CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD SAN FRANCISCO BAY REGION

TENTATIVE ORDER

Updated Waste Discharge Requirements, Water Quality Certification, and Rescission of Order No. 00-061 for:

Montezuma Wetlands LLC, Montezuma Wetlands Restoration Project, Solano County

The California Regional Water Quality Control Board, San Francisco Bay Region (Regional Water Board), finds that:

1. **Owner, operator, and discharger**: The Montezuma Wetlands Restoration Project (Project) is owned and operated by Montezuma Wetlands LLC (Discharger).

2. **Location and Setting**: The areal extent of the Project is approximately 2,400 acres at the eastern edge of the Suisun Marsh near the town of Collinsville, approximately 17 miles southeast of Fairfield (Figure 1). Surface elevations at the site have subsided up to 10 feet since the historical tidal marshes were diked and drained for agricultural use more than 100 years ago. As a result of subsidence and intensive long-term livestock grazing, the site supports primarily ruderal grasslands with some seasonal wetland habitat. Restoration and enhancement of wetlands at the site are taking place via engineered placement of approximately 17.5 million cubic yards (cy) of suitable dredged sediment to raise the subsided site to elevations appropriate for restoration of 1,877 acres of tidal and seasonal wetlands.

3. **Regulatory and Project Status**: The Regional Water Board adopted Waste Discharge Requirements Order No. 00-061 (Order) for the Project in 2000. The original Order allowed placement of sediment dredged from navigation channels to raise the site to elevations appropriate for restoration of a tidal and seasonal wetland complex similar to that which was historically present. The Order contemplated four Phases of this Project. The U.S. Army Corps of Engineers (Corps), San Francisco Bay Conservation and Development Commission, Solano County, and the State Lands Commission also issued permits. Construction at the Project site began in 2001. Since December 2003, 3.6 million cy of sediment have been placed to within one to two feet of design elevation in 350 acres of the Phase I portion of the Project site. In October 2010, Solano County revised Use Permit U-91-35 and Marsh Development Permit MD-91-04 to reflect the minor improvements to Project design and operations described in Finding 8. The original Order contemplated a review and renewal of the WDR every ten years.

PURPOSE OF ORDER

4. The primary objectives of this Order are to:

    a) Continue to regulate the discharge of sediments, some of which may contain contaminants at levels that, if not managed properly, could pose a threat to the beneficial uses of the

surface water and groundwater at or adjacent to the site. This Order also continues to regulate the discharge of return-flow or "decant" water to waters of the State; and,

b) Update the Order and Self-Monitoring Program to reflect minor improvements to project design and operations resulting from monitoring and technical review by agencies and outside experts. Finding 8 summarizes the proposed design and operational modifications.

PROJECT ENVIRONMENTAL BENEFITS

5. The Project will restore approximately 1,877 acres of tidal and seasonal wetlands, and approximately 480 acres of upland buffer zone habitats at the site (Figure 2), which will provide the following environmental benefits:

   a) Restore priority habitats identified by the San Francisco Bay Area Wetlands Ecosystem Goals Project (Baylands Ecosystem Habitat Goals, 1999), including tidal perennial aquatic habitat, saline emergent wetland habitat, tidal sloughs, seasonal wetlands, and perennial grasslands. The restoration of these habitats on the Project site will provide ecological benefits for many target species, including delta smelt, Chinook salmon, salt marsh harvest mouse, shorebirds, wading birds and waterfowl, and others.

   b) Increase tidal marsh acreage in Suisun Marsh by approximately 12.6 percent (a 1,713- acre increase from the current total of 13,560 acres). Between 80 and 90 percent of historic tidal marsh in the San Francisco Estuary has been lost to diking, filling, and other development. The California Wetlands Conservation Policy (Executive Order W-59-93) calls not only for "no net loss," but also for a region-wide increase in total wetland acreage and quality. The restored Project marshlands will increase both wetland acreage and quality, because they will have a high degree of "connectivity" to existing wetlands due to their immediate proximity to the existing Suisun Marsh complex.

   c) Maximize beneficial reuse of dredged material as a resource while reducing in-Bay and ocean disposal of dredged sediments, consistent with the goals of the Long Term Management Strategy for the Placement of Dredged Material in the San Francisco Bay Region.

DESIGN AND CONSTRUCTION

Phasing

6. The Project is divided into four phases to minimize temporal impacts to existing habitat on site (e.g., Phase I, which is being constructed first, has the least amount of existing habitat value, and Phase IV the most). Each of the Project's four phases is hydrologically separate so that tidal action can be returned to each phase independently. The following table shows the acreage and approximate dredged material fill capacity associated with each phase. After dredged material placement, settling, and consolidation to the appropriate design elevation, tidal flow will be returned to each Phase by breaching in the existing perimeter levee in one or more locations. According to the mitigation measures in the Project Final Environmental Impact Report/Environmental Impact Statement (EIR/EIS) and the Mitigation, Monitoring, and Reporting Plan (MMRP), a number of chemical, ecological, and engineering performance criteria must be met in Phase I prior to constructing Phases II, III, and IV.

Phase	Total Area (Acres)	Sediment Fill Capacity (Million Cubic Yards)	Sediment Placement (Acres)
I	873	5.0	531
II	502	4.5	371
III	357	2.5	211
IV	647	5.5	515
Total	**2,379**	**17.5**	**1,628**

The Discharger proposes to re-create approximately 1,713 acres of fully tidal marsh (1,198 acres low marsh and 430 acres high marsh using imported dredged material, and 85 acres subtidal channels), 68 acres of muted tidal elements (e.g., fluvial hollows and intertidal ponds), 72 acres of seasonal ponds, and 24 acres of remnant levees to serve as high tide refugia for birds and small mammals. Additionally, the Discharger proposes to enhance and protect 480 acres of upland transition and buffer habitat. Table 1, attached to this Order, is a detailed summation of acres of habitat type per Project phase. Figure 2 graphically depicts these habitat design elements.

Fill Elevation Design

7. The restoration incorporates placement of dredged sediment to create a tidal marsh plain separated into high marsh and low marsh. High and low marshes are characterized by their elevations in relation to tide levels and by the frequency and duration of tidal inundation. The different design elevations across the restored marsh plain will be achieved by the engineered placement of sediment into cells separated by levees; the levees will be lowered and notched to provide sufficient tidal prism into the cells after sediment placement is completed. The low and high marsh elevations have been designed to accommodate natural sedimentation after tidal breaching to bring the marsh surface to its final elevation.

Design Modifications

8. The Project uses adaptive management based on monitoring and technical review by both regulatory agencies and a technical review team (TRT) to inform wetland restoration implementation. The TRT, comprising scientific experts in fields related to wetland restoration, is described in detail in Finding 22. Since the Project first received dredged sediment in December 2003, knowledge gained during years of operations and monitoring indicates that certain modifications to the original design and proposed implementation are necessary. The modifications that the Discharger proposes to implement in the coming years are summarized below. All of the modifications were presented in a July 2007 report entitled "*Adaptive Management Restoration Plan for Phase I of the Montezuma Wetlands Project"* ("The July 2007 Plan"), which has been reviewed and supported by the TRT.

    a) **Staged Restoration of Tidal Action to Completed Areas of Phase I.** Sediment was delivered to Phase I more slowly than expected. As a result, not all cells have been filled to target elevations, and it remains infeasible to open the whole phase to tidal action at one time. The Discharger therefore proposes to return tidal action to the finished portions of Phase I before all of Phase I has been filled. Design and construction flexibility within Phase I will allow tidal action to be restored in two to four stages, if necessary, depending on the future rate of sediment delivery to this phase.

b) **Allowing up to 20% Foundation Sediment in Phase I.** To date, the Project has received and successfully placed about 3.6 million cy of sediment, including 280,000 cy of foundation sediment. The four-phase Project has a foundation limit of 20% of the site's 17 million cy total capacity (i.e., 3.4 million cy) based on the findings of the Final EIR/EIS. During the initial permitting process, Solano County placed an additional restriction on the amount of foundation material in Phase I for three reasons: 1) foundation sediment had never been placed in a wetland restoration project; 2) the agencies wanted site-specific data before allowing up to 20% foundation into the remaining three phases; and 3) Phase II was expected to be initiated within three to four years after Phase I, so data from Phase I was expected to be available to confirm that the 20% foundation limit would be protective of the environment when Phase II was started.

   Since 2003, when sediment was initially placed at the site, monitoring data has shown that the decant water quality and leaching potential of foundation sediment placed at the site are not detectably different from that of surface sediment, and that foundation sediment has not caused any apparent water quality impacts. In October 2010, Solano County, with the support of the TRT, the Regional Water Board Executive Officer, and U.S. EPA, approved placement of up to 20% foundation sediment in Phase I based on a Negative Declaration and Initial Study, finding no potentially significant adverse environmental impacts likely to occur.

c) **Creation of Least Tern Habitat.** The endangered least tern was first observed at the Project in 2005 and nesting has occurred at the site each year since 2006. The terns are currently nesting in portions of the site that are designated to be low marsh habitat once tidal action is restored to Phase I. Although these areas will no longer be available for nesting after they have been flooded, there is another area of the Project capable of providing better long-term tern nesting habitat. Based on discussions with tern experts, the TRT, and the resource agencies, the Discharger will construct nesting habitat at the upper edge of the high marsh, near seasonal wetlands. The current design includes two peninsulas extending into the wetlands from the adjacent uplands; upland access is needed to facilitate access for monitoring and habitat maintenance. The peninsulas will be above the line of highest tidal action and will be topped with sand and/or shells to provide an appropriate nesting substrate. Total nesting area will comprise 2 to 4 acres. Final design plans will be presented to the TRT and resource agencies for comment prior to construction. Consultation with USFWS regarding the least tern habitat creation was completed in November 2010. CDFG's comments were incorporated into the amended Solano County Use Permit/Marsh Development Permit issued in October 2010. Construction of this habitat is planned for 2013, but is dependent upon sediment availability and construction of the adjacent cell and seasonal wetland.

d) **Modification of High Marsh Design for Salt Marsh Harvest Mice.** After two years of work with the TRT to assess emerging data regarding Suisun Marsh habitats supportive of the endangered Salt Marsh Harvest Mouse (SMHM), it became clear that support of the SMHM in Suisun Marsh does not depend on pure stands of pickleweed. Instead, data shows that a mixed halophytic vegetative regime (i.e., a more natural Suisun Marsh landscape) can support higher densities of SMHM than habitat dominated by pickleweed. Consequently, the Discharger is proposing to modify the high marsh design in two ways: 1) Raise the target elevation 1.2 feet to ensure more-saline conditions for promoting halophytic vegetation and

to reflect updated estimates of tidal elevations; and, 2) Merge cells 5A and 5B with Cell 12 so that the Phase I managed diked area originally designed to grow nearly 100% pickleweed will instead become a tidally-influenced high marsh with more-diverse halophytic vegetation. This design change will eliminate a highly-engineered marsh element that would have relied on perpetual active management and maintenance.

e) **Pumping Water Directly from the Sacramento-San Joaquin River Delta Using Approved Fish Screens.** Historically, the Project has obtained water from on-site shallow groundwater wells that serve to filter adjacent river/bay water through sands located near the Phase IV perimeter levee. However, due to slower than expected deliveries of sediment to the Project, the groundwater wells have not been able to keep up with the year-after-year demands to keep the sediment cells inundated with water during the long dry periods. Consequently, the Discharger proposes to use the Liberty offloader, now equipped with the same State and federal resource agency-approved fish screens that were used successfully at the Hamilton Wetland Restoration Project, to pump water directly from the river. The Discharger also proposes to supplement groundwater extraction using a 3,000 gpm pump fish-screened intake system installed on the perimeter levee in the offloading area. State and federal resource agencies granted approval for these river pumps on the condition that they are operated only between August 1 and December 15 (to protect larval stages of longfin and Delta smelt), unless monitoring by these agencies in a particular year indicates that river pumping outside that window would not harm protected fish.

Surface water pumping was authorized in 2011 by a Streambed Alteration Agreement from the California Department of Fish and Game (CDFG) and amended Biological Opinions from U.S. Fish and Wildlife Service (USFWS) and NOAA's National Marine Fisheries Service (NMFS).

Dredged Sediment Classification

9. This Order allows two types of sediment, classified as "cover" or "surface" material (i.e., sediment of a quality suitable for the marsh surface) and "noncover" or "foundation" material (i.e., sediment of a quality suitable for burial under surface sediment), to be placed at the Project site from dredging projects throughout the San Francisco Bay and Sacramento-San Joaquin River Delta regions. Surface and foundation material acceptance criteria for the Project are derived from Regional Water Board sediment screening and testing guidelines for beneficial reuse of dredged material (Specification B.2).

   The upper layers of the restoration cells consist of surface sediment. Foundation sediment is placed in only the deepest portions of the site. Foundation sediment is always covered by at least 3 feet of surface sediment, and is typically isolated from surface-water bodies and constructed channels by at least 200 lateral feet of surface sediment. However, the separation of foundation sediment from surface waters and constructed channels may be less than 200 feet if hydraulic and geomorphic analyses confirm that the material is buried deeper than the maximum incision depth of any natural lower-order channels that may form after tidal action is restored.

Sediment Placement

10. Sediments are brought by barge to the Project site and placed hydraulically into sediment cells. Water from a holding pond in the southern portion of the site, known as the "make-up water pond," is mixed with sediment on the barges to form a slurry containing about 15% to 35% sediment. The slurry is pumped through a pipeline into sediment placement cells in the restoration area. The make-up water pond is supplied by shallow groundwater wells in the sandy subsurface soils on the site, adjacent to the western boundary of the Sacramento-San Joaquin River Delta. It is supplemented by direct pumping from the Sacramento River as discussed in Finding 8e.

    Decant water from the sediment placement cells is drained back to the make-up water pond through an existing network of ditches into a main return water channel. Once the surface of the placed sediment reaches design elevations, the perimeter levees will be breached at certain locations, allowing the tides to ebb and flow across the site.

    Placement of dredged sediments at the site, followed by additional natural buildup of sediments from tidal inundation, will raise the subsided land surface to an elevation suitable for the reestablishment of the proposed tidal marsh ecosystem.

Sediment Placement Cells

11. Within each phase of the Project, a number of sediment placement cells, ranging in size from 15 to 200 acres each, will be formed by the construction of containment levees from on-site soils or imported surface-quality dredged sediment. Phase I (Figure 3) currently has eight cells ranging in size from 30 to 90 acres. The cells function as settling basins for the dredged sediments pumped from the barges, and are designed to handle either surface sediment only (Cells 8/9 and 10), or both surface and foundation sediment (Cells 1, 2, 3/4, 6/7, 11, and 12). Cells designed to handle both surface and foundation sediment typically have an interior separation levee that forms a foundation material subcell in the center of the sediment cell. Cell 11 was constructed slightly differently, in that the foundation sediment was placed so that it could be covered by at least 7 feet of surface sediment. Because of the extra depth at which foundation sediment in Cell 11 was buried, the interior separation levee was not required.

    Until the foundation sediment is fully covered with surface sediment, it is kept inundated to a depth that discourages wildlife exposure (Specification B.3). Water is also added to the completed cells to limit the formation of deep desiccation cracks in the surface sediment that could create exposure pathways to the contaminants in the foundation layer.

Confirmation Sampling of Incoming Sediment

12. The Discharger conducts confirmation sampling of incoming dredged sediment to demonstrate that contaminant concentrations do not exceed the applicable numeric acceptance criteria in Specification B.2. Surface grab samples are collected from each sediment placement cell as it is being filled. The number of samples collected adheres to the same volume-based frequency employed during the pre-dredge sediment testing program described in Specification B.1.

Construction of Placement Cell Containment Levees

13. Currently, sediment placement cell containment levees are constructed using onsite soil. The Discharger anticipates that during the term of this Order, the supply of onsite soil meeting the

minimum geotechnical specifications necessary for levee construction may run out before construction of future Project phases is complete. Pursuant to the original project description, if this happens, the Discharger proposes to import additional surface-quality dredged material that meets levee construction specifications. This additional dredged material would be dried and stockpiled on site at the rehandling facility (described in Finding 14).

Rehandling Facility

14. The project includes a planned sediment rehandling facility in the southeast corner of the property adjacent to an existing oyster shell and sand processing facility. The rehandling facility is intended for dewatering surface-quality dredged sediments for onsite construction use and for potential offsite sale. The rehandling facility was part of the original project design and was evaluated in the EIR/EIS. To date, it is partially constructed (approximately 40 acres of rehandling cells have been built) but not yet operational. The rehandling facility is located in a portion of the site zoned for industrial use and is completely contained by levees to prevent releases of dried dredged material via erosion, runoff, and wind transport. Decant water generated from drying of material for onsite construction use will either evaporate within the drying area, be discharged to the return water channel, or be recycled onsite for dust control, levee compaction, or irrigation to enhance salt marsh harvest mouse habitat as described in the 2002 Interim Habitat Enhancement Plan for Unfilled Phases. This Order does not regulate the discharge of decant water from dredged material dewatered for offsite use. The Discharger will apply for and obtain all appropriate permits prior to operating the rehandling facility for offsite use of dredged material.

Water Management System

15. The water management system for the Project is described below. It consists of the following elements:
    - the **make-up water pond**
    - the **water supply system**
    - the **decant water drainage system**, and
    - **decant water effluent monitoring**.

Make-Up Water Pond

16. The 32-acre make-up water pond is located in the southeastern portion of the site, adjacent to the Sacramento River (Figure 3). It is divided into two water management cells with outboard levees built to elevation +10 feet NGVD (12.73 ft. NAVD 88) and it has an approximate total capacity of 200 acre-feet of water to elevation +6 feet NGVD (8.73 ft. NAVD 88). The make-up water pond is intended to serve the following functions:
    - Receive and store shallow groundwater supplied by the extraction wells adjacent to the Sacramento River and surface water pumped from the River
    - Provide a water source to mix into the sediment on the dredge barges to make a slurry that can be pumped to the sediment placement cells
    - Provide a means for recycling water that is removed from the restoration area sediment cells and potentially from the rehandling facility
    - Serve as a controllable facility to monitor water quality before discharge into the Sacramento River.

17. The make-up water pond is also used as a source of water to keep uncovered foundation placement cells fully inundated during the dry season to a depth that will discourage waterfowl and shorebird foraging. The make-up water pond also provides water to foundation cells after placement of cover material to prevent the formation of deep desiccation cracks that might expose wetland plants and animals to sediment with higher-than-ambient contaminant concentrations.

18. There are two overflow weirs in the make-up water pond. Weir #1 is the discharge weir, over which water flows into a pipeline that discharges into the Sacramento River. The discharge pipeline is equipped with a valve to control the release of water. Weir #1 is also effluent monitoring station MUWP identified in the Self-Monitoring Program that accompanies this Order. Prior to discharge, water is routed through ½-inch mesh filter fabric within this weir to remove debris and to prevent entrainment of western pond turtles, a state species of special concern, that are occasionally present in the pond. Weir #2 provides water to make the dredged material slurry that is pumped from the dredge scows during offloading operations. It is also screened with ½-inch mesh filter fabric to prevent entrainment of western pond turtles.

Water Supply System

19. **Groundwater Extraction**: Shallow groundwater is extracted using an array of wells located within the southernmost Phase IV area of the Project site, near the perimeter levee adjacent to the mouth of Montezuma Slough and to the Sacramento River (Figure 3). Water supply wells were installed in a shallow water-bearing zone, which is encountered at approximately 5 to 10 feet below the ground surface (bgs). The shallow water-bearing zone extends to approximately 55 feet bgs. A clay layer separates the shallow aquifer from a deeper water-bearing zone that extends from approximately 70 to 83 feet bgs. Data evaluated in the Final EIR prepared by Solano County and further confirmed in a field pumping test indicate that the shallow water-bearing zone is connected to the Sacramento-San Joaquin River Delta and is hydrologically separated from the deeper aquifer.

    Since site operations began in 2003, groundwater extraction rates have ranged from 1,500 to 3,000 gpm with an average flow rate of 2,000 gpm during pumping. Recent flow rates have been lower, in the range of 1,200 to 1,500 gpm, due to fouling of the well screens by iron bacteria in the aquifer, infiltration of sand into the wells from the surrounding substrate, and lower than expected production from the aquifer. Despite the addition of more wells and modification of existing wells to increase production, the well system has been unable to provide enough water to keep the sediment cells ponded throughout the dry season. The water shortages have been exacerbated when sediment placement, which increases water demand, occurs during the dry season. Persistent dry-season water deficits prompted the Project to propose extracting surface water from the Sacramento River to supplement the well system.

Decant Water Drainage System

20. Drainage systems are installed within each of the sediment placement cells to remove excess decant water from the dredged material slurry as the sediment settles. Decant water from sediment placement cells in Phase I drains via gravity over weirs into the return water channel, which conveys it to the make-up water pond. The return water channel pre-dates the Project and was formerly used to drain rainwater from the site. The return water channel is approximately 11,000 feet long and flows back to a small pond immediately adjacent to the

make-up water pond. An electric pump is used to move water from this small pond into the makeup water pond.

Decant water from Phase III operations will not discharge to the return water channel. Instead, it will be pumped to the make-up water pond through a pipeline. Following completion of Phase II, the pipeline will run along the upland edge of Fire Truck Road to the make-up water pond.

21. The Discharger manages the foundation cells to filter out suspended sediment from the decant water before it reaches the return water channel, minimizing the potential for the movement of foundation sediment into the make-up water pond. Decant water is filtered through two to six layers of non-woven geotextile fabric placed over gravel-backfilled trench drains in the sidewalls of the foundation cell separation levees before it is pumped into the return water channel. An exception to the use of sidewall drains was made for the initial placement of a small volume of foundation sediment in the bottom of Cell 11 in Phase I. The size and shape of Cell 11 provided adequate retention time for suspended solid settlement and removal from the water column before discharge over the weir into the return channel.

Performance Monitoring and Management

Technical Review Team

22. As required by the Corps' permit for the Project, the Discharger has contracted with a non-profit organization to coordinate and manage a technical review team (TRT) to provide expert and objective analysis and recommendations on subjects associated with the construction, monitoring, and performance of the Project. The TRT reviews and comments on matters pertaining to, but not limited to, the following items:
    - Quality of the monitoring data, analyses, results, and conclusions
    - Assessment of the monitoring results relative to project goals and requirements
    - Compliance with performance standards
    - Initiation of new Phases
    - Determination of when a completed Phase may be breached
    - Establishment of appropriate reference sites for monitoring purposes
    - Optimum contingency measures to be implemented if needed and
    - Adaptive management changes to retrieve better monitoring information and to enhance habitat establishment and Project performance

    The Discharger has contracted with the San Francisco Estuary Institute (SFEI) to administer the TRT since 2002. SFEI reports the annual findings and recommendations of the TRT and maintains a complete record of all TRT activities and reports (see http://ww.sfei.org/montezuma-tech-review). The TRT consists of a variety of scientists and wetland restoration practitioners from local, state, and federal agencies, universities, non-governmental organizations, and the private sector who, collectively, possess expertise on each major subject of the monitoring effort for the Project.

    The TRT is not a decision-making body; it is solely advisory. The Project will be monitored during its construction and for at least 10 years after completion. Provision 3 of this Order requires the Discharger to continue to organize and convene the TRT during the construction, monitoring, and performance phases of the Project.

Decant Water Effluent Management and Monitoring

23. **Effluent Flow Rates**: Assuming a maximum working day of 20 hours per 24 hours, decant water would be generated at a maximum rate of between 2,000 and 5,000 gallons per minute (gpm) [or 2.4 million gallons to 6 million gallons per day (mgd), which would be discharged approximately every other day]. The Discharger's operation of the water management system during periods of active dredged material placement (December 2003 to December 2006 and December 2011 to April 2012), has shown that most of the decant water can be recycled on-site by storing it in constructed sediment cells and in unfilled Phases II and IV. Since operations started in December 2003, discharge of a total of 43.6 million gallons of water from the site occurred for only 4 weeks during March and April of 2004. Use of unfilled phases for water recycling will enhance existing wetland values in those phases consistent with the MMRP biological performance criteria.

24. **Effluent Discharge Location**:

Discharge Point Name	Code	Latitude	Longitude
Offloading Dock in River	E-001	38-04-19	121-51-34

The discharge point is located at a depth of approximately -7 feet below MLLW or approximately 14 feet above the river bed. On March 1, 2007, the Executive Officer approved cutting off the original diffuser and shortening the outfall pipe to eliminate sedimentation blockage that rendered the diffuser unusable. To justify modifying the outfall pipe in this manner, the Discharger used an EPA-approved, three-dimensional, single-port submerged discharge flow modeling software application called Visual Plumes to model initial dilution. The model output indicated that 10:1 dilution could be achieved approximately 10 to 25 feet downstream from the end of the pipe depending on current speed in the river. The model used conservative assumptions such as current speeds measured at an upstream USGS gauging station in a period of low Delta outflow, as well as an effluent flow rate higher than any actually used during site operations.

25. **Effluent Limits**: Decant water is managed primarily for salinity and suspended sediment. Contaminants in water, primarily conventional pollutants and heavy metals, are monitored in the makeup water pond prior to discharge as required by section C of this Order and the attached Self-Monitoring Program (SMP). The Discharger monitors internal process water quality in the makeup water pond, using a threshold of one-half the effluent limits in section C. If this threshold is exceeded, the Discharger will implement contingency measures such as increasing settling time in sediment placement cells or increased mechanical filtration of water in foundation cells. These contingency measures are outlined in the MMRP.

Mercury Methylation Management and Monitoring

26. Mercury occurs naturally in the San Francisco Bay environment and has been introduced as a contaminant in various chemical forms from a variety of anthropogenic sources. Total levels of mercury in ambient Bay sediments are elevated above naturally occurring background levels. The Project is designed to place sediment with the highest levels of mercury and other chemicals of concern below the biologically active zone, covered by at least three feet of clean surface sediment.

Although mercury is often present in sediment in forms that do not readily enter the food web, it can be transformed through natural bacterially-mediated processes into bioavailable methylmercury. Methylmercury is the toxic form of mercury that most readily bioaccumulates in food webs to levels that can endanger people and wildlife.
The MMRP, which established monitoring procedures and performance criteria for all aspects of the Project, including bioaccumulation of contaminants such as methylmercury, is over a decade old. Since its publication in June 2000, scientific knowledge has changed regarding appropriate methods for monitoring biological uptake of methylmercury. Therefore, portions of MMRP related to methylmercury bioaccumulation monitoring and performance criteria are in the process of being updated by the Discharger in conjunction with the TRT. These updates will be incorporated into the post-breach biological performance monitoring plan described in Finding 27 and Provision 6. As outlined in the SMP, pre-breach methylmercury bioaccumulation monitoring is only required if breeding wildlife biosentinel species, most likely shorebirds nesting within the Project site, are observed foraging in the sediment placement cells or the make-up water pond prior to restoration of tidal action.

Biological Performance Monitoring

27. As noted above, the TRT is reviewing post-breach biological monitoring approaches so that it may recommend appropriate modifications to the MMRP. Provision 6 requires the Discharger to submit a detailed post-breach biological performance monitoring plan, acceptable to the Executive Officer, before Phase I is breached. The plan will include monitoring protocols for the following performance measures:
    - Vegetation colonization (spatial extent, distribution, and diversity)
    - Presence of special status wildlife species
    - Water quality conventional parameters (e.g., TSS, turbidity, dissolved oxygen, pH, temperature, conductivity)
    - Methylmercury bioaccumulation in appropriate (resident or breeding) vertebrate species
    - Physical development of habitat features (e.g., channel morphology and seasonal wetland hydrology)

GROUNDWATER RESOURCES

28. Two water-bearing zones have been identified in the Project's vicinity: a shallow, brackish zone and a deeper zone used for domestic supply. Shallow groundwater on the low-lying parts of the site generally lies within a few feet of the surface. Available data indicate that the shallow aquifer does not extend beyond 55 feet below ground surface at the site. Soils at the site are silt, clay and loam, interbedded with peat. The shallow aquifer is a sandy layer (up to 50 feet thick), that is present on the southern portion of the site (Phase IV), and has higher permeability. Soil borings taken at the southern perimeter of the site and synchronized water level fluctuations with tidal changes suggest that this sand layer is hydraulically connected to adjacent surface water bodies (the Sacramento River and Montezuma Slough).

29. Shallow groundwater at the site is not a viable source for domestic supply due to high salinity. According to the criteria referenced in State Water Board Resolution No. 88-63 and Regional Water Board Resolution 89-39, "Sources of Drinking Water" where:

- The total dissolved solids exceed 3,000 mg/L (5,000 µS/cm, electrical conductivity), and it is not reasonably expected by the Water Board that the groundwater could supply a public water system.

Background groundwater monitoring conducted prior to dredged material placement demonstrated that the shallow groundwater at the south end of the Project site (Phase IV) was brackish, with an average electrical conductivity (EC) of approximately 6,500 µS/cm. North of the river, shallow groundwater in Phase 1 monitoring wells was even more saline, with an average EC of approximately 13,000 µS/cm. The average EC in adjacent surface water in the Sacramento River was 3,000 µS/cm.

30. Background site investigations have shown that there is no hydraulic connectivity between the shallow and deep-water aquifers, which are separated by a clay aquitard. Groundwater in the deep aquifers is of high enough quality that it is used for drinking. Salinity measured in two offsite water supply wells (Birds Landing and Collinsville) that draw water from deeper aquifers was a thousand times lower than salinity measured in the on-site shallow monitoring wells.

    In Phase I there are a total of 13 monitoring wells in the shallow brackish aquifer: seven in the shallowest water-bearing zone (approximately 10 to 25 feet bgs) and six in a deeper zone (approximately 35 to 45 feet bgs) that is separated from the shallowest zone by silt layers. Monitoring since 2003 has shown no apparent effects on groundwater quality in either zone. Both of these zones are separated by a clay aquitard from the drinking water aquifer which is more than 70 feet bgs. Groundwater resources will be protected from potential increases in salinity or other contaminants by pumping groundwater only from the shallow zone, testing dredged material for leachable pollutants before acceptance at the site, and by continued shallow- and intermediate-zone on-site groundwater monitoring.

APPLICABLE PLANS, POLICIES, AND REGULATIONS

31. **State Wetland Policy**: The Project is consistent with the goals of the State Wetlands Policy: California Wetlands Conservation Policy (Executive Order W-59-93, signed August 23, 1993), which is incorporated in the Basin Plan, and includes ensuring "no overall loss" and achieving a "…long-term net gain in the quantity, quality, and permanence of wetland acreages and values…." Senate Concurrent Resolution No. 28 states that "it is the intent of the legislature to preserve, protect, restore, and enhance California's wetlands and the multiple resources which depend on them for benefit of the people of the State." Section 13142.5 of the Water Code requires that the "[h]ighest priority shall be given to improving or eliminating discharges that adversely affect …wetlands, estuaries, and other biologically sensitive areas."

32. **Long Term Management Strategy for the Placement of Dredged Material in the San Francisco Bay Region (LTMS)**: The Project is consistent with the primary goals of the LTMS, which are to significantly reduce in-Bay disposal and to maximize the beneficial reuse of dredged material. The Regional Water Board, along with other State and federal regulatory agencies with authority over dredging activities, including the Bay Conservation and Development Commission (BCDC), U.S. EPA, and the Corps, joined with navigation interests, fishing groups, environmental organizations, and others to form the LTMS. Large, multi-user dredged material placement sites that use dredged material to raise existing elevations in

subsided diked baylands so that wetland vegetation will grow are a key component of the LTMS.

The Project is capable of accepting sediment from a variety of dredging operations in navigation channels, berths, and marinas throughout the Bay Area, and possibly the Sacramento River Delta. All navigational dredging in the Bay Area is regulated by the state and federal agencies that make up the Dredged Material Management Office (DMMO) – BCDC, U.S. EPA, the Corps, the State Lands Commission (SLC), and the Regional Water Board. To ensure that sediment accepted at the site meets state water quality standards, participating dredging projects will adhere to testing requirements set forth by the DMMO agencies. Sediments must be analyzed for contaminants prior to approval of each dredging project. Regional Water Board staff will review sediment testing data from pending dredging projects to evaluate its conformity with the dredged material acceptance criteria provided in this Order (see Specifications B.1 & B.2).

33. **Basin Plan**: The Porter Cologne Water Quality Control Act (Section 13240) authorizes the Regional Water Board to develop a Water Quality Control Plan for the San Francisco Bay Basin (Basin Plan), which is the Water Board's master water quality control planning document. The Basin Plan designates beneficial uses and water quality objectives for waters of the State, including surface waters and groundwater. It also includes implementation programs to achieve water quality objectives. The Basin Plan was duly adopted by the Water Board and approved by the State Water Resources Control Board, U.S. EPA, and the Office of Administrative Law where required. The latest version can be found at the Regional Water Board's website at http://www.waterboards.ca.gov/sanfranciscobay/basin_planning.shtml.

34. **Beneficial Uses**: The beneficial uses identified in the Basin Plan for waters of the Sacramento-San Joaquin River Delta, Montezuma Slough, and local groundwater are:

Beneficial Use	Sacramento-San Joaquin Delta	Montezuma Slough	Ground [1]Water
Municipal and Domestic Supply	√	√	√
Industrial Supply	√	√	√
Navigation	√	√	
Water Contact Recreation	√	√	
Non-contact Water Recreation	√	√	
Commercial and Sport Fishing	√	√	
Wildlife Habitat	√	√	
Preservation of Rare and Endangered Species	√	√	
Fish Migration	√	√	
Fish Spawning	√	√	
Estuarine Habitat	√	√	
Warm Freshwater Habitat	N/A	√	

[1]Groundwater in the deeper aquifer is suitable for these beneficial uses; shallow groundwater is brackish and has limited beneficial uses.

TOTAL MAXIMUM DAILY LOADS

35. Section 303(d) of the federal Clean Water Act requires the State to identify water bodies that do not meet water quality standards and to develop action plans, called Total Maximum Daily Loads (TMDLs), to improve water quality. The Suisun Marsh, which includes the Project within its official boundary, is listed as impaired due to mercury, nutrients, low dissolved oxygen/organic enrichment, and salinity. A TMDL for mercury, nutrients, and low dissolved oxygen/organic enrichment in Suisun Marsh is currently under development. The Regional Water Board may consider revisions to requirements contained in this Order, at a future date, once a TMDL for the Suisun Marsh, or any other TMDL affecting the Project, has been adopted.

CALIFORNIA ENVIRONMENTAL QUALITY ACT (CEQA)

36. With the exception of the minor modifications detailed in Finding 8, this Order is the continued operation of an existing facility without significant expansion of use and hence exempt from CEQA review under CEQA Guidelines section 15301. The following addresses each of the minor modifications.

    a) **Staged Restoration of Tidal Action to Completed Areas of Phase I.** The fact that the effects will occur gradually to areas of Phase I as opposed to simultaneously is a modification without significant effects and is thus exempt from CEQA (Cal. Code Regs., tit. 14, § 15061(b)(3)). Both NMFS and USFWS determined no significant effects would occur as a result of this modification.

    b) **Increased Proportion of Foundation Sediment and**
    c) **Creation of Least Tern Habitat.**
    As lead agencies, Solano County and the Corps certified the Final Environmental Impact Report/ Environmental Impact Statement (EIR/EIS) for the Project on February 2, 1999. This document was considered and relied upon in preparation of the original Order in 2000. Solano County adopted a Mitigated Negative Declaration in October 2010 for the increased proportion of foundation sediment in Phase I and construction of least tern nesting habitat. The Regional Water Board, as a responsible agency under CEQA, finds that all environmental effects have been identified for project activities that it is required to approve, and that the Project will not have significant adverse impacts on the environment provided that the mitigation presented in the final EIR/EIS and in the June 20, 2000, MMRP, and any subsequent TRT- and agency-approved MMRP updates, is carried out as conditioned in this Order.

    d) **Modification of High Marsh Design for Salt Marsh Harvest Mice.** This modification is proposed as a means of providing a mixed halophytic vegetative regime, which can support higher densities of salt marsh harvest mice. This modification is therefore categorically exempt from CEQA as an action taken to assure the maintenance, restoration and enhancement of a natural resource and protection of the environment (Cal. Code Regs., tit. 14, §§ 15307 and 15308).

    e) **Pumping Water Directly from the Sacramento-San Joaquin River Delta Using Approved Fish Screens.** NMFS, USFWS, DFG and the State Water Resources Control Board have evaluated and authorized the proposed project modification

allowing diversion of water up to 3000 gpm during specified timeframes and with specified equipment (fish screens) to supplement the use of groundwater. This is a modification without significant effects and is thus exempt from CEQA (Cal. Code Regs., tit. 14, § 15061(b)(3)). In addition, pumping water from the river will protect wildlife from potential contact with foundation sediments and advance timely completion of the wetlands restoration project, activities which are categorically exempt from CEQA as actions taken to assure the maintenance, restoration and enhancement of a natural resource and protection of the environment (Cal. Code Regs., tit. 14, §§ 15307 and 15308).

Overall, the Regional Water Board finds that the minor modifications to the Montezuma Wetlands Restoration Project will enhance and protect natural resources and the environment.

PUBLIC NOTICE

37. The Regional Water Board notified the Discharger and interested agencies and persons of its intent to issue WDRs for the Project and provided them with an opportunity to submit their written views and recommendations.

PUBLIC HEARING

38. The Regional Water Board, in a public meeting on October 10, 2012, heard and considered all comments pertaining to the WDRs for the Project.

IT IS HEREBY ORDERED, PURSUANT TO THE PROVISIONS OF DIVISION 7 OF THE CALIFORNIA WATER CODE AND REGULATIONS, AND GUIDELINES ADOPTED THEREUNDER, THAT THE DISCHARGER SHALL COMPLY WITH THE FOLLOWING:

A. PROHIBITIONS

1. Discharges of water, material, or wastes which are not otherwise authorized by the Order are prohibited.

2. It is prohibited to import dredged materials without first following the testing and screening protocols described in Specification B.1 below, and obtaining the Regional Water Board Executive Officer's acceptance. Movement of on-site material is allowed.

3. The activities subject to these requirements shall not cause a condition of pollution or nuisance as defined in sections 13050(i) and (m), respectively, of the Water Code.

4. Levee breaching and flooding of existing least tern nesting habitat in Phase I shall not take place until new nesting habitat, acceptable to USFWS and CDFG, has been constructed and copies of those agencies' written approvals have been provided to Regional Water Board staff.

5. This Order does not allow for the take, or incidental take, of any special status species. The Discharger shall use the appropriate protocols, as approved by CDFG, USFWS, and NMFS, to ensure that project activities do not adversely impact Preservation of Rare and Endangered

Species, a beneficial use of San Francisco Bay and its tributaries as set forth in the Regional Water Board's Water Quality Control Plan.

B. SPECIFICATIONS

1. **Dredged Material Screening Procedures**. The Discharger shall submit data, acceptable to the Executive Officer, characterizing the quality of all dredged material proposed for use as fill at the Project. Review of the data shall be coordinated through the DMMO. Sediment characterization shall follow the protocols specified in the following documents:

    a. The DMMO guidance document, "Guidelines for Implementing the Inland Testing Manual in the San Francisco Bay Region" (Corps Public Notice 01-01, or most current version), with the exception that the water column bioassay simulating in-Bay unconfined aquatic disposal shall be replaced with the modified effluent elutriate test, as described in Attachment B of the Inland Testing Manual, for both water column toxicity and chemistry (DMMO suite of metals only); and

    b. Regional Water Board May 2000 staff summary report, "Beneficial Reuse of Dredged Materials: Sediment Screening and Testing Guidelines," or most current revised version.

    Modifications to these procedures may be approved by the Executive Officer on a case-by-case basis pending the Discharger's ability to demonstrate that the dredged materials are unlikely to adversely impact beneficial uses.

2. **Dredged Material Acceptance Criteria**: The dredged material acceptance criteria in the following table shall be used to screen prospective dredging projects for placement of material at the Project site. Exceptions may be granted if, at least 60 days prior to proposed placement of dredged material, the Discharger submits a technical report, acceptable to the Executive Officer, demonstrating that the material is unlikely to adversely impact beneficial uses.

Montezuma Wetland Restoration Project
Dredged Material Acceptance Criteria[1]

CONSTITUENT	Surface (Cover)	Foundation (Non-Cover)
Metals(mg/kg)		
Arsenic	15.3	70
Cadmium	0.33	9.6
Chromium	112	370
Copper	68.1	270
Lead	43.2	218
Mercury	0.43	1.3[2]
Nickel	112	200[2]
Selenium	0.64	1.4[2]
Silver	0.58	3.7
Zinc	158	410

CONSTITUENT	Surface (Cover)	Foundation (Non-Cover)
Organochlorine Pesticides & PCBs (µg/kg)		
DDTs, sum	7.0	100[2]
Chlordanes, sum	2.3	4.8
Dieldrin	0.72	4.3
Total PCBs (sum of RMP 40 congeners)	22.7	180
Total PAHs (sum of RMP 25 compounds)	3,390	44,792

[1]Surface and Foundation criteria taken from San Francisco Bay Regional Water Quality Control Board (SFBRWQCB), Beneficial Reuse of Dredged Materials: Sediment Screening and Testing Guidelines, Draft Staff Report, May 2000, except where otherwise noted.

[2]Foundation criteria for mercury, nickel, selenium, and DDT taken from original Montezuma WDR based on SFBRWQCB Sediment Screening Criteria and Testing Requirements for Wetland Creation and Upland Beneficial Reuse, Interim Final, December 1992.

3. To discourage foraging by invertebrate-eating shorebirds and non-diving waterfowl, foundation material in any particular phase of the Project shall be continuously inundated to a depth of two feet (61 cm) or greater until covered by at least three feet of surface-quality dredged material. After surface material placement, foundation cells in any particular Project phase shall be continuously inundated to a depth of six inches (15 cm) or greater until the exterior levees in that Project phase are breached to restore tidal action. An exception to this requirement is allowed during the consolidation period immediately prior to placement of the three-foot surface material cover layer. In order to achieve the minimum consolidation necessary to prevent turbulent flow and mixing of foundation sediment with surface sediment, water must be temporarily drained from the foundation cells for up to two months immediately prior to placement of the cover layer.

4. If necessary to keep foundation cells inundated, the Discharger shall pump groundwater and/or water from the Sacramento River. Water may only be pumped from the river between August 1 and December 15, through State and federal resource agency-approved fish screens, unless monitoring indicates that pumping river water outside this window will not harm larval protected species and the resource agencies have provided written approval prior to the commencement of such pumping.

5. Prior to restoration of tidal action, the Discharger may elect to allow placement cells containing only surface material to partially dry on a seasonal basis. The Discharger shall implement the pre-breach biosentinel monitoring protocol described in the attached SMP regardless of whether the cells are allowed to partially dry or are fully inundated.

C. EFFLUENT LIMITS

1. All discharges from Phases I-IV during levee breaching and from the Make-up Water Pond shall not exceed the following limits:

Conventional Pollutants		**Monthly**	**Instantaneous**	**Instantaneous**
Constituent	**Unit**	**Average**	**Minimum**	**Maximum**
a. Total Suspended Solids (TSS)	mg/L	< 50		100
b. Dissolved Oxygen (D.O.)[1]	mg/L		7.0	
c. pH	pH		6.5	8.5
d. Temperature	ºC			< 11ºC above receiving water temperature

[1] This limitation applies when receiving waters contain at least 7.0 mg/L D.O. In cases where receiving waters do not meet the Basin Plan objective, discharges must be at or above the D.O. level in the receiving water.

Toxic Pollutants

Constituent	**Daily Maximum Limit (µg/l)[1]**
Arsenic[2]	69
Cadmium[2]	3.9[4]
Chromium VI[2,3]	16
Copper[2]	9.4
Lead[2]	65
Mercury	2.1
Nickel[2]	74
Selenium	20
Silver[2]	1.9
Zinc[2]	90
PAHs	15.0

[1] Limits for discharge to estuarine receiving water in the Sacramento-San Joaquin River Delta (salinity between 1 and 10 ppt) are based on the more stringent of the Basin Plan marine and freshwater acute toxicity-based water quality objectives for toxic pollutants (1-hr average concentrations for metals, 24-hr average for PAHs).

[2]These objectives for metals are expressed in terms of the dissolved fraction of the metal in the water column.

[3] This objective may be met as total chromium.

[4] The table value assumes a hardness of 100 mg/l $CaCO_3$. At other hardness concentrations, the 1-hour average objective for cadmium is $e^{(1.128\ H\ -\ 3.828)}$ where H = ln (hardness) as $CaCO_3$ in mg/l.

D. RECEIVING WATER LIMITATIONS

1. Discharges of impounded water from the Make-up Water Pond or from Phases I-IV due to levee breaching shall not cause the following conditions to exist in waters of the State at any place:

    a. Floating, suspended, or deposited macroscopic particulate matter or foam

b. Bottom deposits or aquatic growths to the extent that such deposits or growths cause nuisance or adversely affect beneficial uses

c. Alteration of temperature, turbidity, or apparent color beyond present natural background levels

d. Visible, floating, suspended, or deposited oil or other products of petroleum origin toxic or other deleterious substances to be present in concentrations or quantities which will cause deleterious effects on wildlife, waterfowl, or other aquatic biota, or which render any of these unfit for human consumption, either at levels created in the receiving waters or as a result of biological concentration.

2. The discharge of waste shall not cause the following limits to be exceeded in waters of the State:

   a. Dissolved Oxygen: 7.0 mg/L, minimum

   b. Dissolved Sulfide: 0.1 mg/L, maximum

   c. pH: Variation from normal ambient pH by more than 0.5 pH units.

   d. Un-ionized Ammonia: 0.025 mg/L as N, annual median; and 0.16 mg/L as N, maximum.

   e. Nutrients: Waters shall not contain bio-stimulatory substances in concentrations that promote aquatic growths to the extent that such growths cause nuisance or adversely affect beneficial uses.

   f. Temperature: Increase above ambient by more than 2.8ºC.

   g. Turbidity shall not exceed background of the Waters of the State, as measured in NTU, as follows:

Receiving Water Background	**Incremental Increase**
< 50 units	5 units, maximum
≥ 50 units	10% of background, maximum

The discharge shall not cause a violation of any particular water quality standard for receiving waters adopted by the Regional Water Board or the State Board as required by the Clean Water Act and regulations adopted thereunder. If more stringent applicable water quality standards are promulgated or approved pursuant to Section 303 of the Clean Water Act, or amendments thereto, the Board will revise and modify this Order in accordance with such more stringent standards.

E. PROVISIONS

1. All technical and monitoring reports required pursuant to this Order are requested pursuant to section 13267 of the Water Code. Failure to submit reports in accordance with schedules established by this Order or attachments to this Order, or failure to submit a report of sufficient technical quality acceptable to the Executive Officer may subject the Discharger to enforcement action pursuant to Section 13268 of the Water Code.

2. **Monitoring and Reporting**: The Discharger shall comply with the Self-Monitoring and Reporting Program (SMP) attached to this Order, and as may be amended by the Executive Officer. The Discharger shall submit an annual self-monitoring report **by March 1 of each year** by uploading an electronic copy of the report to the California Wetlands Portal website at http://www.californiawetlands.net/tracker/ba/fileset/1062, as well as providing an electronic copy to Regional Water Board staff via email, CD, or FTP site. The SMP may be amended by the Executive Officer in response to a written request by the Discharger, or as necessary to assure collection of information to demonstrate compliance with this Order.

3. **Technical Review Team (TRT):** The Discharger shall continue to organize and convene a TRT to provide expert and objective analysis and recommendations on subjects associated with the construction, monitoring, and performance of the Project. The TRT shall consist of a variety of scientists and wetland restoration practitioners from local, State, and federal agencies, universities, non-governmental organizations, and the private sector who possess expertise on each major subject of the monitoring effort for the Project. The TRT roster may be revised over time as needed to reflect changes in the focus of the monitoring effort.

4. **Quality Assurance Project Plan (QAPP) Revisions:** In July 2003, several months before the first barge-load of sediment was delivered to the Project, the Discharger submitted a detailed monitoring program QAPP containing data quality objectives, sampling and analytical methods, and procedures for data management and validation. At that time, the focus was monitoring chemicals of concern in pre-breach sediment, surface water, groundwater, and post-breach plant and invertebrate tissue. The Regional Water Board, as well as other local, State, and federal permitting agencies recognized, however, that the QAPP may need to be modified from time to time to reflect necessary changes in monitoring strategies, frequencies, and protocols.

   The Discharger shall review the QAPP annually and update it as necessary, acceptable to the Executive Officer, to reflect the most current scientifically-accepted state of knowledge regarding monitoring strategies and protocols.

   Due Date for QAPP Revision Submittals: The Discharger shall submit proposed QAPP revisions to the Executive Officer and the TRT for comment and acceptance at least **60 days prior to initiating the proposed revisions**. The Discharger shall not initiate revisions until they have been accepted by the Executive Officer.

   QAPP Compliance: The Discharger shall adhere to the methods and procedures described in the most current version of the QAPP determined acceptable by the Executive Officer.

5. **Levee Breach Water Quality Monitoring and Management Plan:** The Discharger shall submit a plan and schedule, acceptable to the Executive Officer, to monitor and manage the levee breaching process to prevent degradation of water quality in Montezuma Slough that could result from increased salinity, dissolved metals, and suspended sediment, or decreased dissolved oxygen and pH in the outflow of water from ponded dredged material placement cells. The plan shall contain contingency measures to ensure that the breaching process will not cause exceedances of water quality objectives or adversely impact beneficial uses in Montezuma Slough or the Sacramento River.

Due Date for Levee Breach Water Quality Monitoring and Management Plan: The Discharger shall submit the subject plan at least 90 days prior to initiating levee breach construction activities in Phase I. No levee breach shall be initiated until the plan has been accepted by the Executive Officer.

6. **Post-Breach Biological Performance Monitoring Plan:** The Discharger shall submit a plan and schedule, acceptable to State and federal resource agencies (CDFG, USFWS, and NMFS) and the Executive Officer, to monitor the following biological performance measures in each phase of the Project after the levees have been breached and tidal inundation has been restored:

    - Vegetation colonization (spatial extent, distribution, and diversity)
    - Presence of special status wildlife species
    - Water quality conventional parameters (e.g., TSS, turbidity, dissolved oxygen, pH, temperature, conductivity)
    - Methylmercury bioaccumulation in appropriate "biosentinel" (resident or breeding) vertebrate species
    - Physical development of habitat features (e.g., channel morphology, seasonal wetland hydrology).

    The plan shall be designed to monitor the performance criteria specified in the original MMRP, as well as any updates to the performance criteria in the MMRP as recommended by the TRT and approved by the appropriate regulatory and resource agencies. In addition, the plan shall include a decision tree linking monitoring data to management actions that the Discharger can implement to improve site conditions if performance criteria are not met.

    Due Date for Post-Breach Biological Performance Monitoring Plan:
    The Discharger shall submit the subject plan at least 60 days prior to initiating levee breach construction activities in Phase I. The Plan shall not be implemented until accepted by the Executive Officer.

7. **Aggressive non-native plant species** that threaten sensitive native tidal marsh communities, including those listed under Tier I (and to a lesser extent Tier II) of the Water Board's "Invasive Non-Native Plant Species to Avoid in Wetlands Projects in the San Francisco Bay Region" (2006), available at, http://www.swrcb.ca.gov/rwqcb2/water_issues/programs/stream_wetland/app1inclrefs.pdf shall be kept off site to the extent feasible. Invasive cordgrass (*Spartina alterniflora*) is a high priority for preclusion from tidal wetlands restoration sites in the Region, and the Discharger shall coordinate efforts with the Invasive Spartina Project to eradicate this species. Coordination with the Bay Area Early Detection Network (BAEDN), CDFG, and USFWS should help determine priority aggressive species for eradication.

8. **Performance Criteria**: The Discharger shall adhere to the performance criteria described in the final EIR and further defined in the MMRP, as well as any updates to the performance

criteria in the MMRP as recommended by the TRT and approved by the appropriate regulatory and resource agencies.

F. GENERAL PROVISIONS

1. The Discharger shall immediately notify the Regional Water Board by telephone or email whenever an adverse condition occurs as a result of the proposed discharge or construction activities. An adverse condition includes, but is not limited to, a violation or threatened violation of the conditions of this Order, a significant spill of petroleum products or toxic chemicals, or other events that could affect compliance. Pursuant to Water Code section 13267(b), a written notification of the adverse condition shall be submitted to the Water Board within two weeks of occurrence. The written notification shall identify the adverse condition, describe the action(s) necessary to remedy the condition, and specify a time schedule for remediation.

2. The Discharger shall remove and properly dispose any wastes discharged at this site in violation of these Requirements.

3. The Discharger shall ensure that all individuals working on the site, including all contractors and sub-contractors, are familiar with the contents and requirements of this Order, and with all relevant plans and BMPs.

4. The Discharger shall permit the Regional Water Board or its authorized representative, upon presentation of credentials:

    - Entry on to the premises on which wastes are located or in which records are kept;
    - Access to copy any records required to be kept under the terms and conditions of this Order;
    - Access to inspect any monitoring equipment or monitoring method; and
    - Access to sample any discharge or surface water covered by this Order.

5. This Order does not:

    - Authorize commission of any act causing injury to the property of another or of the public;
    - Convey any property rights;
    - Remove liability under federal, State, or local laws, regulations, or rules of other programs and agencies; or
    - Authorize the discharge of wastes without appropriate permits from other agencies or organizations.

6. **Change in Control or Ownership**: In the event of any change in control or ownership of land or waste discharge facilities presently owned or controlled by the Discharger, the Discharger shall notify the succeeding owner or operator of the existence of this Order by letter, a copy of which shall be immediately forwarded to Regional Water Board staff. To assume operation of this Order, the succeeding owner or operator must apply in writing to the Executive Officer requesting transfer of the Order. The request must contain the new owner or operator's full legal name, contact information for the new owner or operator and any agents responsible for communicating with Regional Water Board staff, and a statement that the new owner or operator assumes full responsibility for compliance with this Order.

7. The Regional Water Board may modify, or revoke and reissue, this Order if present or future investigations demonstrate that the discharges governed by this Order will cause, have the potential to cause, or will contribute to adverse impacts on water quality or beneficial uses of the receiving waters. The Regional Water Board may reopen this Order to review results of the Discharger's and staff's studies and new data on Section 303(d) listed contaminants and decide whether effluent limits should be revised.

8. This Order supersedes Order No. 00-061. Order 00-061 is hereby rescinded.

I, Bruce H. Wolfe, Executive Officer, do hereby certify that the foregoing is a full, true, and correct copy of an order adopted by the California Regional Water Quality Control Board, San Francisco Bay Region, on October 10**,** 2012.

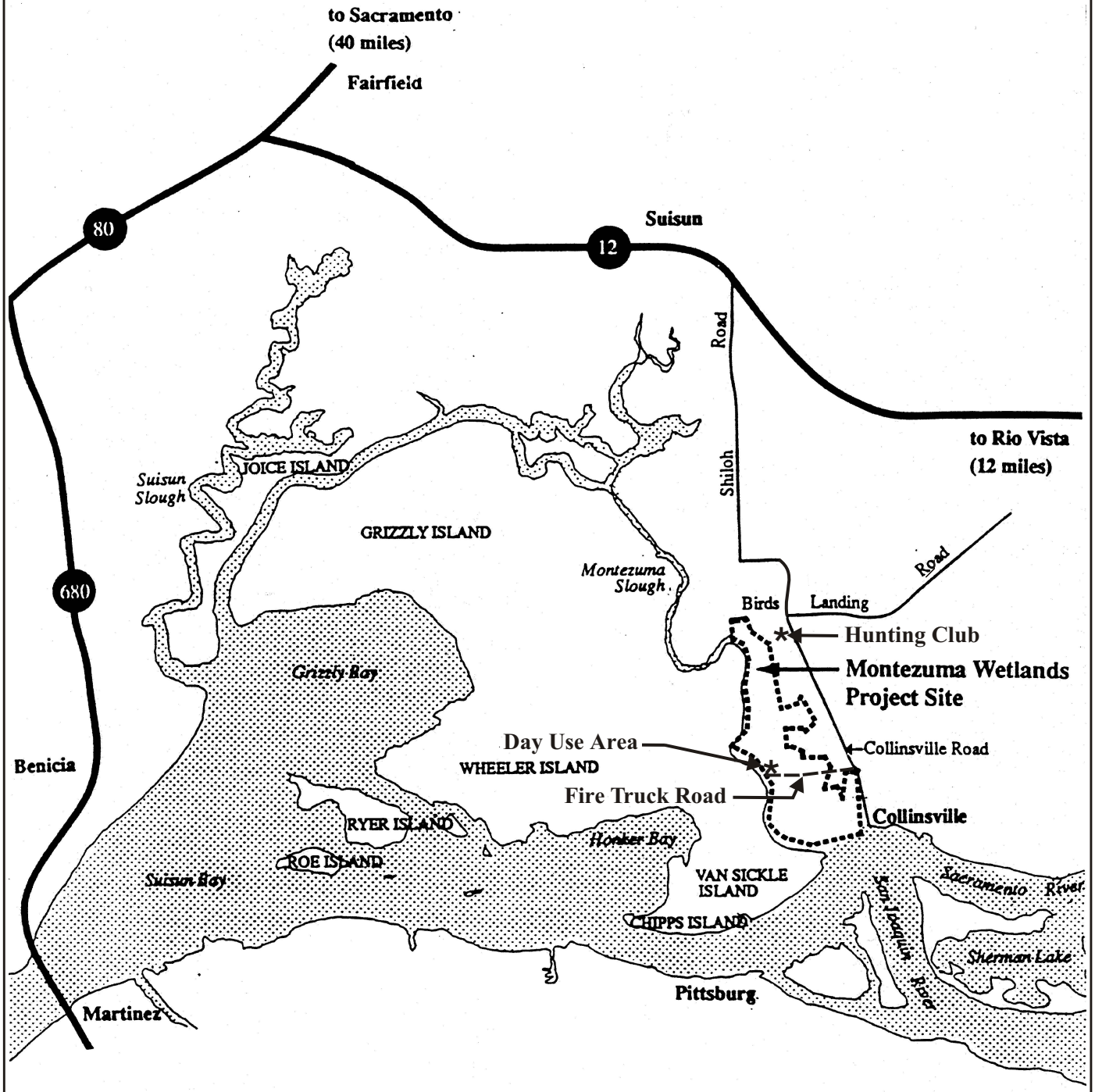
_____
Bruce H. Wolfe
Executive Officer

Attachments:

Figure 1. Location Map
Figure 2. Habitat Design Map
Figure 3. Site Overview Map
Figure 4. Water Management Schematic

Table 1 – Habitat Design Elements

Attachment A. Self-Monitoring Program (SMP)



Source: Brady and Associates (1994)

Site Location Map

MONTEZUMA WETLANDS PROJECT

Figure 1

2392SV102.CDR 061801

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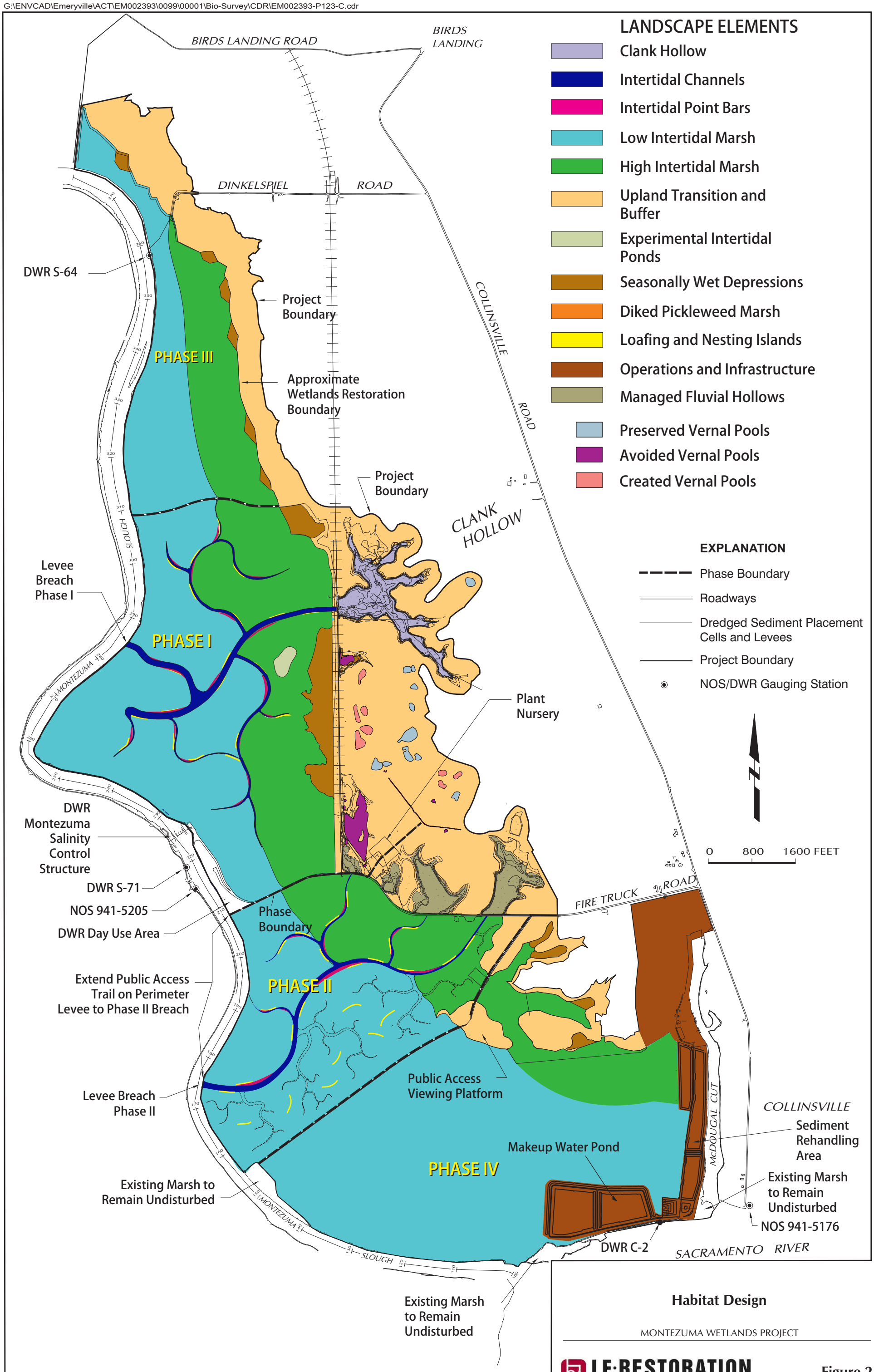

Habitat Design

MONTEZUMA WETLANDS PROJECT

LF·RESTORATION CORPORATION

Figure 2

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BIRDS LANDING

SITE ACCESS POINT
DINKELSPIEL ROAD

APPROXIMATE
WETLAND
BOUNDARY

DWR S-64

SMALL BOAT
LAUNCH RAMP

Project
Area

PHASE III

PHASE I NORTHERN LEVEE

CELL 6/7

CELL 8/9

CELL 8/9

CELL 6/7

PHASE I

CELL 11

CELL 3/4

CELL 10

CELL 3/4

CELL 2

CELL 5/12

CELL 1

EXISTING DWR
SALINITY CONTROL
STRUCTURE

DWR S-71

DWR DAY USE AREA

DWR DAY USE AREA

PHASE I SOUTHERN BOUNDARY

RETURN WATER CHANNEL

FUTURE PUBLIC ACCESS
VIEWING PLATFORM

PHASE II

SEDIMENT PIPELINE

PHASE IV

MONTEZUMA SLOUGH

MONTEZUMA SLOUGH

MONTEZUMA SLOUGH

SLOUGH

VAN SICKLE
ISLAND

COLLINSVILLE ROAD

CLANK
HOLLOW

MONTEZUMA
HILLS

Project
Area

FIRE TRUCK ROAD

SITE ACCESS POINT

SITE ACCESS POINT

ONSITE POWER LINE

EXISTING JERICO DREDGE
SAND, OYSTER SHELL
PROCESSING FACILITY

SEDIMENT REHANDLING FACILITY

INFRASTRUCTURE, FIELD
OFFICE, STORAGE, PARKING

MAKE-UP WATER POND

McDOUGAL CUT

COLLINSVILLE

NOS 941-5176

RETURN WATER CHANNEL POND

NOS C-2

LIBERTY OFFLOADER

BARGE ACCESS ROUTE
THROUGH CHANNEL

SACRAMENTO RIVER

N

0 1000 2000 FEET

PHASE BOUNDARY

ROADWAYS

STATIONING OF MONTEZUMA SLOUGH
(1,000 FT INTERVELS)

NOS/DWR GAUGING STATION

SUPPLY WELLS

Site Overview Map

MONTEZUMA WETLANDS PROJECT

LF·RESTORATION CORPORATION

Figure 3

→ Subdrain and Decant Water to Makeup Water Pond →
Via Return Water Channel

Return Water Channel

Weir-drained Decant Water

Sidewall-Drained Filtered Decant Water

Water to Slurry Sediments →

← Dredged Sediment Slurry Pipeline ←

Over-Weir Discharge to Suisun Bay →

← Ground Water ←

Sediment Transport Barge

Offloading Equipment

Fish-screened surface intake (may be used Aug 1- Dec 15)

Sacramento River

Sediment Offloading Facility

Decant Water

Cover Dredged Sediment

Interior Cell Levee

Weir

Sidewall Drain System (See Figure 18)

Noncover Sediment Separation Levee

Noncover Dredged Sediment

Sediment Placement Cells

Make Up Water Pond

Well Screen

Shallow Ground-Water Extraction Wells

Perimeter Levee

Sacramento River

River Pump w/Fish Screen (may be used to pump surface water Aug1 - Dec 15)

LEGEND:

- Cover Dredged Sediment
- Noncover Dredged Sediment
- Existing Ground Surface
- Water
- Dredged Sediment Slurry Pipeline

Not to Scale

Water Management Schematic

MONTEZUMA WETLANDS

LF·RESTORATION CORPORATION

Figure 4

G:\ENVCAD\Emeryville\ACT\EM002393\0099\00001\EM002393-WM Schematic.cdr

Table 1

Habitat Design Elements

Montezuma Wetlands Project

	PHASE I		PHASE II		PHASE III		PHASE IV		TOTAL	
	acres	%	acres	%	acres	%	acres	%	acres	%
Wetland Elements										
Intertidal Marsh Plain										
Low Marsh[1]	332.1	51.6	281.3	66.3	139.1	56.8	445	79.0	1,197.5	63.8
High Marsh	198.4	30.8	90	21.2	72	29.4	70	12.4	430.4	22.9
Subtidal Channel Habitat[2]	31.6	4.9	18.7	4.4	10.5	4.3	24.2	4.3	85	4.5
Experimental Intertidal Ponds	6.6	1.0	0	0.0	0	0.0	0	0.0	6.6	0.4
Seasonally Wet Depressions	27.5	4.3	0	0.0	22.5	9.2	22	3.9	72	3.8
Managed Fluvial Hollows										
For SMHM	0	0.0	18.4	4.3	0	0.0	0	0.0	18.4	1.0
For shorebirds	0	0.0	13.9	3.3	0	0.0	0	0.0	13.9	0.7
Clank Hollow	28.8	4.5	0	0.0	0	0.0	0	0.0	28.8	1.5
Loafing and Nesting Islands	18.9	2.9	1.7	0.4	1	0.4	1.9	0.3	23.5	1.3
SUBTOTAL	643.9	100.0	424	100.0	245.1	100.0	563.1	100.0	1876.1	100.0
Upland Elements										
Upland Transition and Buffer	220	95.9	73	93.7	108.1	96.3	79	94.2	480.1	95.3
Perimeter and Phase Levees	9.5	4.1	4.9	6.3	4.2	3.7	4.9	5.8	23.5	4.7
SUBTOTAL	229.5	100.0	77.9	100.0	112.3	100.0	83.9	100.0	503.6	100.0
TOTAL	873.4		501.9		357.4		647.0		2,379.7	

Notes:

[1] Low marsh acreage includes the low intertidal range of channel banks (i.e., between the low marsh design elevation [2.6' NGVD] and MLLW [-1.0' NGVD])

[2] Channel acreage below MLLW (-1.0' NGVD)

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
SAN FRANCISCO BAY REGION

SELF-MONITORING PROGRAM

FOR

MONTEZUMA WETLANDS RESTORATION PROJECT

ORDER No. R2-2012-_____

A. GENERAL

1. Reporting responsibilities of waste dischargers are specified in Sections 13225(a), 13267(b), 13383 and 13387(b) of the California Water Code (Water Code), and in the Regional Water Board's Resolution No. 73-16.

2. The principal purposes of a monitoring program by a waste discharger, also referred to as a self-monitoring program, are: (1) to document compliance with waste discharge requirements and prohibitions established by the Regional Water Board, and (2) to facilitate self-policing by the waste discharger in the prevention and abatement of pollution arising from waste discharge.

B. SAMPLING AND ANALYTICAL METHODS

1. Sample collection, storage, and analyses shall be performed according to Code of Federal Regulations title 40, section 136, or other methods approved and specified by the Executive Officer of the Regional Water Board.
2. Water and soil analyses shall be performed by a laboratory approved for these analyses by the State Department of Public Health (DPH).
3. The director of the laboratory whose name appears on the certification, or his/her laboratory supervisor who is directly responsible for the analytical work performed shall supervise all analytical work including appropriate quality assurance/quality control procedures in his/her laboratory and shall sign all reports of such work submitted to the Regional Water Board.
4. All monitoring instruments and equipment shall be properly calibrated and maintained to ensure accuracy of measurements.

C. DEFINITION OF TERMS

1. A **grab sample** is defined as an individual sample collected in a short period of time not exceeding 15 minutes. It is used primarily in determining compliance with daily maximum limits and instantaneous maximum limits. Grab samples represent only the condition that exists at the time the wastewater is collected.

2. A **discharge episode** consists of effluent discharge from the make-up water pond that does not cease for more than 30 consecutive days. If discharge stops for more than 30 consecutive days and then starts up again, the date of start-up will be considered the beginning of a new discharge episode for monitoring purposes.
3. **Receiving waters** refers to any water body that actually receives or potentially could receive surface or groundwater that passes over, through, or under dredged sediment during placement, dewatering, and settling/consolidation activities. For the purpose of discharge episode monitoring, the receiving waters are the Sacramento River and Montezuma Slough.
4. **Receiving Waters Standard Observations** refer to:
    a. Evidence of floating and suspended materials generated by project activities, as recorded by visual observations.
    b. Discoloration and turbidity: description of color, source, and size of affected area.
    c. Evidence of odors, presence or absence, characterization, source, and distance of travel from source.
5. **Site Standard Observations** refer to visual inspection of:
    a. Overall condition and integrity of the sediment placement cell containment levees.
    b. Location of placed material, amount of freeboard available, and whether any discharge of dredged sediments outside of the containment levees has occurred.
    c. Overall condition and integrity of the make-up water pond containment levee, effluent discharge weir, and discharge outfall pipeline.
    d. Overall condition and integrity of the dredged material transport pipeline from the intake at the connection point with the Liberty offloader to the point of discharge into a sediment placement cell.
    e. Location and identification of vertebrate wildlife nesting onsite and foraging in partially or fully filled sediment placement cells prior to restoration of tidal action.

D. SPECIFICATIONS FOR SAMPLING AND ANALYSES

The Discharger shall perform sampling and analyses according to the schedule in **Table 1** in accordance with the most-current Quality Assurance Project Plan (QAPP) accepted by the Executive Officer and the following conditions:

1. Make-up Water Pond and Phase I-IV Levee Breach Discharges
    a. If analytical results are received showing any daily limit is exceeded for any inorganic constituent, a confirmation sample shall be taken within 24 hours and the results shall be known within 24 hours of the sampling.
    b. If any instantaneous maximum limit for a constituent is exceeded in the confirmation sample(s), then the preliminary confirmation results shall be reported immediately to Regional Water Board case manager via email and the discharge shall be restricted to the extent practical, until the cause of the violation can be found and corrected. Within five days of the discharge limit exceedance, the Discharger shall submit a contingency report as described in section H.
    c. For other violations, the Discharger shall implement procedures that are acceptable to the Executive Officer on a case by case basis.

2. Receiving Waters

   a. Receiving water sampling in the Sacramento River shall be conducted on days coincident with discharges from the make-up water pond.

   b. In tidally-influenced receiving waters, samples shall be collected at each station on each sampling day during the period within 1 hour following low slack water. Where sampling at the lower slack water period is not practical, sampling shall be performed during the higher slack water period.

      d. Samples shall be collected at least one foot below the surface and at least one foot above the slough or river bottom.

      e.

3. Incoming Sediment Confirmation

   a. Surface grab samples of incoming dredged sediment shall be collected from at least four locations in each placement cell at the same volume-based frequency per dredging project source as is prescribed by the Dredged Material Management Office (DMMO) pre-dredge sediment testing program. Each set of four or more samples corresponding to a specific range of dredged sediment volume in cubic yards may be combined to form one composite sample per cell.

   b. If confirmation sampling shows that sediment placed at the Project site has exceeded numeric acceptance criteria listed in Specification B.2, additional higher resolution sampling shall be immediately conducted to establish the nature and extent of the exceedance. Discrete grab samples shall be collected at one-foot depth intervals from at least three locations in each affected cell and analyzed for each chemical constituent that exceeded an acceptance criterion in the original confirmation sample.

   c. Within five days of receipt of the higher resolution sampling analytical results, the Discharger shall submit a contingency report to the Regional Water Board case manager per section H.

D. DESCRIPTION OF SAMPLING STATIONS

1. INCOMING SEDIMENT CONFIRMATION

   During each sampling event, the Discharger shall use its discretion to collect grab samples of sediment from at least four locations per placement cell where the sediment slurry has undergone sufficient consolidation to make chemical analysis of the sediment solids practical.

2. MAKE-UP WATER POND (effluent limits apply during discharges to the Sacramento River)

Station	Description
MUWP	The inboard side of the overflow weir for the discharge pipeline

3. PHASES I-IV ON INBOARD SIDE OF LEVEE BREACHES

   Sampling locations shall be proposed in the **Levee Breach Water Quality Monitoring and Management Plan**, to be submitted at least 90 days prior to breaching levees in Phase I pursuant to Provision 6 of this Order.

4. RECEIVING WATERS

Station	Description
RW1-down	At a point in the Sacramento River about 100 feet down-current (dependent on tide) from the make-up water pond discharge outfall
RW1-up	At a point in the Sacramento River about 100 feet up-current (dependent on tide) from the make-up water pond discharge outfall
RW2-down	At a point in Montezuma Slough about 100 feet down-current (dependent on tide) from the breach in the levee separating the particular Phase of the Project undergoing breaching from Montezuma Slough
RW2-up	At a point in Montezuma Slough about 100 feet up-current (dependent on tide) from the breach in the levee separating the particular Phase of the Project undergoing breaching from Montezuma Slough

5. SHALLOW GROUNDWATER MONITORING WELLS

Stations	Description
MWP1 Well Series	Onsite shallow and intermediate water quality monitoring wells in Phase I. Monitoring well locations for future Project phases shall be determined during the detailed design of those phases. At a minimum, the Discharger shall install two wells in the shallowest encountered groundwater zone and one well in the next deeper groundwater zone below a confining silt or clay layer in each Project phase.

6. PRE-BREACH METHYLMERCURY BIOSENTINEL MONITORING

   Specific sampling locations in the sediment placement cells and the make-up water pond shall be determined based on the species chosen by the Discharger in consultation with the project's Technical Review Team (TRT), and per future revisions to the QAPP submitted pursuant to Provision 5 of this Order and accepted by the Executive Officer.

7. POST-BREACH HABITAT PERFORMANCE

   Sampling and observation locations shall be proposed in the **Post-Breach Habitat Performance Monitoring Plan**, to be submitted at least 60 days prior to breaching levees in Phase I pursuant to Provision 7 of this Order.

F. RECORDS TO BE MAINTAINED

Written reports shall be maintained by the Discharger or its laboratory, and shall be retained for a minimum of five years. This period of retention shall be extended during the course of any unresolved litigation regarding this discharge or when requested by the Regional Water Board. Such records shall show the following for each sample:

1. Identity of sample and sample station number.
2. Date and time of sampling and the name of the person performing the sampling.
3. Date and time that analyses are started and completed, and name of the personnel performing the analyses.

4. Complete procedure used, including method of preserving the sample, and the identity and volumes of reagents used.
5. Calculation of results.
6. Results of analyses, and detection limits for each analysis.

G. REPORTING REQUIREMENTS

By March 1 of each year, the Discharger shall submit an annual report to the Regional Water Board covering the previous calendar year's activities. The Discharger shall upload an electronic copy of the report to the California Wetlands Portal website at http://www.californiawetlands.net/tracker/ba/fileset/1062 and provide an electronic copy to Regional Water Board staff via email, CD, or FTP site.

Each annual report shall contain the following:

1. Letter of Transmittal

   A letter transmitting the essential points in each report should accompany each report. Such a letter shall include a discussion of any Waste Discharge Requirement violations found during the last report period, and actions taken or planned for correcting the violations. If the Discharger has previously submitted a detailed time schedule for correcting requirement violations, a reference to the correspondence transmitting such schedule will be satisfactory. If no violations have occurred in the last annual report period, this shall be stated in the letter of transmittal. Monitoring reports and the letter transmitting the monitoring reports shall be signed by the duly authorized representative of Montezuma Wetlands LLC responsible for the overall operation of the facility from which the discharge originates. The letter shall contain a statement by the official, under penalty of perjury, that to the best of the signer's knowledge the report is true, complete, and correct.

2. A map or aerial photograph showing observation and monitoring stations.
3. Tabular and graphical summaries of the monitoring data obtained during the previous year.
4. A description of the compliance record and any corrective actions taken or planned that may be needed to bring the Discharger into full compliance with the Waste Discharge Requirements.
5. Laboratory statements of results of analyses specified in Table 1; the director of the laboratory whose name appears on the laboratory certification shall supervise all analytical work in his/her laboratory and shall sign all reports of such work submitted to the Board.

   a. The methods of analyses and detection limits must be appropriate for the expected concentrations. Specific methods of analyses must be identified. If methods other than EPA approved methods or Standard Methods are used, the exact methodology must be submitted for review and approved by the Executive Officer.

   b. In addition to the results of the analyses, laboratory quality assurance/quality control (QA/QC) information must be included in the monitoring report. The laboratory QA/QC information should include the method, equipment and

analytical detection limits; the recovery rates; an explanation for any recovery rate that is less than the recovery acceptance limits specified in the USEPA method procedures or the laboratory's acceptance limits, if they are more stringent than those in the USEPA method procedures; the results of equipment and method blanks; the results of spiked and surrogate samples; the frequency of quality control analysis; and the name and qualifications of the person(s) performing the analyses.

H. CONTINGENCY REPORTING

Unauthorized Releases: A report to the Regional Water Board case manager shall be made by telephone and email of any accidental discharge of whatever origin immediately after it is discovered. A written report shall be filed with the Board within five days thereafter. This report shall contain the following information:

a. A map showing the location(s) of discharge(s);
b. Approximate flow rate;
c. Nature of effects, i.e., all pertinent observations and analyses; and
d. Corrective measures underway or proposed.

I, Bruce H. Wolfe, Executive Officer, hereby certify that the foregoing Self-Monitoring Program:

1. Has been developed in accordance with the procedure set forth in this Board's Resolution No. 73-16 in order to obtain data and document compliance with waste discharge requirements established in this Order.

2. May be reviewed at any time subsequent to the effective date upon written notice from the Executive Officer or request from the discharger, and revisions will be ordered by the Executive Officer.

3. Is effective as of October 10, 2012.

_____

Bruce H. Wolfe
Executive Officer

Attachments:
Table 1 - Schedule for Sampling, Measurements, and Analyses

TABLE 1
SCHEDULE OF SAMPLING, MEASUREMENTS, AND ANALYSIS

Station	Constituent	Unit	Type of Sample	Frequency of Sampling & Analysis
Site & Receiving Water Standard Observations	Varies – see Definitions of Terms, C.4 and C.5	Not Applicable	Visual Inspection	Weekly during sediment placement operations
Incoming Sediment Confirmation (minimum 4 locations per placement cell TBD at time of sampling)	Inorganics[1] Organics[2]	mg/kg dry wt. µg/kg dry wt.	Surface grab samples combined into one composite per cell per sampling event	Varies based on volume of sediment delivered from a particular dredging project –minimum number of samples same as in pre-dredge testing program[3]
MUWP (Make-up Water Pond)	Flow Rate	mgd	Weir volume calculation	Daily during discharge
	TSS	mg/L	Grab	Daily for first five days of discharge episode; weekly for remainder of discharge episode
	Turbidity	NTU	Field	Daily during discharge
	Dissolved Oxygen	mg/L	Field	Daily during discharge
	pH	Std Units	Field	Daily during discharge
	Temperature	°C	Field	Daily during discharge
	Conductivity	µmhos/cm	Field	Daily during discharge
	Inorganics[1]	µg/L	Grab	Daily for first five days of discharge episode; weekly for remainder of discharge episode
	Acute Toxicity (ASTM 48- or 96-hour static non-renewal)[4]	% Mortality % Normal Development	Grab – volume varies according to test organism used	Once within one week prior to discharge; weekly for remainder of discharge episode
RW1-up & RW1-down (Two points in Sacramento River 100 ft up- & down-current of discharge)	Turbidity TSS	NTU mg/L	Field Grab	Twice during each discharge episode – once within first week and once within last week. Once if discharge episode lasts less than one week.
	Dissolved Oxygen	mg/L	Field	Twice during each discharge episode – once within first week and once within last week. Once if discharge episode lasts less than one week.
	pH	Std Units	Field	Twice during each discharge episode – once within first week and once within last week. Once if discharge episode lasts less than one week.

Station	Constituent	Unit	Type of Sample	Frequency of Sampling & Analysis
	Temperature	°C	Field	Twice during each discharge episode – once within first week and once within last week. Once if discharge episode lasts less than one week.
	Conductivity	µmhos/cm	Field	Twice during each discharge episode – once within first week and once within last week. Once if discharge episode lasts less than one week.
	Inorganics[1]	µg/L	Grab	Twice during each discharge episode – once within first week and once within last week. Once if discharge episode lasts less than one week.
Phase I-IV Levee Breaches (Stations TBD)	Turbidity	NTU	Field	D/W/M[5]
	Dissolved Oxygen	mg/L	Field	D/W/M
	pH	Std Units	Field	D/W/M
	Temperature	°C	Field	D/W/M
	Conductivity	µmhos/cm	Field	D/W/M
	Inorganics[1]	µg/L	Grab	D/W/M
RW2-up & RW2-down (Two points in Montezuma Slough 100 ft up- & down-current of levee breach)	Turbidity	NTU	Field	D/W/M
	Dissolved Oxygen	mg/L	Field	D/W/M
	pH	Std Units	Field	D/W/M
	Temperature	°C	Field	D/W/M
	Conductivity	µmhos/cm	Field	D/W/M
	Inorganics[1]	µg/L	Grab	D/W/M
MWP1 Well Series (Phase I Groundwater Monitoring Wells)	Groundwater Elevation	meters	Field – measuring tape	Bi-Annual (once during wet season and once during dry season)
	pH	Std Units	Field	Bi-Annual (once during wet season and once during dry season)

Station	Constituent	Unit	Type of Sample	Frequency of Sampling & Analysis
	Temperature	°C	Field	Bi-Annual (once during wet season and once during dry season)
	Conductivity	µmhos/cm	Field	Bi-Annual (once during wet season and once during dry season)
	Inorganics[1]	µg/L	Grab	Bi-Annual (once during wet season and once during dry season)
Pre-Breach Biosentinel Monitoring (sediment placement cells & make-up water pond)	Methylmercury[6]	mg/kg wet weight	Tissue[7]	Annual – during breeding season for selected biosentinel species
Post-Breach Habitat Performance	**TBD** based on **Post-Breach Habitat Performance Monitoring Plan**, to be submitted at least 60 days prior to breaching levees in Phase I pursuant to Provision 7 of this Order. The Self-Monitoring Program shall be revised as ordered by the Executive Officer upon acceptance of this plan. At a minimum, the plan shall describe monitoring protocol for the following biological performance measures: • Vegetation colonization (spatial extent, distribution, and diversity) • Presence of special status wildlife species • Water quality conventional parameters (e.g., TSS, turbidity, dissolved oxygen, pH, temperature, conductivity) • Methylmercury bioaccumulation in appropriate "biosentinel" (resident or breeding) vertebrate species • Physical development of habitat features (e.g., channel morphology, seasonal wetland hydrology). The plan shall be designed to monitor the performance criteria specified in the original MMRP, as well as any updates to the performance criteria in the MMRP as recommended by the TRT and approved by the appropriate regulatory and resource agencies. In addition, the plan shall include a decision tree linking monitoring data to management actions that the Discharger can implement to improve site conditions if performance criteria are not met.			

[1]Arsenic, cadmium, chromium, copper, lead, mercury, nickel, selenium, silver, and zinc – reported as dissolved except for mercury and selenium which should be analyzed and reported as total concentrations.

[2]PAHs (25 compounds reported by RMP), PCBs (40 congeners reported by RMP), organochlorine pesticides (total Chlordanes, total DDT (sum of 6 isomers), Dieldrin)

[3]DMMO (2001) Guidelines for Implementing the Inland Testing Manual in the San Francisco Bay Region, Table 1. Minimum Sediment Sampling Guidelines.

[4]ASTM E1192-97(2008) Standard Guide for Conducting Acute Toxicity Tests on Aqueous Ambient Samples and Effluents with Fishes, Macroinvertebrates, and Amphibians, or equivalent method if acceptable to Executive Officer.

[5]Once within 3 days prior to breach; during the first and fifth day following breach; weekly during the first month; monthly thereafter until receiving water limits (Basin Plan water quality objectives for inorganics) met for three consecutive months.

[6]If wildlife are identified foraging in uncovered foundation material placement cells during the breeding season,

additional bioaccumulative contaminants may be added to the constituent list as appropriate based on sediment concentrations reported during pre-dredge testing and placement cell confirmation sampling.

[7]Appropriate biosentinel species for each area will be determined in consultation with the TRT. Likely biosentinels for the sediment placement cells include the eggs of non-special status shorebirds such as black-neck stilts and American Avocets nesting near the cells. Small fish (whole body), if present, may be appropriate biosentinels for the make-up water pond.