property owner requests variance from existing land use restriction.	Cal. Health and Safety Code §§ 25233(c) and 25234	Relevant and Appropriate	Cal. Health and Safety Code § 25233(c) sets forth substantive criteria for granting variances from the uses prohibited in § 25232(b)(1)(A)-(E) based on specific environmental and health criteria.

Notes:

[a] Only the substantive provisions of the requirements cited in this table are potential ARARs.

[b] Statutes and policies, and their citations, are provided as headings to identify general categories of potential ARARs for the convenience of the reader. Listing the statutes and policies does not indicate that the EPA has determined that entire statutes or policies as potential ARARs; specific potential ARARs are addressed in the table below each general heading; only substantive requirements of specific citations are considered potential ARARs.

Key:

BAAQMD = Bay Area Air Quality Management District
CCR = *California Code of Regulations*
CFR = *Code of Federal Regulations*
DTSC = Department of Toxic Substances Control
mg/kg = Milligram per kilogram
PCB = Polychlorinated biphenyl
ppm = Part per million
RCRA = Resource Conservation and Recovery Act
USC = *United States Code*

Abbreviations and Acronyms

§	Section
ARAR	applicable or relevant and appropriate requirement
CCR	California Code of Regulations
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
EP	extraction procedure
EPA	United States Environmental Protection Agency
Fed. Reg.	Federal Register
mg/kg	milligram per kilogram
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
PCB	polychlorinated biphenyl
ppm	part per million
RCRA	Resource Conservation and Recovery Act
Res.	Resolution