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June 5, 2002

Mr. Dan Buford
U.S. Fish and Wildlife Service
2800 Cottage Way, W-2605
Sacramento, CA 95825-1846

Attn: Mr. Dave Wooten
Mr. Terry Adelsbach

Subject: Meade Street Operable Unit, Subunits 1 and 2A
U.S. Army Corps of Engineers File Number 26417S

Dear Mr. Buford:

Thank you for taking the time to meet with us regarding the proposed remediation activities for the Meade Street Operable Unit located at south 47th Street and Meade Street, Richmond, California 94804. As discussed at the May 13, 2002 meeting, we are providing supplemental information for the informal consultation process for the subject project under Section 7 of the Federal Endangered Species Act of 1973 (as amended). Based on the supplemental information provided, we would like to request a modification to the work proposed to reduce long-term adverse effects to California clapper rail (CCR), salt marsh harvest mouse (SMHM), and their habitat. The requested changes are the result of information obtained after the original submittals on December 20, 2001, April 10, 2002, and May 2, 2002 by Levine Fricke (LFR), and are intended to supplement and build upon the information provided in those documents. To assist you in your review, we are providing the following information including photographs of the proposed remediation area and graphics illustrating the proposed changes:

1. Project Background and summary of the previously proposed activities;
2. A description of the proposed modifications to the project;
3. Eco-toxicity and new chemical characterization data for the proposed remediation area;
4. A description of the environmental setting;
5. An evaluation of potential effects to CCR, SMHM, and their habitat from the proposed changes and avoidance and minimization measures to be implemented for the project; and
6. Conclusion

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I. Background

The California Regional Water Quality Control Board adopted a cleanup and abatement order, Order No. 01-101, (the Order) for the Meade Street Operable Unit (the Site) on September 19, 2001 (See Appendix A). The Site is located along Stege Marsh near Richmond Inner Harbor in Contra Costa County, California (Figure 1). Due to the complexities of the site and multiple responsible parties, the cleanup order requires that the remediation efforts be implemented in phases, or subunits, beginning in the summer of 2002. The Meade Street Operable Unit consists of the Zeneca property, the University of California Berkeley, Richmond Field Station (RFS), and the inner portion of the Eastern and Western Stege Marsh. The Zeneca property and Eastern Stege Marsh are designated as Operable Unit 1 and the RFS upland property including Western Stege Marsh have been designated as Operable Unit 2. Operable Unit 2 was further subdivided into two subunits, Subunits 2A and 2B. The location and boundaries of the subunits are shown on Figures 2 and 3.

The first phase of remedial activities will be performed for the upland portion of Subunit 1 and Subunit 2A as specified in the Order. The main objective of the cleanup for Subunits 1 and 2A is to remove and treat the primary source of contamination and to prevent migration of contaminants into the adjacent marshlands, tidal sloughs, and ultimately San Francisco Bay. The constituents of concern within Subunits 1 and 2A are primarily metals (arsenic, cadmium, copper, iron, lead, mercury, selenium, and zinc) and low pH. As described in the Remedial Design Details prepared by LFR (January 2002), the Biological Assessment for the project (December 2001), and a letter to your office modifying the upland remediation design (LFR May 2, 2002), the cleanup action currently includes the following components:

- Excavation of approximately 250,000 cubic yards (cy) of cinder from the upland portion of Subunits 1 and 2A;
- Excavation of approximately 2,000 cy of cinder material from the "orange pond" within Western Stege Marsh;
- Neutralizing and capping the cinder material on the site by mixing it with crushed limestone on the upland portion of Subunit 1;
- Neutralizing the groundwater by injecting calcium polysulfide buffering agent in Subunit 1;
- Installing a flow-through groundwater treatment wall or biologically active permeable barrier (BAPB) at the downgradient edge of the uplands across Subunit 1 and for approximately 250 linear feet of the easternmost portion of the upland edge of Subunit 2A. The BAPB within Subunit 2A will be located approximately 75 feet north of Western Stege Marsh;
- Installation of a slurry wall along the southern portion of 46th Street (currently under design);

- Segregation, treatment, and offsite disposal or placement on Subunit 1 of the soils and/or cinders containing elevated levels of mercury within Subunit 2A;
- Remediation and abandonment of existing leaky utilities and installation of a new storm drain along the eastern and western boundary of Subunit 1;
- Groundwater and surface water monitoring to evaluate the effectiveness of the remedial actions performed for Subunits 1 and 2A.

In addition to the above activities, a subsequent and separate remediation program will be implemented for the marsh portion of Subunit 1 (Eastern Stege Marsh) and Subunit 2B (the western portion of Western Stege Marsh) in the summer of 2003 as required by the Order. Additional characterization and risk analyses are currently being conducted for these areas. Once the characterization and identification of the areas requiring remediation is complete for these subunits, a remedial design will be developed. Since the remedial work will directly affect the need for and type of marsh restoration to be implemented, the marsh enhancement plan must be developed in conjunction with the remedial design. Therefore, the remedial program developed for each subunit will include a marsh enhancement plan. It should be noted that the marsh enhancement plan for Subunit 2 would include habitat enhancement for both Subunits 2A and 2B.

II. Proposed Modifications to the Project

As depicted in the LFR documents submitted to your office, the extent of the remedial activities to be conducted currently includes the upland portion of the Subunits 1 and 2A and the area characterized as the "orange pond" located in northeastern portion of Western Stege Marsh (See Figure 4). We respectfully request to extend the remediation boundary to include a portion of Western Stege Marsh as depicted in Figure 5. The additional area includes approximately 2 acres of contaminated sediments. The area is being expanded based on additional data that has recently been collected to comply with the RWQCB request to delineate the western extent of contamination in Subunit 2A. The results indicate that the area west of the orange pond is heavily contaminated with heavy metals, which pose a significant threat to wildlife that inhabit the marsh. A further discussion of the chemical and physical characteristics as well as the risks to the ecological community for the additional remediation area is provided in the following section, Section 3.

The remedial design for the additional marsh acreage is identical to that described in Section I above except for the volume of material to be treated. Approximately 9,000 additional cubic yards of cinders and sediment would be excavated and treated from the new area. The estimated depth of the excavation is approximately 2 to 3 feet below sediment surface (bss). Once the sediment and cinder material is excavated, the area would be backfilled with clean fill and contoured to support a high marsh area and gradual upland transition zone as shown on Figure 6.

Native vegetation appropriate for the elevation contours will be planted at the end of construction activities.

Due to the increase in the volume of material that would require excavation and treatment, and the need to finish the remediation work within the marsh before any heavy rains begin, additional time is needed to treat the contaminated sediments. Therefore, we respectfully request to begin the first phase of excavation activities on August 1, 2002 for the upland portion of Subunit 2A and the western portion of the upland landfill in Subunit 1 as shown on Figure 7. The excavation will begin in the northeastern portion of Subunit 1 and proceed south in Subunit 1 and to the west in the upland portion of Subunit 2A. The second phase of excavation within the marsh portion of Subunit 2A would not begin until after September 1, 2002, after the completion of the clapper rail breeding season as shown on Figure 8. It is anticipated that the construction period for the upland portion of Subunit 2A will last approximately 4 to 6 weeks. The construction period for the marsh portion of Subunit 2A is projected to last approximately 6 to 8 weeks. The construction period for Subunit 1 remains unchanged.

III. Chemical Characterization and Ecotoxicity Data

Several environmental investigations have been performed to determine the extent of contamination in the marsh portion of Subunit 2A. The most recent investigation was performed in March 2002 to delineate the western extent of contamination for Subunit 2A. RWQCB staff requested the additional sampling to ensure that the all areas requiring remediation in Subunit 2A were adequately identified in order to reduce to the risks to human health and the environment to acceptable levels and that additional remedial actions would not have to be performed in the future. A summary of the results of past investigations conducted in the marsh portion of Subunit 2A are presented in Table 1. A summary of the results from the most recent investigation is presented in Table 2.

To determine whether the concentrations detected pose an unacceptable risk to the ecological community and to identify areas requiring remediation, an ecological risk assessment was performed. The risk assessment document was submitted to the RWQCB in December 2001. Site specific target levels (SSTLs) were developed for the California clapper rail (CCR), red-tail hawk (RTH), and the salt marsh harvest mouse (SMHM). The concentrations detected in the sediment were then compared to the SSTLs for each species as well as NOAA's ERM values to determine whether the sediment posed a risk to the CCR, RTH, SMHM, or the benthic community. The sampling points containing metals in excess of the SSTLs and the ERMs are shown on Figures 9 and 10 respectively. As shown on these figures, the sediment within the marsh portion of Subunit 2A poses an unacceptable risk to both the higher trophic level organisms as well as the benthic community.

In addition to the sediment, surface water, and groundwater samples analyzed for Subunit 2A, toxicity testing and a benthic and epi-benthic macro invertebrate community survey were conducted for both Subunits 2A and 2B. The toxicity test and benthic community sample locations within the project area are shown on 10. The results of the toxicity sample collected within the project area (SM-109) exhibited 100% mortality for both the *Mytilus edulis* and the *Eohaustorius* and are presented in Table 3.

The primary impetus for the benthic survey was the lack of visual observations of benthic macro-invertebrates during the previous sampling efforts in the area, and to obtain a random sampling of the benthic community to determine the level of bio-uptake and/or bioaccumulation within the marsh. The survey was conducted using the RWQCB Bay Protection Toxic Cleanup Program (BPTCB) protocols. However, as shown in the results of the survey, all benthic community samples taken within Subunit 2A detected no benthic organisms. A report detailing the benthic community survey and results is provided in Appendix B.

IV. Environmental Setting

The existing conditions for the Meade Street Operable Unit 1 and 2A are described in Section 4.0 of the Biological Assessment for the project (LFR 2001). The primary vegetation communities at the site include tidal salt marsh (low, middle, and high), freshwater marsh, willow scrub, ruderal scrub, and eucalyptus stands. The upland portion of Subunit 1 addressed in this letter is on top of an old landfill that is currently covered by a 2-foot clay cap. The vegetation in this portion of Subunit 1 consists of a ruderal scrub community dominated by coyote brush (*Baccharis pilularis*), pampas grass (*Cortaderia selloana)*, acacia (*Acacia ssp.*), and brome (*Bromus sp.*). The portion of Subunit 2A addressed in this letter consists of high salt marsh at the southern and southwestern portions of the project area, and ruderal scrub habitat along the edges of the marsh (Figure 11). An approximately 10-foot wide belt of concrete riprap separates the high salt marsh and ruderal areas along the northern marsh boundary, and a raised berm, the EBRPD Bay Trail created originally as a rail spur by the Santa Fe Land Development Company in 1959, forms the eastern boundary of Western Stege Marsh. Both of these areas create an abrupt transition zone between the marsh and upland areas, and are heavily vegetated with a mixture of native and non-native invasive vegetation. The dominant plant species observed in the upland area includes coyote brush, pampas grass, fennel (*Foeniculum vulgare*), Scotch broom (*Cytisus scoparius*), wild radish (*Raphanus sativus*), Italian thistle (*Carduus pycnocephalus*), wild oats (*Avena sp.*), ripgut brome (*Bromus diandrus*), and poison oak (*Toxicodendron diversilobum*). A brackish small pond (approximately 2,835 sq. ft.) is located in the southeastern corner Western Stege Marsh, and supports a small amount of cattails (*Typha latifolia*) and a mixture of the aforementioned upland species on the upper banks.

The high salt marsh habitat within the project area of Subunit 2A is dominated primarily by a monoculture of saltgrass (*Distichlis spicata*), with sparse amounts of jaumea (*Jaumea carnosa*)

intermixed. The elevation range of the area is between 3.5 and 5 NGVD. The "orange pond" of Western Stege Marsh (approximately 20,500 sq. ft.) is located immediately northeast of the high marsh plane and does not support vegetation, but is at a slightly lower elevation than the high marsh. Two patches of alkali bulrush (*Scirpus robustus*) are located to the southeast and north of the orange pond, approximately 450 sq. ft. and 7,500 sq. ft. respectively. One additional raised area (approximately 1,500 sq. ft.) is located to the east of the larger patch of alkali bulrush, and supports about 20 scattered individuals of gumplant (*Grindelia stricta* var. *augustifolia*) with a saltgrass understory. A vegetation map depicting each of these areas is provided as Figure 11, and annotated photographs of the project area are provided in Figures 12 - 21.

Areas adjacent to the south and southwest of Subunit 2A (outside of the proposed remediation area) include an area of mid to low marsh, Meeker Slough and its associated tributaries, a small island of fill material, a portion of the Bay Trail, and low marsh and mudflat areas on the outboard side of the Bay Trail. The area to the north of Subunit 2A consists of the UC Berkley Richmond Field Station upland facilities (Subunit 2B). A brief description of each of these areas is provided below.

To the west and southwest of Subunit 2A the elevation of the marsh begins to drop slightly (to approximately 2 NGVD) in association with historic tidal channels of Meeker Slough. This elevation change is visible on the surface of the marsh from the transition of vegetation and the presence of small historic tidal sloughs that are tributaries to Meeker Slough and gradually terminate as they trend to the north and northeast (Figure 5). The tidal slough closest to the project boundary is approximately 50 feet away, and ranges in width from approximately 10 to 25 inches (Figure 19A and 19B). Vegetation along the tidal sloughs and lower to mid portions of the marsh is dominated by a mixture of Pacific cordgrass (*Spartina foliosa*) and pickleweed (*Salicornia virginica*). None of the tidal sloughs or areas supporting cordgrass and pickleweed would be affected by the proposed 2002 remediation activities. The southwest corner of Subunit 2A is the closest portion of the project area to the margin of cordgrass, at a distance of approximately 25 feet.

To the south of Subunit 2A and the tidal sloughs discussed above, there is a small, linear "island" of fill material thought to be deposited from the construction of the railroad spur in the late 1950's. The island is approximately 9,000 sq. ft. in size with elevations ranging from approximately 4 to 7 NGVD. The dominant vegetation on the island consists of coyote brush, pampas grass, gumplant, and fennel (Figure 11).

To the south of the island, a portion of the Bay Trail runs in an east-west direction and bisects the marsh. The Bay Trail is a raised embankment with a paved hiking trail that is maintained by the East Bay Regional Park District and used for public shoreline access. The EBRPD owns a 200 foot wide strip of marshland across the University of California at Berkeley's property. The Bay Trail is located in the center of this strip and is approximately 10 feet wide at the top of the levee,

and has a crest elevation of approximately 10 to 11 NGVD. On the outboard side of the Bay Trail levee, the marsh transitions from a mid- to low-marsh area supporting pickleweed and cordgrass to intertidal mudflats and open bay water (Figures 1 and 3).

V. Potential Impacts to Salt Marsh Harvest and California Clapper Rail

A. Potential Impacts to Salt Marsh Harvest Mouse (SMHM)

Information about the life history, habitat requirements, known distribution of SMHM, and an analysis of potential effects to the species are described in the Biological Assessment (BA) for the project previously submitted to your office (LFR 2001). The BA determined that the proposed remediation activities would not have direct or indirect effects to SMHM due to the lack of suitable habitat and the unlikely possibility of SMHM occurrence within the project area. This determination was based on a field evaluation of the Zeneca Richmond Facility (including Subunit 2A) conducted by Dr. Shellhammer and LFR biologists to determine the suitability of Eastern and Western Stege Marsh for SMHM (Appendix C). The results of Dr. Shellhammer's evaluation indicate that the eastern third of Western Stege Marsh (Subunit 2A) is not likely to be used by SMHM, as it supports a monoculture of saltgrass or open water and "iron-rich mud". In Dr. Shellhammers experience, SMHM are "seldom if ever...found in monocultures of saltgrass". Therefore, remediation of Subunit 2A is not expected to adversely affect SMHM or its habitat. In addition, the portion of Subunit 1 addressed in this letter is an upland community and would not provide suitable habitat for SMHM. Lastly, the removal of contaminated sediments, recontouring of the marsh to provide a more gradual transition zone, and the revegetation program to be implemented as part of the project would have a beneficial effect to SMHM by providing a more diverse plant community and better opportunities for SMHM to disperse and/or take refuge during high tide events.

B. Potential Impacts to California Clapper Rail (CCR)

Information regarding the life history, habitat requirements, known distribution of CCR, and an analysis of potential effects to CCR are also described in the BA for the project previously submitted to your office (LFR 2001). In addition, results of CCR surveys following the established USFWS (1999) protocols were submitted to your office on April 10, 2002. Lastly, a modification of the upland remediation design was submitted to your office on May 2, 2002 with regard to the CCR survey results and discussions between your office and LFR.

As described in our meeting on May 13, 2002, and the previous sections of this report, we are providing additional vegetation and benthic community information that would alter the likelihood of potential CCR use of the easternmost portion of high marsh within Subunit 2A. In addition, CCR are not expected to utilize the upland portion of Subunit 2A or the portion of Subunit 1 addressed in this letter as both of these areas are dominated by ruderal scrub habitat.

The impact analysis that follows is organized by the potential direct and indirect impacts to CCR, and is supported by annotated photographs of the project area (Figures 12 - 21), and a benthic community survey of the project area (Appendix B).

Direct Impacts

Potential direct impacts to CCR include any activity that may directly affect rails (including eggs, fledglings, juveniles, and/or adults) and/or rail habitat. Examples of these impacts include direct mortality through incidental contact, removal of rail nests, or the removal of potential habitat for nesting, foraging, or escape/sheltering/dispersal activities. According to the Recovery Plan for CCR, the most intensive nesting activity of CCR occurs from mid-March through July and the most heavily used portions of San Francisco Bay salt marshes for rail nesting are the lower, cordgrass-dominated areas within 10 meters (approximately 32 feet) of tidal sloughs (USFWS 1984). Eddleman and Conway (1998) also characterize nesting habitat in San Francisco Bay as the presence of tidal sloughs; abundant invertebrate populations; pickleweed coverage with extensive cordgrass coverage in the lower zone; and tall pickleweed, gum plant, and wrack (e.g., kelp, dry seaweeds) in the upper zone. Alkali bulrush, which is present at the upland transition of Subunit 2A, eliminates foraging areas by overgrowing small sloughs and does not provide suitable nesting habitat (USFWS 1984). Major food items of CCR include various bivalves and crustaceans (horse mussel, clams, yellow shore crabs) as well as other invertebrate species (amphipods, aquatic insects, snails, slugs, worms) (USFWS 1984; Eddleman and Conway 1998; Goals Project 2000). CCR are known to utilize dense herbaceous vegetation or dive underwater to escape potential predators, and typically freeze before walking or running to sheltering habitat (Eddleman and Conway 1998). CCR are typically thought to be non-migratory residents of San Francisco Bay salt marshes, but post-breeding dispersal has been documented during the fall and early winter (Goals Project 2000).

Due to the habitat characteristics that exist within the upland portion of Subunit 2A and Subunit 1, CCR are not expected to utilize these areas. In addition, due to the existing habitat characteristics of the marsh portion of Subunit 2A, and the results of CCR surveys conducted during the breeding season, no direct impacts to CCR or CCR habitat are expected from implementation of the project. Justification for this determination is provided below:

***Breeding*:**

- A protocol level survey of the proposed project area (both Eastern and Western Stege Marsh) was conducted from February 21, 2002 to April 3, 2002. The only variance from the standard U.S. Fish and Wildlife standard protocol was the use of taped calls during the last visit in an effort to elicit clapper rail response. Although clapper rails were detected within the southwestern portion of Western Stege Marsh (primarily in the low intertidal salt marsh located outboard of the EBRPD Trail and along Meeker Slough), no evidence of nesting (courtship, pairing, or territorial behavior or calling) was documented. Therefore, no

breeding is thought to occur in the vicinity of the project at this time. In addition, no suitable breeding habitat (areas supporting cordgrass or pickleweed) would be disturbed by the proposed activities. The nearest cordgrass/pickleweed areas to the project area are approximately 25 feet to the west of the project area, and persist primarily along the tributaries of Meeker slough (Figures 11 and 12).

***Feeding*:**

- A benthic macro-invertebrate study using the RWQCB BPTCP Protocol was conducted within the area of Subunit 2A located within the western portion of Western Stege Marsh. No trace of living benthic organisms was detected on the inboard side of the EBRPD Trail. In addition, toxicity testing with *Mytilus edulis* and *Eohaustorius* was conducted using sediments from the inboard side of Western Stege Marsh with a 100% mortality rate. Therefore, the inboard portion of Western Stege Marsh does not provide appropriate foraging habitat for CCR. Furthermore, remediation of the marsh would provide beneficial effects to the benthic community, thereby enhancing foraging habitat upon completion of the remedial construction activities.

***Sheltering*:**

- As described in Section IV of this report (Environmental Setting), the vegetation within the project area consists primarily of a monoculture of saltgrass approximately 6 inches in height. In addition, saltgrass surrounding the "orange pond" appears to be dead (Figure 18). The orange pond area itself does not support vegetation. Therefore, these areas would not provide appropriate refuge from predation or high tide events. Other vegetation in Subunit 2A include the following: the 1500 foot raised area scattered with sparse gumplant individuals (approximately 7 feet on center); the two areas of alkali bulrush; and upland species dominated by coyote brush and pampas grass. These areas would not provide suitable refuge from predators as they are located approximately 180, 225, and 250 feet (respectively) from the nearest tributary of Meeker slough or any area supporting taller marsh vegetation (cordgrass and pickleweed). No suitable escape cover exists between the cordgrass area adjacent to the tributaries of Meeker slough and the aforementioned areas of Subunit 2A, as it only supports saltgrass. Because CCR typically freeze, then walk or run to escape predators, the open area between the slough channels and upland/transition vegetation would likely prove deadly for CCR trying to escape an aerial or ground assault. In addition, the harsh upland transition areas (including the riprap along the northern boundary of the marsh) could support predators of CCR such as Norway rats. Therefore, it is more likely that CCR would utilize portions of the slough channels or adjacent vegetation as refugia, including vegetation along the primary channel of Meeker slough and the western outboard section of the marsh where sightings have occurred. Both of these areas support a higher density of cordgrass and herbaceous vegetation. Photographs of each of the vegetation types within the project area at an average high tide (approximately 4 feet NGVD), the tributaries

of Meeker slough, and the outboard portion of Western Stege Marsh are shown in Figures 13, 14, 19, and 21.

***Dispersal*:**

- Because the project area does not contain any tidal sloughs or areas supporting cordgrass or pickleweed, it would not directly impact any areas providing suitable dispersal habitat for the species. In addition, long-term remediation and restoration of the site with a more gradual transition zone between the middle and upper marsh zones and the upland areas would likely provide better dispersal opportunities for CCR.

Indirect Impacts

Potential indirect effects to CCR include any activity that would disturb rail behavior (e.g., breeding, courtship, foraging, dispersal) or cause indirect effects to habitat adjacent to a project location (e.g., altered hydrology, incidental introduction of contaminants). Typically, noise disturbance or activities that would visually disturb CCR from normal breeding, foraging, or sheltering activities are considered indirect effects. In the San Francisco Bay Area, CCR individuals accustomed to the presence of human beings tolerate people nearby while feeding (USFWS 1984). Because the project area is located adjacent to the EBRPD Trail, it is regularly subjected to high amounts of pedestrian use, including off-leash dogs who may "tromp" through the marsh and disturb CCR activities. As discussed in the letter report titled "Modification to the Upland Remediation Design" (LFR 2002b), noise levels within the marsh are already elevated due to nearby industrial activities and its proximity to Interstate 580 (ambient noise levels at the site were measured close to 80 decibels during the evening commute hours). According to Caltrans studies, the typical noise level generated by construction equipment conducting excavation is 88 decibels at a distance of 50 feet from the equipment. Therefore, the construction equipment is not expected to generate substantially greater noise levels than the existing environment surrounding the marsh. In addition, because of the depth of excavation required for the remediation, heavy equipment will be below ground surface for a portion of the excavation period, further reducing the construction related noise. Therefore, as concluded in the LFR study, it is feasible that the construction activities would not be of consequence to CCR, and the temporary, incremental increase in noise levels would not adversely affect CCR.

Similarly, visual impacts to CCR would be temporary and would be minimized through the use of screening around the project area. To minimize short-term visual impacts related to construction activities, visual screening would be placed along the perimeter of the work areas. The screening for Subunit 1 would consist of a temporary construction fence with slats or tarps attached. For Subunit 2A, visual screening would be placed along the fenceline that currently separates the upland portion of Subunit 2A and the marsh portion of Subunit 2A. The elevation of the upland portion of Subunit 2A is approximately 8 to 10 feet above the marsh, and the area to the south of the existing fence is heavily vegetated with pampas grass and coyote brush

(Figures 13, 14, and 20). Both the elevation change and heavy brush would add to the visual screening provided by the fence. For the marsh portion of Subunit 2A, a temporary construction fence with slats or tarps would be placed along the outer boundary of the marsh (Figure 20A). In addition, the "island" of fill material to the south of Subunit 2A is vegetated with coyote brush and pampas grass, which also provides a visual buffer for the project area from the outboard portion of the marsh. Lastly, the EBRPD Trail is an elevated walkway (approximately 10 feet high) which would provide additional visual and noise screening for the project area from the outboard portion of the marsh (Figure 20B). Therefore, there would be no visual impacts to CCR from the proposed project.

Contamination of adjacent habitat due to offsite migration of contaminated sediments could potentially affect higher quality habitat surrounding Meeker slough or within the outboard portion of the marsh. However, the primary objective of the proposed project is to remove the primary contaminant source from the marsh in its entirety. Therefore, the proposed project would have long-term beneficial effects to CCR by removing contaminants that may have reproductive or developmental effects to CCR, or reduce prey populations available to CCR (as is demonstrated by the benthic study for the project area). Lastly, attraction of opportunistic predators (e.g., red fox, rats, raccoons, raptors) could potentially impact CCR populations through increased predation. Currently, the introduced red fox, rats, and feral cats are thought to be the primary predators of CCR. Thus, removal of riprap and thick non-native upland vegetation would provide beneficial effects to CCR by providing less opportunity for CCR predators.

No indirect effects to CCR are expected as a result of the proposed project activities. In addition to the above discussion, further justification and avoidance measures to be implemented for the project are provided below. Supporting photographs and ecotoxicity data are provided in Figures 13 - 21 and Table 3.

***Breeding*:**

- As described above, no breeding is thought to be occurring within Stege Marsh at this time. Therefore, no indirect visual or noise effects to breeding are anticipated. As described in the Biological Assessment for the project, the most likely breeding areas in the vicinity of the project area are in the lower intertidal marsh on the outboard side of the EBRPD Trail. This area is approximately 500 to 600 feet from the boundary of the upland portion of Subunit 2A. Construction activities (excavation, treatment, and backfilling), would begin in the northeasterly portion of the upland unit during the tail end of the breeding season (August 1, 2002), and work westerly and southerly until the entire upland portion of Subunit 2A and the portion of Subunit 1 addressed in this letter is complete. The upland work is expected to last approximately 4 to 6 weeks. No work would occur within the marsh portion of Subunit 2A

until after September 1, 2002. To further reduce any visual effects to CCR, visual screening would be installed as described above.

Feeding:

- As described above and supported by the benthic and epi-benthic macro invertebrate community analysis in Appendix B, the inner portion of Western Stege Marsh does not support an invertebrate population. Therefore, no foraging is likely to occur within this area. However, foraging may occur along the edge of Meeker Slough, at the edge of Western Stege Marsh. Therefore, to minimize visual and noise impacts to CCR foraging, fencing would be installed along the outer boundary of Subunit 2A as described above. As demonstrated in Figure 21, the project area is not visible from the outboard portion of the marsh due to the EBRPD Trail. To minimize noise disturbance, all heavy equipment idling time and operating time would be minimized to the greatest extent possible while working in the marsh area. The remediation activities within the marsh portion of Subunit 2A are expected to last approximately 6 to 8 weeks. Because the remediation activities within the marsh would remove contaminated sediments with extremely low pH that do not currently support a benthic community, the long-term recovery of the marsh may improve foraging opportunities for CCR.

Sheltering:

- As demonstrated in the CCR survey report for the project, CCR have been observed primarily on the outboard portion of the marsh, and along the primary channel of Meeker Slough (Figure 12). Both of these areas provide better quality sheltering habitat for CCR than areas closer to the project area, as the vegetation is taller and more dense along the slough, and wrack is abundant within the outer marsh plain. Therefore, it is highly unlikely that construction activities in the upper marsh portion of the project area would affect sheltering activities of CCR. Nonetheless, a USFWS-approved biologist with the authority to halt construction would be onsite during the initial grubbing/clearing of the marsh portion of Subunit 2A. The USFWS-approved biologist would conduct a training session for all construction personnel, including a description of CCR and its habitat, identification of CCR and their calls, the avoidance measures being implemented to reduce adverse effects to the species, and the boundaries of the work area. After the initial clearing and training session is finished, the USFWS-approved biologist would designate a Biological Monitor, also with the authority to halt construction, who would be responsible for monitoring the marsh area during remediation activities within the marsh portion of Subunit 2A. If CCR are observed within the inboard portion of the marsh, construction in the marsh would be halted until the CCR have left the area.

Dispersal:

- As described for direct impacts to CCR, the project is not expected to effect dispersal activities of CCR, as the portion of the marsh within Subunit 2A does not provide dispersal

habitat for the species. In addition, the relatively small size of the marsh on the inboard side of the EBRPD trail would provide marginal dispersal habitat for the CCR.

VI. Conclusion

In conclusion, we respectfully request to extend the remediation boundary of Subunit 2A to include a portion of Western Stege marsh as depicted in Figure 5. In addition, we would like to request that the to begin excavation activities on August 1, 2002 for the upland portion of Subunit 2A and the upland portion of Subunit 1 addressed in this letter. As discussed above, the proposed changes to the boundary of Subunit 2A and modification to the construction schedule will not result in adverse effects to SMHM or CCR with the following proposed avoidance and minimization measures:

- Work will only be conducted in the upland portion of Subunit 2A and the western portion of the upland landfill in Subunit 1 during the end of the breeding season after August 1, 2002;
- Work in the marsh portion of Subunit 2A will commence after the end of the breeding season (September 1, 2002);
- No work will be conducted in the tidal sloughs or any areas consisting of cordgrass or pickleweed (lower and middle marsh areas);
- Visual screening will be installed to minimize visual impacts during implementation of the remedial activities; and
- A USFWS-approved biologist with the authority to halt construction would be onsite during the initial grubbing/clearing of the marsh portion of Subunit 2A. The USFWS-approved biologist will conduct a training session for all construction personnel, including a description of CCR and its habitat, the avoidance measures being implemented to reduce adverse effects to the species, identification of CCR and their calls, and the boundaries of the work area. After the initial clearing and training session is finished, the USFWS-approved biologist would designate a Biological Monitor, also with the authority to halt construction, who would be responsible for monitoring the marsh area during remediation activities within the marsh portion of Subunit 2A. If CCR are observed within the inboard portion of the marsh, construction in the marsh would be halted until the CCR have left the area.

In addition, recovery of Western Stege Marsh will provide benefits to the CCR in the long term because the sediments within the proposed project area pose a significant risk to both the benthic community as well as the higher trophic level organisms such as the clapper rail and the salt marsh harvest mouse. Site-specific toxicity tests show that the sediment is highly toxic with 100% mortality rates when organisms are exposed to the sediment within the project area. The benthic community has been severely impacted with virtually nothing surviving in the project area. Based on these findings, it is necessary to remediate the project area to reduce the risks to the ecological receptors living in Stege Marsh as soon as possible.

We respectfully request your concurrence with the proposed modification to the project. If your office concurs with our determination, please forward a letter to our office as soon as possible so we can prepare for the upcoming remediation activities. If you require any additional information or have questions regarding our request, please do not hesitate to contact me at (510) 874-3284.

Sincerely,

Diane K. Mims
Senior Project Manager
URS Corporation

Janet K. Frentzel
Biologist
URS Corporation

References:

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USFWS. 1999. Standard Methodology for Detecting the Presence of California Clapper Rail Breeding Activity. March 5.

Attachments:

TABLES

1 Metals and pH in Sediment and Soil, Marsh Portion of Subunit 2A
2 Metals and pH in Sediment, Western Boundary Marsh Portion of Subunit 2A
3 Interpretation of Sediment Toxicity Tests

FIGURES

1 University of California, Berkeley, Richmond Field Station Site Location
2 Subunits 2A and 2B Locations and Boundaries
3 Aerial Photo of the Project Area (Subunit 2A)
4 Cinder Excavation Plan
5 Boundary Line for Subunit 2A
6 Post Remediation Grading Plan
7 First Phase of Excavation Activities (August 1 to September 1, 2002)
8 Second Phase of Excavation Activities (After September 1, 2002)
9 Tier 2 Evaluation of Effects to Wildlife (E-SSTL Exceedances)
10 Tier 1 Evaluation of Effects to Benthic Community (ERM Exceedances)
11 Existing Plant Communities and Recent Wildlife Sightings
12 Distances Between Clapper Rail Sitings and Project Area
13 Approximate Boundary of Upland Portion of Subunit 2A
14 Approximate Boundary of the Marsh Portion of Subunit 2A
15 Northern Boundary
16 Eastern Boundary
17 Close-up of Southern and Western Boundaries
18 Close-up of Vegetation
19 Close-up and Distant View of Meeker Slough Tributary
20 Proposed Visual Screening
21 View of Project Area

APPENDICES

Appendix A: Regional Water Quality Control Board Order No. 01-101

Appendix B: Benthic Community Survey Results

Appendix C: Evaluation of Zeneca Richmond Facility as Salt Marsh Harvest Mouse Habitat

cc: Karl Hans, UC Berkeley
Mike Hryciw, UC Berkeley
Anna Moore, UC Berkeley
Pat Schlesinger, General Counsel, University of California
Jane Anderson, Zeneca, Inc.
William Carson, LFR Inc.
Cecil Felix, RWQCB
Molly Martindale, USACOE
Brad Olsen, EBRPD
Leslie Lacko, BCDC

TABLES

TABLE 1
METALS AND pH IN SEDIMENT AND SOIL
MARSH PORTION OF SUBUNIT 2A
RICHMOND FIELD STATION

EPA Method 6010 (7471 for Mercury), units = mg/kg

Sample Location			depth	Arsenic	Cadmium	Copper	Lead	Mercury	Nickel	Selenium	Zinc	pH
TIDAL SALT MARSH HABITAT												
ERMs				70	10	270	218	0.71	51.6	1*	410	
E-SSTL (Clapper Rail)				685	57	598	576	3.8	2,773	16	5,244	
E-SSTL (Harvest Mouse)				355	15	14,399	19,026	143	1,685	145	7,904	
Post Risk Assessment Samples												
SMAB-	1-		0	28	2.4	97	39	0.45 J	71	1.7	480	6.6
SMAB-	2-		0	410	9.1	750	280	23 J	93	56	1,700	6.5
SMAB-	3-		0	1,100	14	2,000	2,600	5.4 J	100	24	3,500	6.4
SMAB-	4-		0	1,100	18	1,400	660	18 J	120	59	2,600	6.5
SMAB-	5-		0	600	19	1,900	440	28 J	140	43	3,700	6.7
SMAB-	6-		0	88	2.4	19	6	0.92 J	25	<1.3	120	6.8
SMAB-	7-		0	1,100	13	1,400	910	30 J	120	81	2,400	6.7
SMAB-	8-		0	1,800	24	3,500	560	170 J	110	93	4,800	7.3
SMAB-	9-		0	1,700	15	1,600	460	62 J	99	130	2,000	6.9
SMAB-	10-		0	2,900	24	1,300	480	160 J	110	260	3,000	6.6
SMAB-	11-		0	640	11	780	180	1.8 J	130	<1.3	2,800	5.7
SMAB-	12-		0	1,700	17	910	180	270 J	97	140	2,000	6.7
Samples included in Risk Assessment												
SM-	108-	B-	0	610	21	54	8.9	0.86	120	6.7	190	
SM-	108-	B-	2	700	41	450	220	11	77	17	8,800	
SM-	108-	B-	4.5	1,200	36	940	310	53	85	53	7,200	
SM-	108-	B-	5.5	7.2	1.6	18	4.7	0.44	50	<0.29	50	
SM-	109-	B-	0	200	12	230	84	9.5	51	9.9	1,300	
SM-	123-	B-	0	26	3.9	460	76	4.3	53 J	4.2	1,300	
SM-	123-	B-	3	130	12	480	190	36	18 J	6.7	2,700	
SM-	123-	B-	8	2.6	1.7	23	5.3	0.95	65 J	<0.3	50	
SM-	124-	B-	3.5	260	18	12,000	700	35	140	18	770	
SM-	131		0	576	3	258	577	12	12	135	688	na
B8MA			1	875	7.7	415	235	35.9	na	<1.6	517	na
B9MA			1	125	8.7	519	91.3	7.09	na	<11.1	1,270	na
E-1			0	496	na	315	310	10.9	na	60.7	957	na
E-2			0	749	na	239	563	5.8	na	124	863	na
RFS-1			0	217	16	1,330	236	5.7	na	19	3,930	na
RFS-1			0-2	425	2.5	425	149	24.2	na	19.7	793	na
RFS-1			3	895	4.6	587	345	22	na	57	1,000	na
RFS-1			5	172	1.1	145	76.7	9	na	9	304	na
RFS-2			1	973	11.1	1,130	801	142	na	444	2,000	na
RFS-2			3	746	8.2	620	211	53	na	78	1,710	na
RFS-2			5	57	1.2	109	34.1	5.2	na	7	271	na
RFS-3			0	1,020	2.4	193	37.2	1.3	na	6	517	na
RFS-3			1	746	3.0	745	289	27.5	na	854	945	na

TABLE 1
METALS AND pH IN SEDIMENT AND SOIL
MARSH PORTION OF SUBUNIT 2A
RICHMOND FIELD STATION

Sample Location			depth	Arsenic	Cadmium	Copper	Lead	Mercury	Nickel	Selenium	Zinc	pH
RFS-3			2.5	**1,330**	**44**	**1,640**	**1,240**	**166**	na	**610**	**5,000**	na
SD1ESD			1	<348	**31**	**813**	172	**8**	na	<17.9	305	na
UPLAND HABITAT (access road)												
E-SSTL (hawk)					230	412	437	42	621		760	
AR2			11	1,600	16	720	300	61	70	93	2,700	7.6
AR2			11.5	980	35	1,200	520	63	65	200	5,400	7
SM-	110-	B-	0	90	4.2	150	190	3	44 J	8.5	310	
SM-	110-	B-	9	350	6.5	420	45	1.4	32 J	3.2	260	
SM-	110-	B-	14	8.3	2.3	71	6.8	0.44	62 J	0.46	1,100	
RFS-4			0-2	688	19.4	4,250	238	7.5	na	249	3,750	na
RFS-4			2.0-4	319	50	8,090	167	26.6	na	8	5,290	na
RFS-4			4.0-5	14	0.14	30	7.61	1.5	na	ND	60	na
SD6MA			1	555	33	823	814	10.6	na	8.7	2,840	na
B10MA			1	2,210	12.3	495	357	20.2	na	11	694	na
21401				1,140	na	373	180	5.5	na	35.7	2,500	na
SD4MA			1	161	9.7	262	293	15.7	na	<4.5	697	na

23	exceeds ERM
23	exceeds E-SSTL (Clapper Rail)
23	exceeds E-SSTL (Harvest Mouse)
23	exceeds E-SSTL (Red-Tailed Hawk)

It should be noted that the data from the additional western boundary delineation is included in this table.

06/03/2002

TABLE 2
METALS AND pH IN SEDIMENT
WESTERN BOUNDARY
MARSH PORTION OF SUBUNIT 2A
RICHMOND FIELD STATION

EPA Method 6010 (7471 for Mercury), units = mg/kg reported as dry weight

Sample Location		Antimony	Arsenic	Beryllium	Cadmium	Chromium	Copper	Lead	Mercury	Nickel	Selenium	Silver	Thallium	Zinc	pH
ERMs			70	-	10	370	270	218	0.71	51.6	1*	3.7	-	410	
E-SSTL (Clapper Rail)			685	-	57	-	598	576	3.8	2,773	16	-	-	5,244	
E-SSTL (Harvest Mouse)			355	-	15	-	14,399	19,026	143	1,685	145	-	-	7,904	
	depth														
SMAB- 1-	0	<11 UJ	28	0.68	2.4	48	97	39	0.45 J	71	1.7	<0.88	<0.88	480	6.6
SMAB- 2-	0	<9.9 UJ	410	0.86	9.1	130	750	280	23 J	93	56	2.1	<0.83	1,700	6.5
SMAB- 3-	0	<11 UJ	1,100	1.2	14	110	2,000	2,600	5.4 J	100	24	1.1	<0.89	3,500	6.4
SMAB- 4-	0	<9 UJ	1,100	0.86	18	160	1,400	660	18 J	120	59	2.1	<0.75	2,600	6.5
SMAB- 5-	0	<10 UJ	600	1.2	19	160	1,900	440	28 J	140	43	3.3	<0.87	3,700	6.7
SMAB- 6-	0	<15 UJ	88	<0.51	2.4	5.9	19	6	0.92 J	25	<1.3	<1.3	<1.3	120	6.8
SMAB- 7-	0	<13 UJ	1,100	1.3	13	280	1,400	910	30 J	120	81	2.6	<1	2,400	6.7
SMAB- 8-	0	18 J	1,800	0.9	24	96	3,500	560	170 J	110	93	5.1	0.99	4,800	7.3
SMAB- 9-	0	34 J	1,700	0.92	15	100	1,600	460	62 J	99	130	10	3	2,000	6.9
SMAB- 10-	0	59 J	2,900	0.93	24	140	1,300	480	160 J	110	260	9.4	6.6	3,000	6.6
SMAB- 11-	0	<16 UJ	640	1.6	11	72	780	180	1.8 J	130	<1.3	<1.3	<1.3	2,800	5.7
SMAB- 12-	0	24 J	1,700	0.67	17	83	910	180	270 J	97	140	6.8	0.95	2,000	6.7

23 exceeds ERM
23 exceeds E-SSTL (Clapper Rail)
23 exceeds E-SSTL (Harvest Mouse)
J = estimated concentration
UJ = estimated reporting limit

Table 3
Interpretation of Sediment Toxicity Tests
UC - Berkeley Richmond Field Station

SAMPLE LOCATION	pH	EOHAUSTORIUS MEAN SURVIVAL (SOLID PHASE)	MYTILUS MEAN DEVELOPMENT (ELUTRIATE)			MYTILUS EC/IC25	TOTAL SEDIMENT CONC. [mg/kg]							MYTILUS EC/IC25 [mg/kg]							ERM [mg/kg]						
		[%]	25%	50%	100%	[%]	As	Cd	Cu	Hg	Pb	Se	Zn	As	Cd	Cu	Hg	Pb	Se	Zn	As	Cd	Cu	Hg	Pb	Se	Zn
HOME CONTROL	--	96																									
SM103	7.21	92	95.5	94.5	92	100	10	2.6	56	0.92	61	0.56	200	10	2.6	56	0.92	61	0.56	200							
SM105	7.06	83*	93.8	93.5	87.8	100	32	3.8	110	2.1	84	0.86	330	32	3.8	110	2.1	84	0.86	330							
SM106	4.65	88*	90	86.5*	0*	53.9	10	1.5	19	0.48	11	0.53	45	5.39	0.81	10.2	0.26	5.93	0.29	24.3							
SM119	6.68	96*	90.2	92.5	91	100	17	3.5	87	2.8	74	0.81	230	17	3.5	87	2.8	74	0.81	230	70	9.6	270	0.71	218	1	410
SM126[a]	2.3	0*[b] (71*)	0* (85.2*)	0* (13*)	0* (0*)	1.6 (31)	650	28	94	1	23	<0.62	220	202	8.68	29.1	0.31	7.13	0.1[d]	68.2							
B4MA	6.56	78*	95	91	0.5*	60.9	56	2.6	160	9.3	210	2.4	210	34.1	1.58	97.4	5.66	128	1.46	128							
B6MA	6.42	73*	93.8	92.5	91.2	100	110	3.5	88	1.9	76	1.4	230	110	3.5	88	1.9	76	1.4	230							
SD3MA	6.85	90	94	93.5	87.8	100	77	4	100	5.4	71	1.3	310	77	4	100	5.4	71	1.3	310							

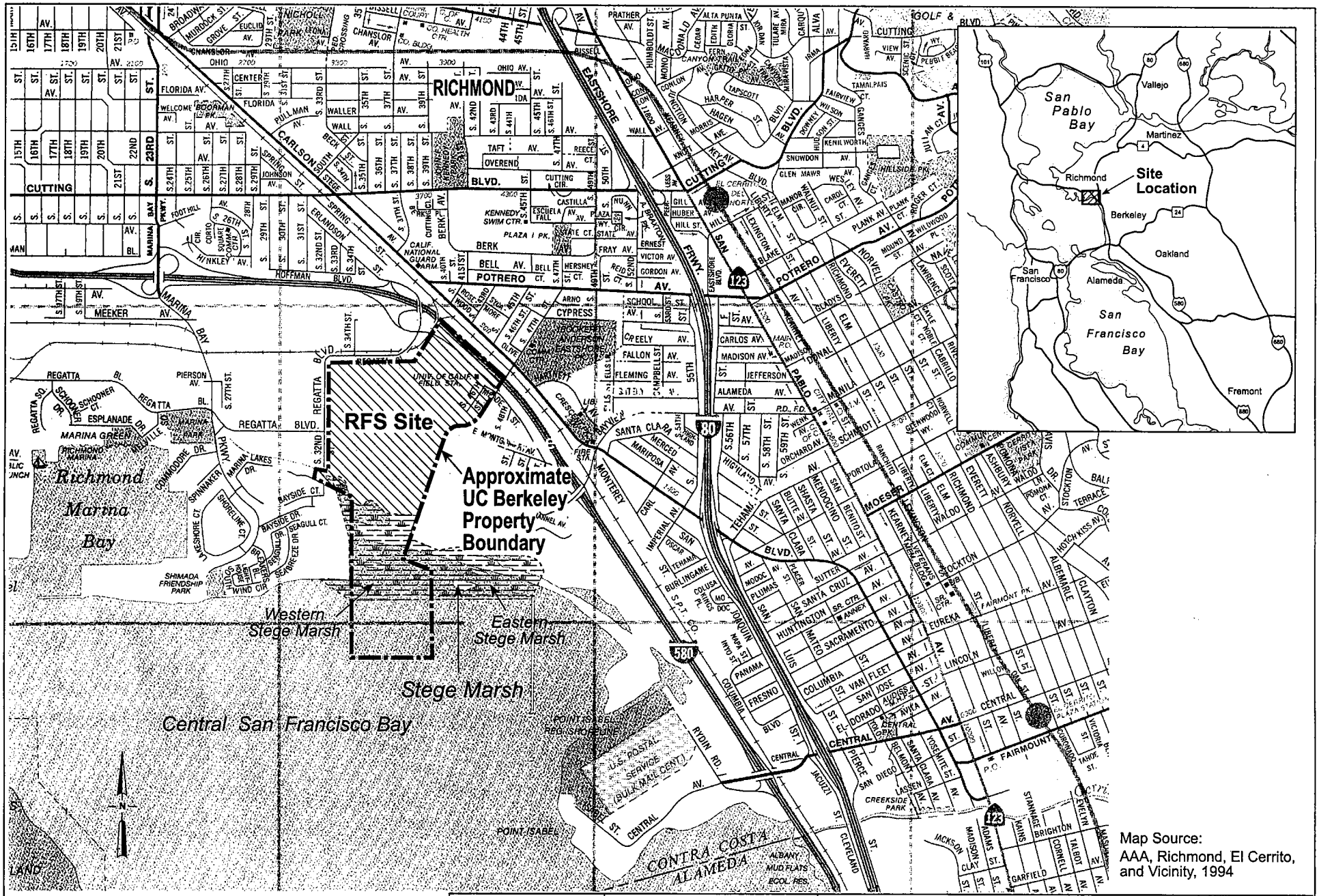
* = Significantly less than the control at p<0.05.
na = not applicable

[a] Value in parathensis represents result by adjusting the pH of the elutriate prior to the test.
Note: AVS concentration low for this sample; contributes to bioavailability of SEM (Cd, Cu, Pb, Ni, Zn) metals in sediment as well as mercury.

[b] Overlying water pH = 3 during the tests.

[c] Not evaluated due lack of amphipod survival in sediment.

[d] Half of the sediment reporting limit used.



Map Source:
AAA, Richmond, El Cerrito, and Vicinity, 1994

URS

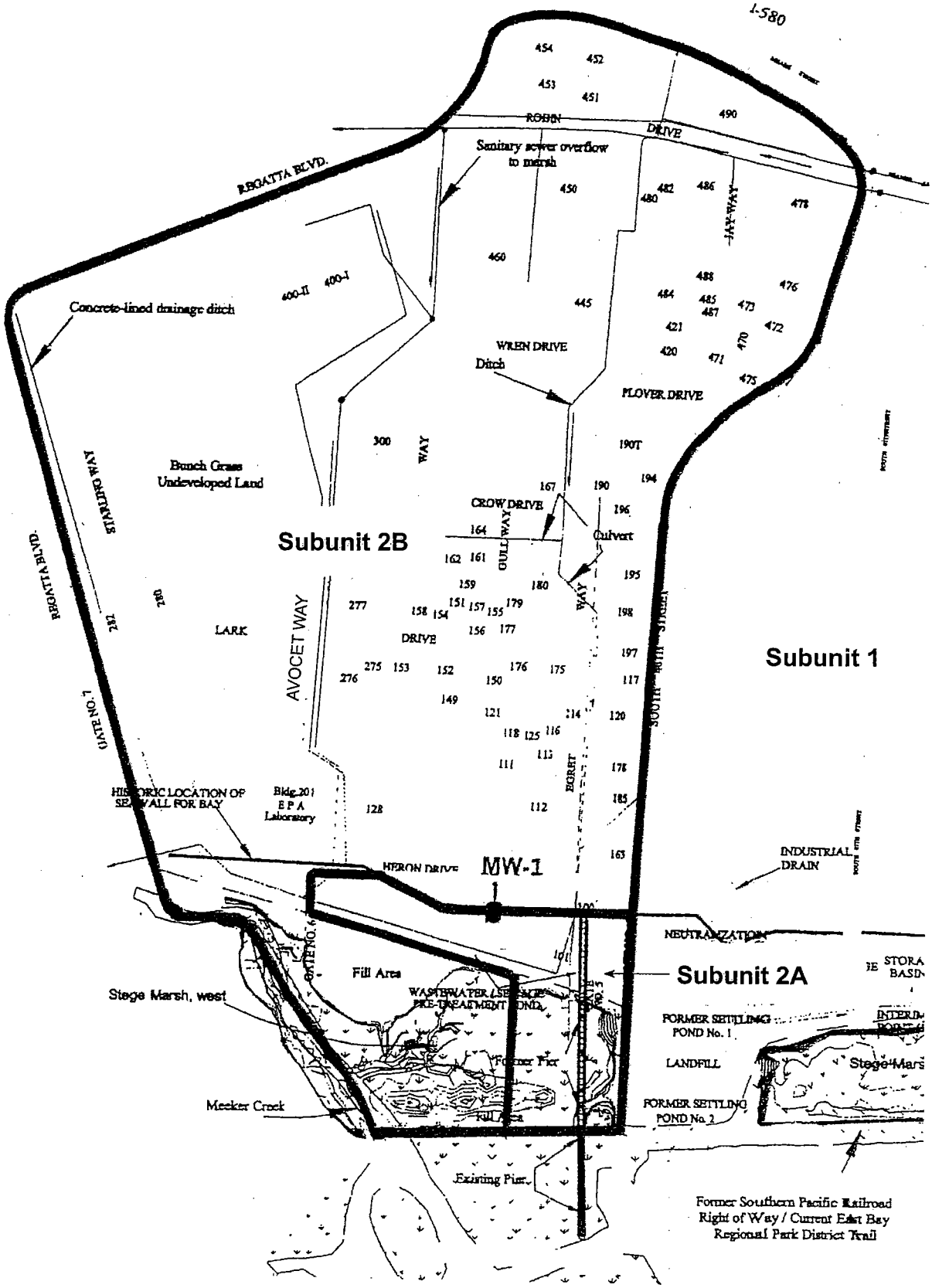
Project No. 51-09967067.00

UC Berkeley
Richmond Field Station

UNIVERSITY OF CALIFORNIA, BERKELEY
RICHMOND FIELD STATION
SITE LOCATION MAP

Figure 1

51-09967067.00-00000/060302/gos



URS	Project No. 51-09967067.00 University of California Richmond Field Station	SUBUNITS 2A AND 2B LOCATIONS AND BOUNDARIES	Figure 2

University of California, Berkeley
Richmond Field Station

IDS

Project Area (Subunit 2A)

Project No. 51-09967067.00		
L:\Projects\UC_Berkeley_Richmond_Field_Station\Additional_Del\planning_and_budgeting.apr	May 2002	Not to Scale	Figure 3

N 519,135
E 1,470,512

N 519,503
E 1,470,542

N 519,376.14
E 1,470,689.33

CONSTRUCT BERM TO 6' ABOVE MSL AS REQUIRED TO CONTROL FLOW INTO EXCAVATION

EXCAVATE TO OLD SEA WALL

N 519,204.78
E 1,470,931.23

N 519,185.26
E 1,470,900.45

N 519,116.29
E 1,470,991.24

POND

102

EXCAVATE TO OLD SEA WALL

EXCAVATE TO OLD SEA WELL

EGRET WAY

REMOVE 1' OF SEDIMENT FROM BELOW BOTTOM OF CINDER EXCAVATION, MIX WITH CRUSHED LIMESTONE, PLACE AS FILL.

EXCAVATION AND BACKFILL AT THE ORANGE AREA WILL OCCUR ONLY WHEN TIDES ARE SUFFICIENTLY LOW TO PREVEND TIDAL WATER FROM ENTERING THE EXCAVATION

INSTALL EMBEDDED POST TEMPORARY FENCE

N 518,961.56
E 1,470,961.17

N 518,738.55
E 1,470,936.09

POND

N 519,671.22
E 1,471,435.38

MATCH LINE SHEET C3

N 518,709.53
E 1,471,028.61

N 518,732.98
E 1,471,073.73

N 518,739.31
E 1,471,123.49

N 518,968.74
E 1,471,210.98

S 46TH ST

CINDER EXCAVATION AREA 1

N 519,666.49
E 1,471,508.51

N 519,411.09
E 1,471,577.57

N 519,805.06
E 1,471,723.72

LEGEND:

200 FOOT BUFFER FROM CALIFORNIA CLAPPER RAIL HABITAT

LOW pH AND METAL AFFECTED SEDIMENT WITH NO WETLAND VEGITATION.

PHOTO LOCATION

NOISE MONITORING LOCATION

0 120'

Scale: 1" = 120' Feet

NOTES

1. CINDER EXCAVATION BOUNDARY COORDINATES ARE FOR INITIAL LAYOUT ONLY. ADJUST CINDER EXCAVATION BOUNDARY TO SUIT ACTUAL CONDITIONS ENCOUNTERED DURING CINDER REMOVAL.
2. SEE SHEET C11 FOR UTILITIES IN CINDER EXCAVATION AREAS.
3. DO NOT DISTURB IN ANY WAY WETLAND VEGETATION ADJACENT TO EXCAVATION LIMITS.

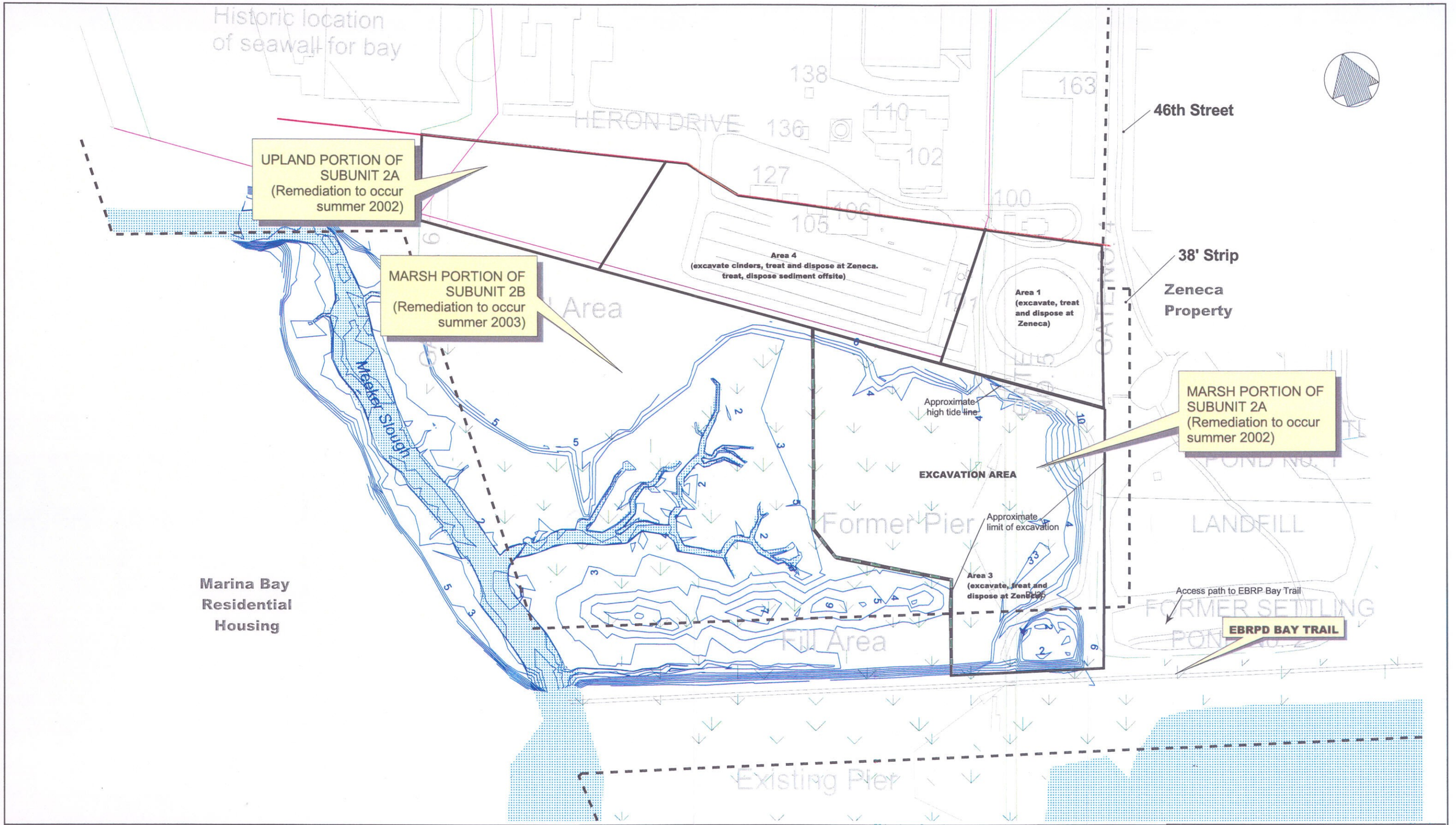
Cinder Excavation Plan

Meade Street Operable Unit, Richmond, California

LFR LEVINE • FRICKE

Figure 4

J:\Engcad\7.5a\SVphase1-REMEDIATION\CinderRemoval\CINDERREMOVAL PERMIT.DWG, C4 All3 Permit, 05/03/2002 02:16:45 PM



LEGEND

- Subunit 2A boundary line
- Stege marsh survey data
- Storm Drain System (Approximate)
- Industrial Drain (Approximate)
- Sanitary Sewer System (Approximate) (dashed line to be verified)
- Edge of Surface Water
- Stege Marsh
- Property Boundary

NOTES :

Project No.
51-09967067.00

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University of California, Berkeley
Richmond Field Station

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Boundary Line for Subunit 2A

May 2002 | Scale 1" = 125' | Figure 5

Seawall

HERON DRIVE

46th Street

Top of Bank

38' Strip

Zeneca Property

UPLAND PORTION OF SUBUNIT 2A (Remediation to occur summer 2002)

Area 4 (excavate cinders, treat and dispose at Zeneca. treat, dispose sediment offsite)

Area 1 (excavate, treat and dispose at Zeneca)

Fill Area

Biologically Active Permeable Barrier (BAPB)

MARSH PORTION OF SUBUNIT 2B (Remediation to occur summer 2003)

MARSH PORTION OF SUBUNIT 2A (Remediation to occur summer 2002)

Approximate high tide line

EXCAVATION AREA

Approximate limit of excavation

Area 3 (excavate, treat and dispose at Zeneca)

Access path to EBRP Bay Trail

FORMER SETTLING POND NO. 2

East Bay Regional Parks (EBRP) Bay Trail

Marina Bay Residential Housing

100 0 100 Feet

LEGEND

Property Boundary

Subunit 2A boundary line

NOTES :

1. Marsh Features and Sloughs are Approximate.
2. Contours are approximate. may change in final design

Project No. 51-09967067.00

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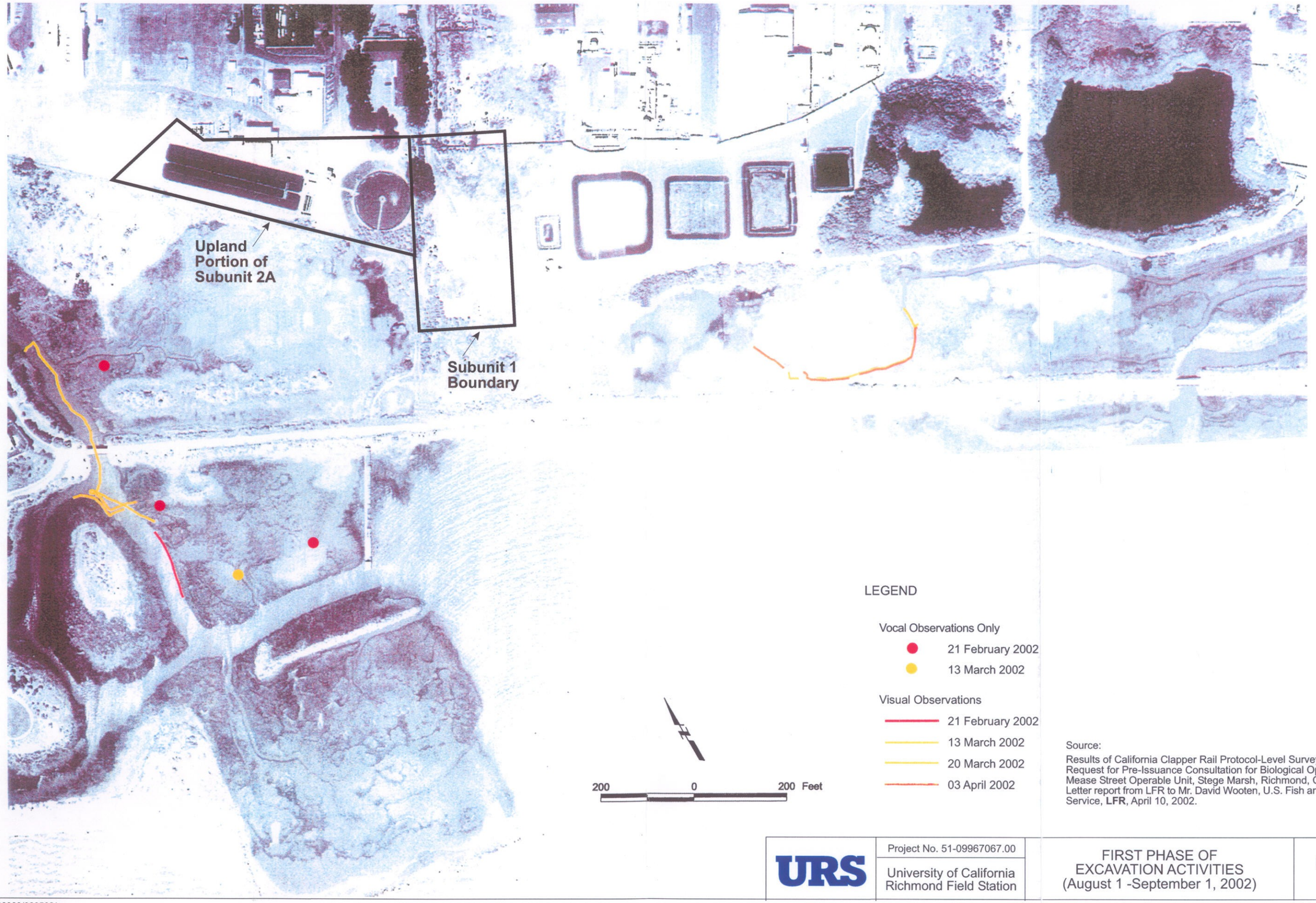
University of California, Berkeley
Richmond Field Station

URS

Post Remediation Grading Plan

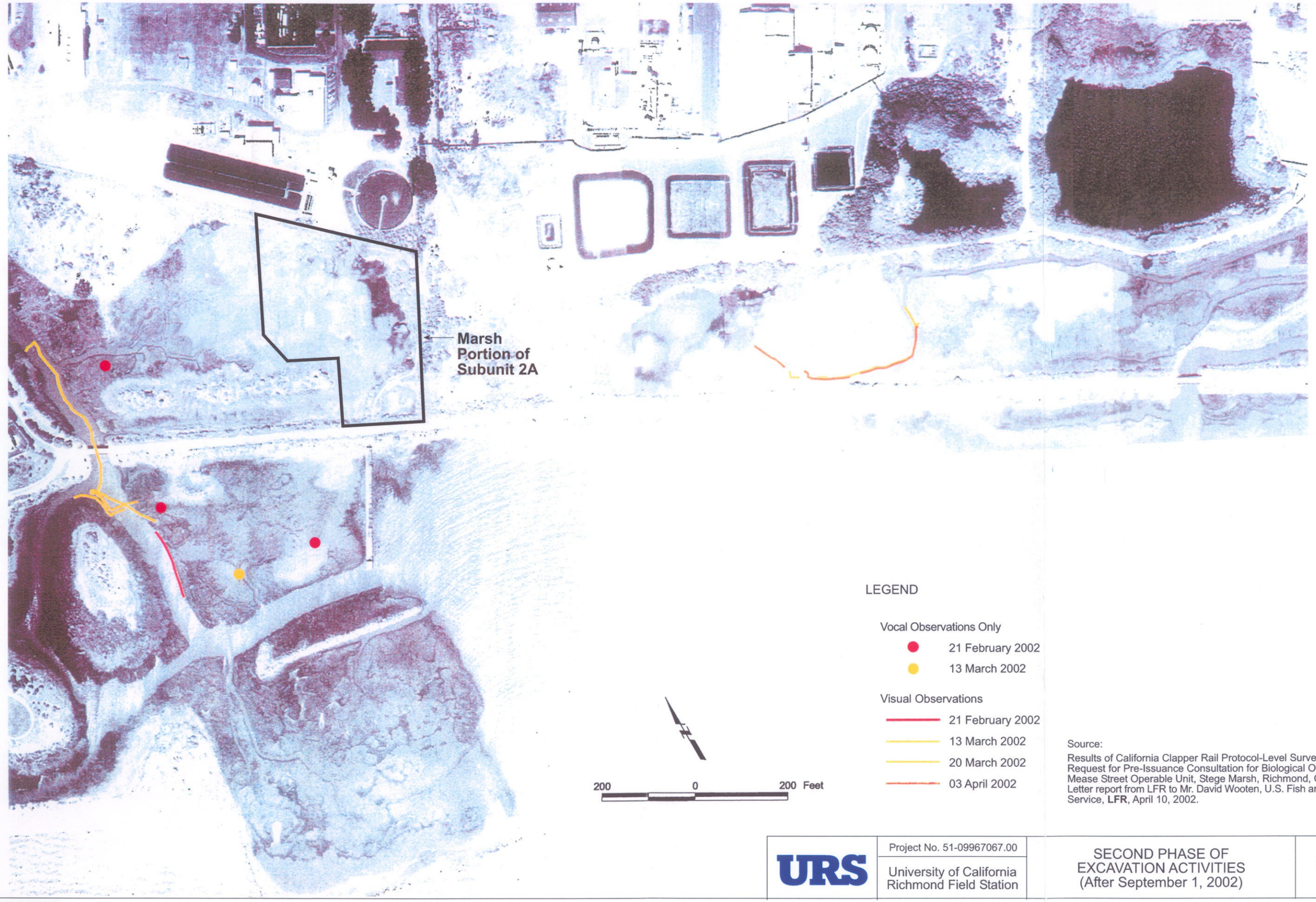
May 2002 | Scale 1" = 100' | Figure 6



Source:
Results of California Clapper Rail Protocol-Level Surveys and Request for Pre-Issuance Consultation for Biological Opinion, Mease Street Operable Unit, Stege Marsh, Richmond, California. Letter report from LFR to Mr. David Wooten, U.S. Fish and Wildlife Service, **LFR**, April 10, 2002.

URS	Project No. 51-09967067.00 University of California Richmond Field Station	FIRST PHASE OF EXCAVATION ACTIVITIES (August 1 -September 1, 2002)	Figure 7

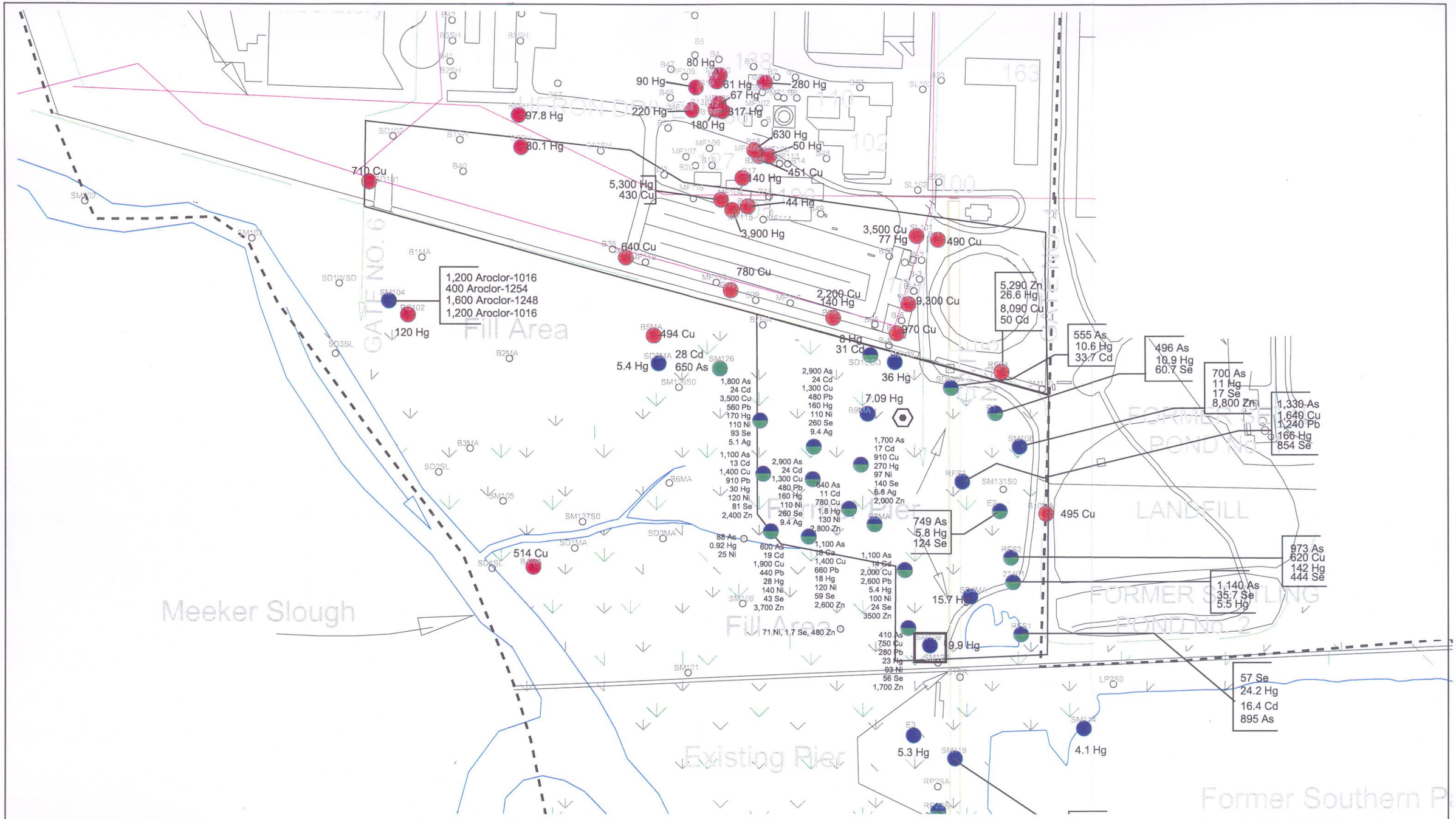
51-09967067.00-00009/060502/gos



Source:
Results of California Clapper Rail Protocol-Level Surveys and Request for Pre-Issuance Consultation for Biological Opinion, Mease Street Operable Unit, Stege Marsh, Richmond, California. Letter report from LFR to Mr. David Wooten, U.S. Fish and Wildlife Service, **LFR**, April 10, 2002.

URS	Project No. 51-09967067.00 University of California Richmond Field Station	SECOND PHASE OF EXCAVATION ACTIVITIES (After September 1, 2002)	Figure 8

51-09967067.00-00009/060502/gos



LEGEND

Ecological Receptors

- Red-tailed Hawk
- Salt Marsh Harvest Mouse
- California Clapper Rail

Euhaustorius (Solid Phase) - 0% survival

Benthic Community Survey (No benthic organisms observed)

150 0 150 Feet

NOTES :

University of California, Berkeley
Richmond Field Station

URS

Tier 2 Evaluation of Effects to Wildlife (E-SSTL Exceedances)

Project No.
51-09967067.00

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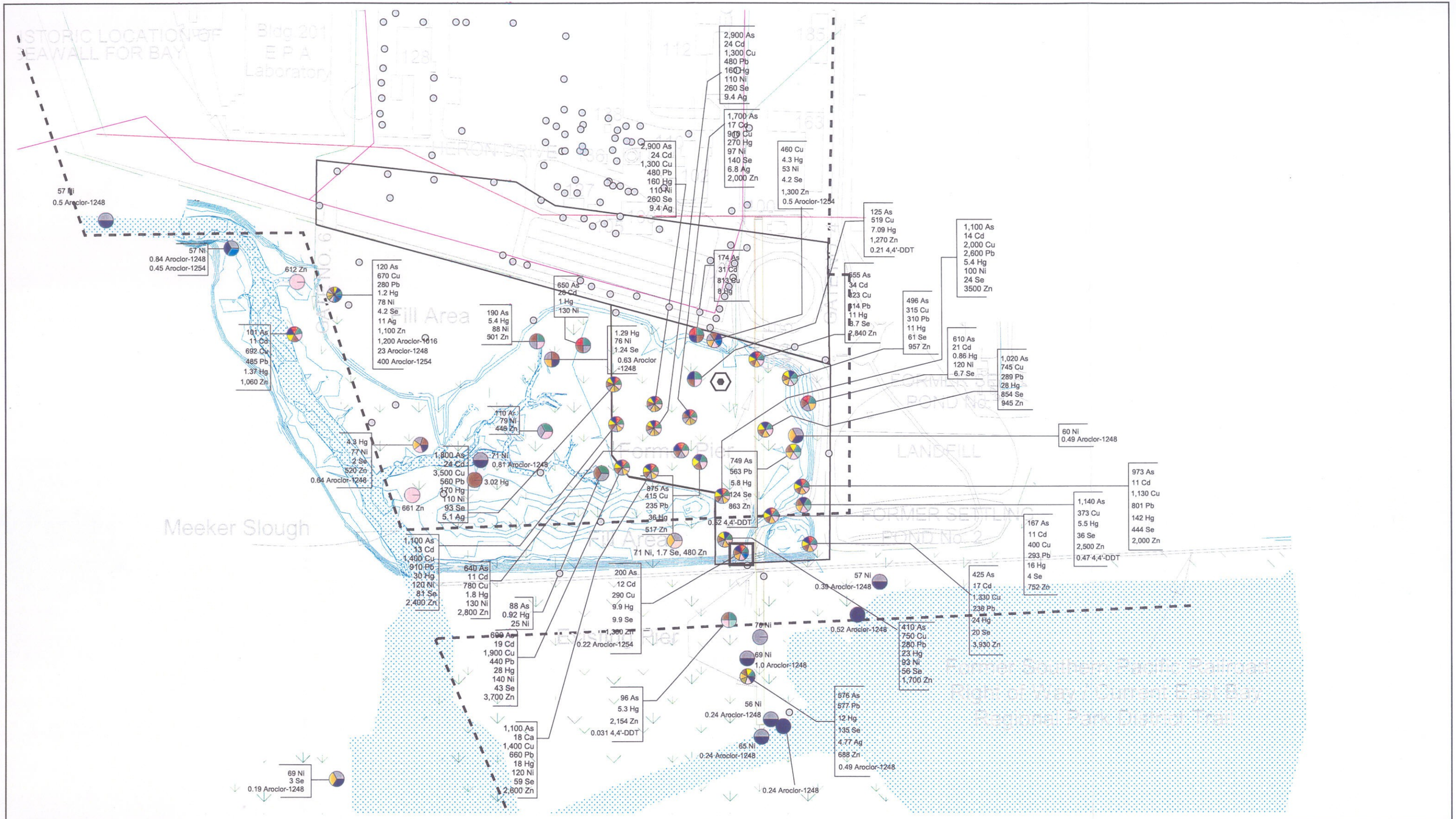
May 2002 | Scale 1"= 125' | Figure 9



LEGEND

ANALYTE	ERM (mg/kg)
Arsenic	70
Cadmium	9.6
Copper	270
Lead	218
Mercury	0.71 - See Note #3
Nickel	51.6
Selenium	1 (AET) - See Note #3
Silver	3.7
Zinc	410

Euhaustorius (Solid Phase) - 0% survival

Benthic Community Survey (No benthic organisms observed)

200 0 200 Feet

NOTES :

Project No.
51-09967067.00

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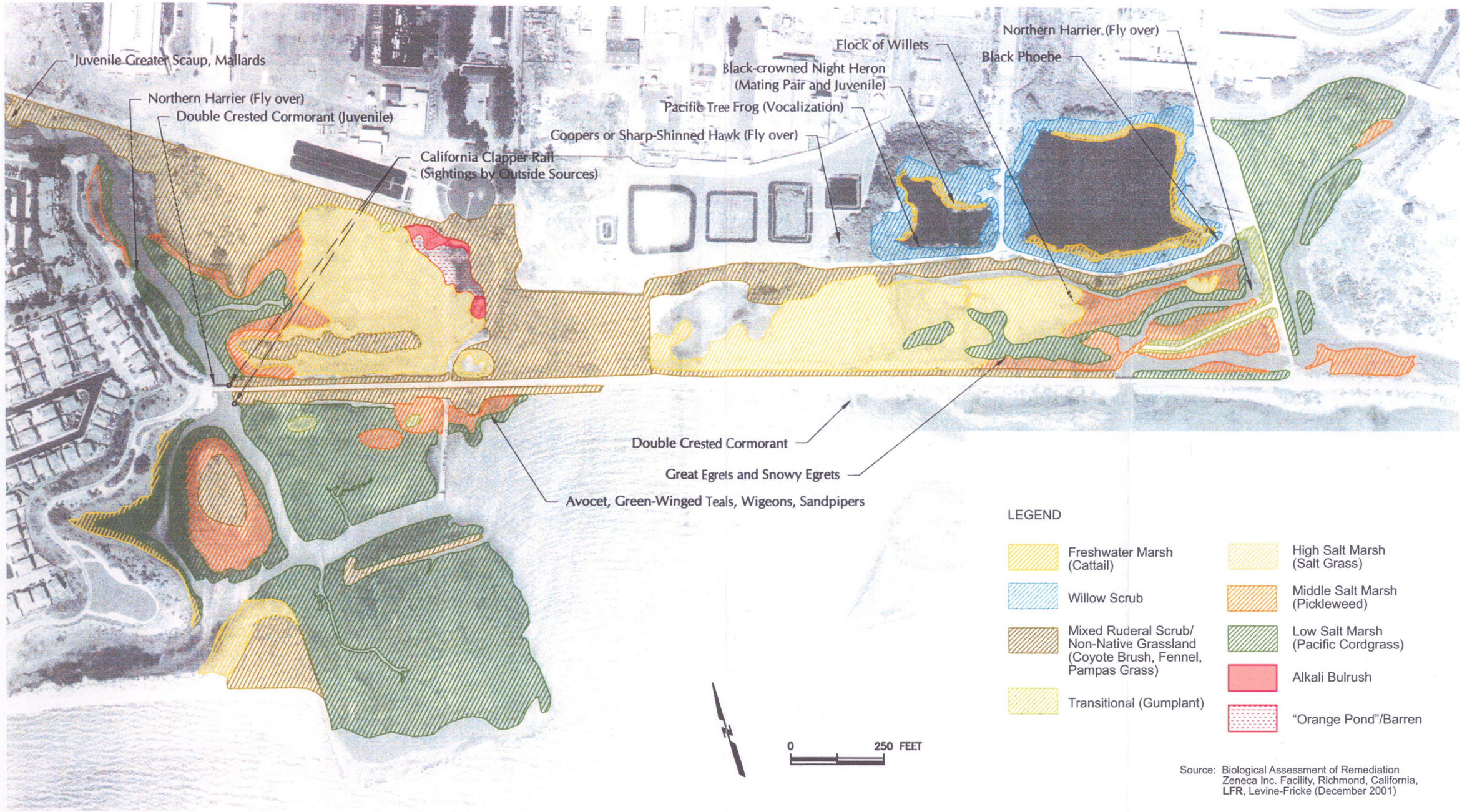
University of California, Berkeley
Richmond Field Station

URS

Tier 1 Evaluation of Effects to Benthic Community (ERM Exceedances)

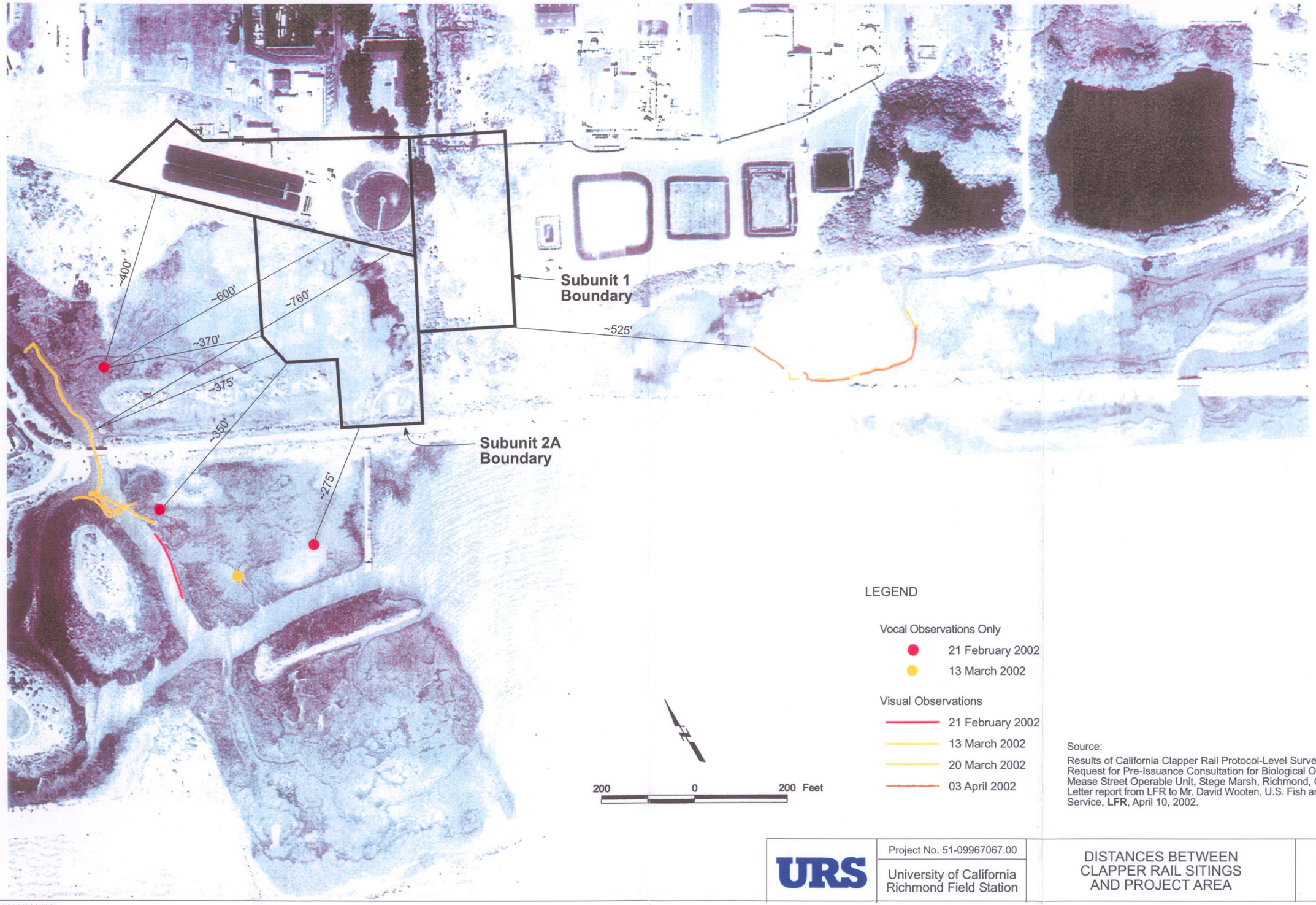
May 2002 | Scale 1"= 166' | Figure 10



Source: Biological Assessment of Remediation Zeneca Inc. Facility, Richmond, California, **LFR**, Levine-Fricke (December 2001)

URS	Project No. 51-09967067.00 University of California Richmond Field Station	EXISTING PLANT COMMUNITIES AND RECENT WILDLIFE SIGHTINGS	Figure 11

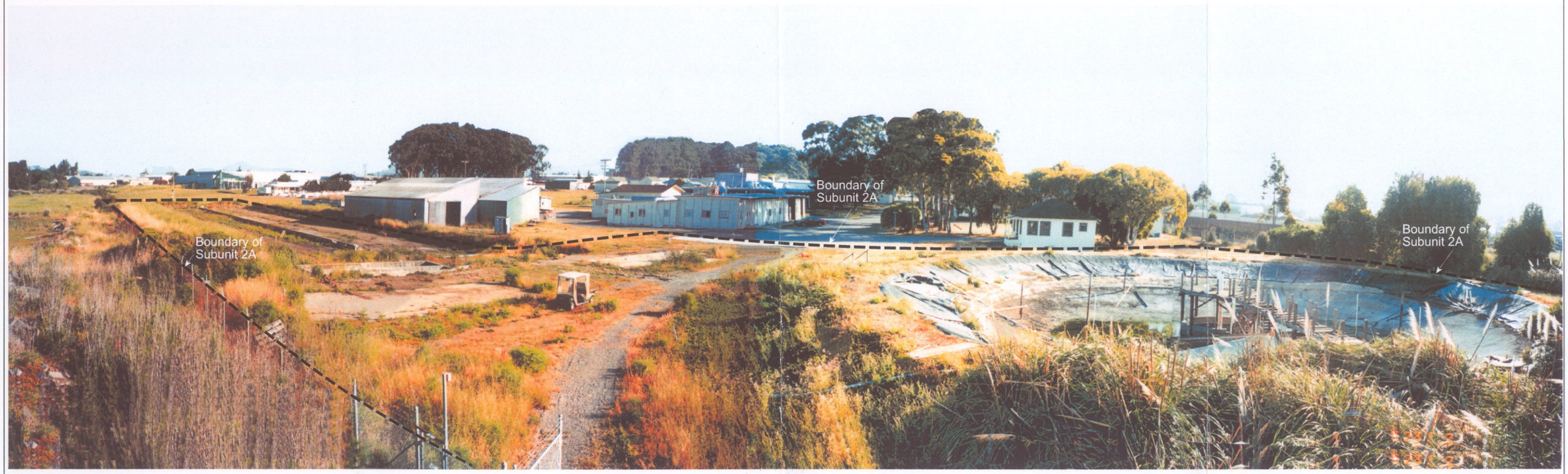
51-09967067.00-00009/060502/gos



Source:
Results of California Clapper Rail Protocol-Level Surveys and Request for Pre-Issuance Consultation for Biological Opinion, Mease Street Operable Unit, Stege Marsh, Richmond, California. Letter report from LFR to Mr. David Wooten, U.S. Fish and Wildlife Service, **LFR**, April 10, 2002.

URS	Project No. 51-09967067.00 University of California Richmond Field Station	DISTANCES BETWEEN CLAPPER RAIL SITINGS AND PROJECT AREA	Figure 12

51-09967067.00-00009/060502/gos



LEGEND

Approximate Boundary

URS	Project No. 51-09967067.00 University of California Richmond Field Station	APPROXIMATE BOUNDARY OF UPLAND PORTION OF SUBUNIT 2A	Figure 13

51-09967067.00-00009/060502/gos

LEGEND

Approximate Boundary

URS	Project No. 51-09967067.00 University of California Richmond Field Station	APPROXIMATE BOUNDARY OF THE MARSH PORTION OF SUBUNIT 2A	Figure 14

51-09967067.00-00009/060302/gos

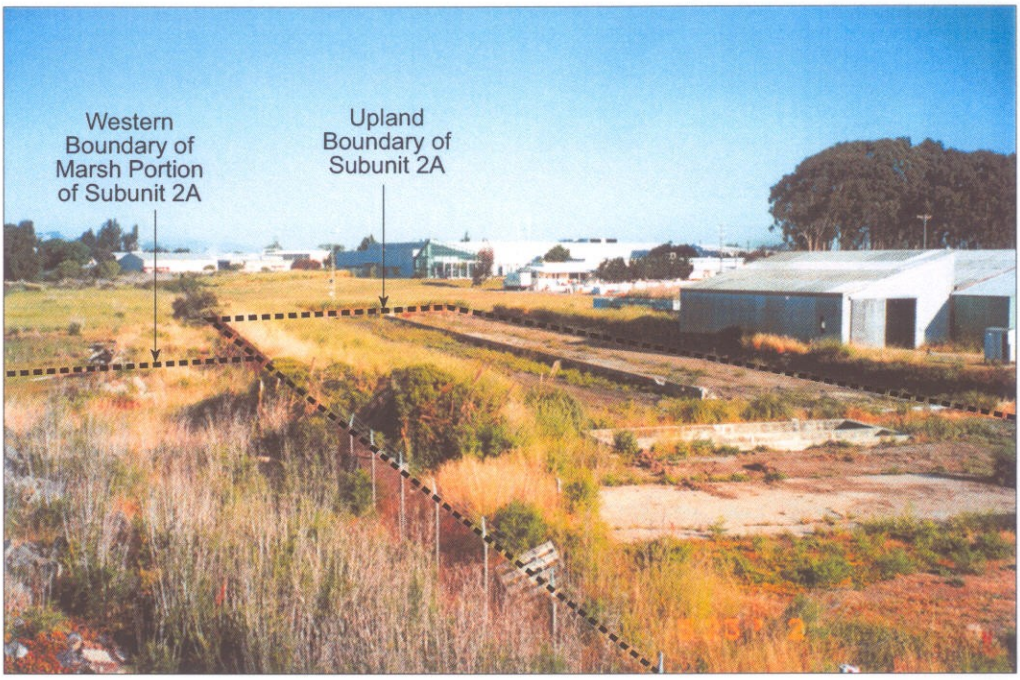


Photo 15A. Northern Boundary of Marsh Portion of Subunit 2A Looking West

Photo 15B. Northern Boundary of Marsh Portion of Subunit 2A Looking East

URS	Project No. 51-09967067.00 University of California Richmond Field Station	NORTHERN BOUNDARY	Figure 15

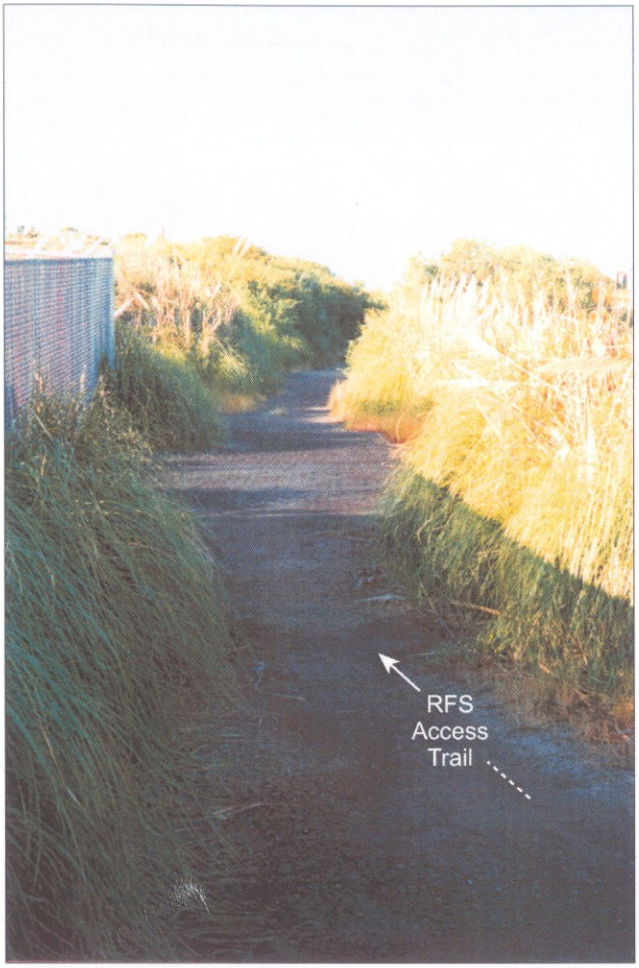


Photo 16A.
Eastern Boundary of Marsh Portion of Subunit 2A Looking South

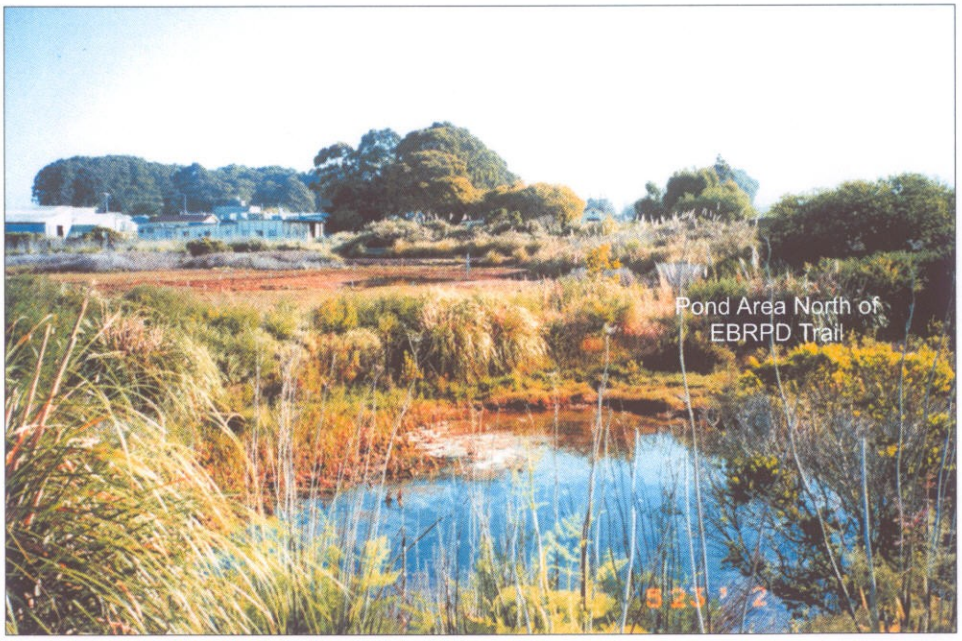


Photo 16B.
Eastern Boundary of Sub Unit 2A Looking North

URS	Project No. 51-09967067.00 University of California Richmond Field Station	EASTERN BOUNDARY	Figure 16

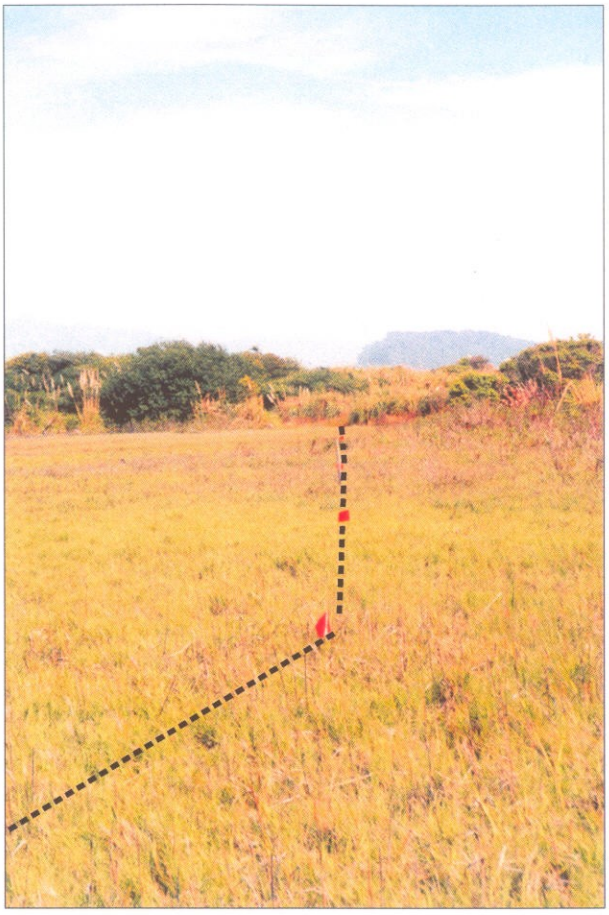
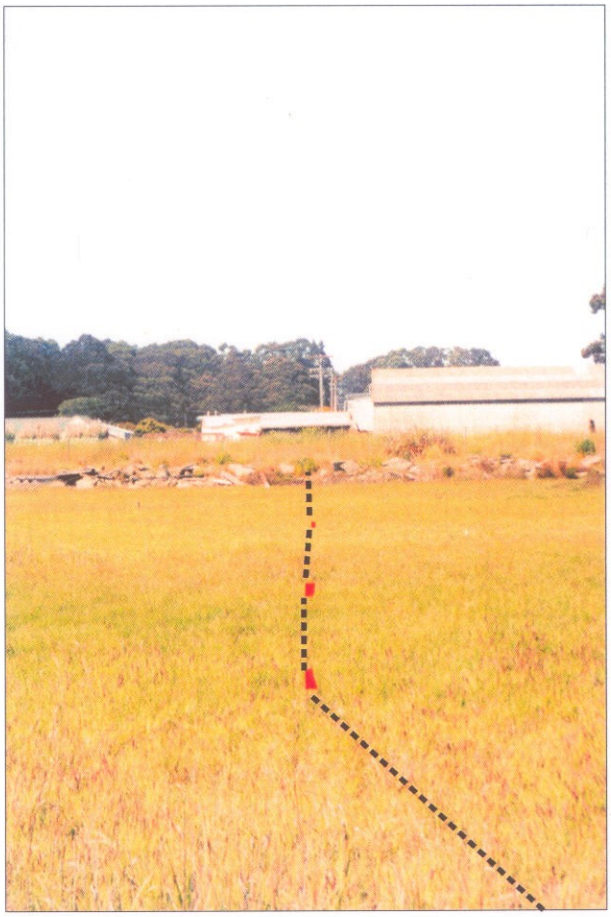


Photo 17A. Close-up of Southern Boundary Looking East

Photo 17B. Close-up of Western Boundary Looking North



LEGEND

---------- Approximate Southern and Western Boundary

URS	Project No. 51-09967067.00 University of California Richmond Field Station	CLOSEUP OF SOUTHERN AND WESTERN BOUNDARIES	Figure 17

51-09967067.00-00009/060302/gos

Photo 18A. Close-up of Vegetation within Marsh Portion of Subunit 2A

Photo 18B. Close-up of Vegetation within Marsh Portion of Subunit 2A

URS	Project No. 51-09967067.00 University of California Richmond Field Station	CLOSEUP OF VEGETATION	Figure 18

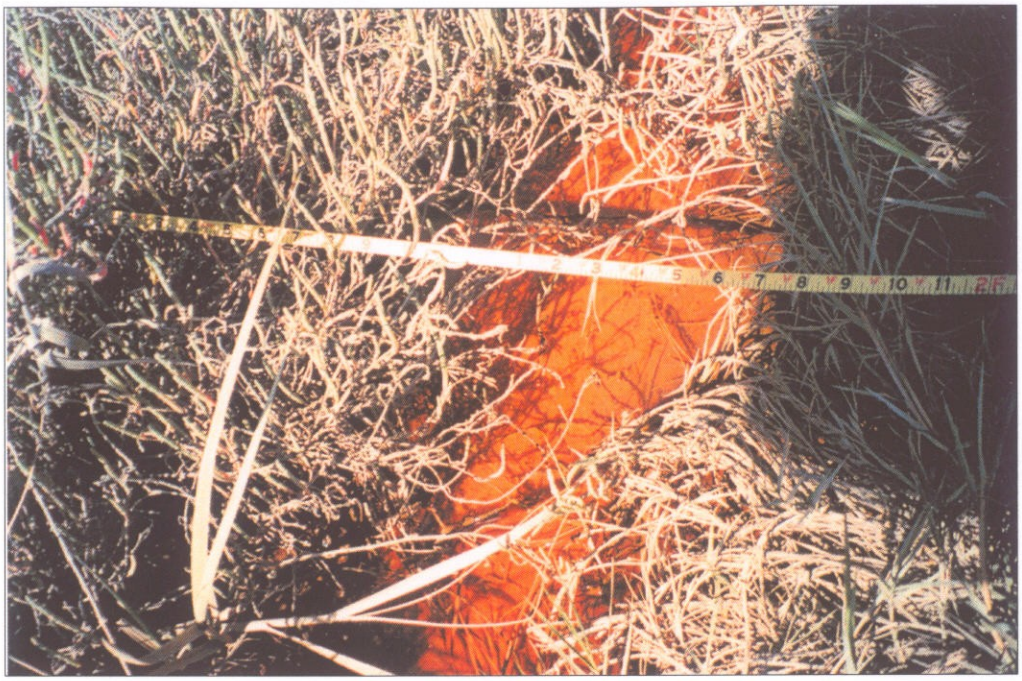


Photo 19A. Close-up of Tributary of Meeker Slough Located West of Subunit 2A

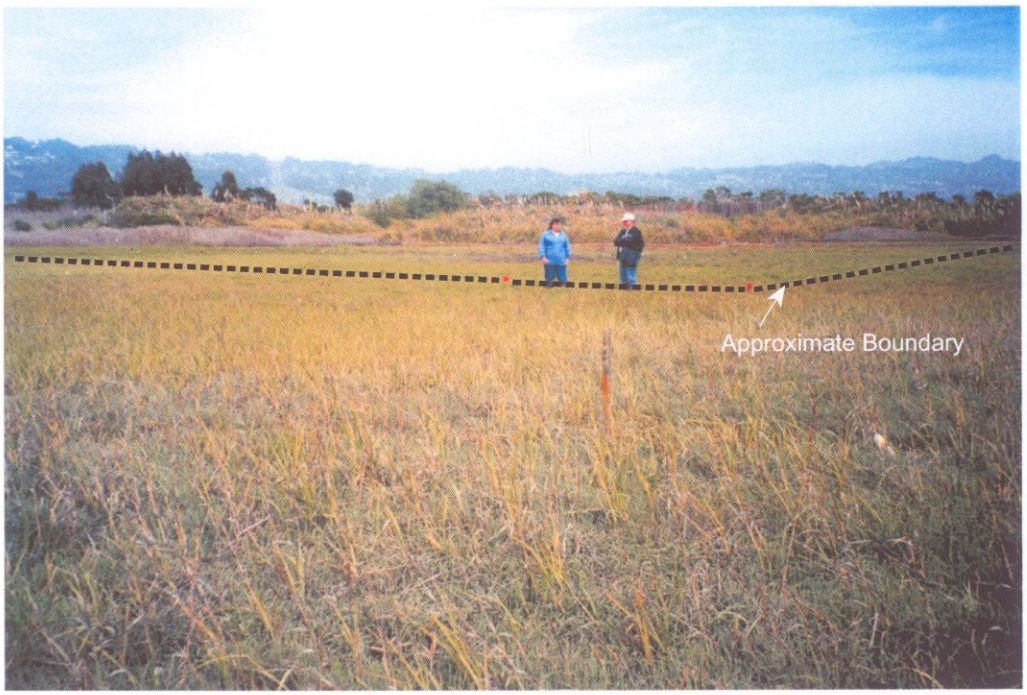


Photo 19B. Distance from Tributary to Southwestern Corner of Marsh Portion of Subunit 2A

URS	Project No. 51-09967067.00 University of California Richmond Field Station	CLOSEUP AND DISTANT VIEW OF MEEKER SLOUGH TRIBUTARY	Figure 19

Photo 20A. Proposed Screening along Western Boundary to Minimize Visual Impacts

Photo 20B. Proposed Screening along Northern Boundary to Minimize Visual Impacts

URS	Project No. 51-09967067.00 University of California Richmond Field Station	PROPOSED VISUAL SCREENING	Figure 20

51-09967067.00-00009/060302/gos

Photo 21. View from Outer Stege Marsh Looking No
the Project Area

ward

Figure
21

APPENDIX A

California Regional Water Quality Control Board
San Francisco Bay Region

Winston H. Hickox
Secretary for Environmental Protection

Internet Address: http://www.swrcb.ca.gov
1515 Clay Street, Suite 1400, Oakland, California 94612
Phone (510) 622-2300 ~ FAX (510) 622-2460

Gray Davis
Governor

Date: OCT 0 5 2001
File No. 2119.1185 and
2119.1220 (CSF)

Certified Mail Nos.
7000167000129116574**3**

Ms. Jane Anderson
Zeneca Ag Products
1200 South 47th St.
Richmond, CA 94804-0023

7000167000129116572**9**

Ms. Anna Moore
University of California
317 University Hall #1150
Berkeley, CA 94720-1150

Subject: Final Order for Site Cleanup Requirements for Meade Street Operable Unit, Richmond, Contra Costa County

Dear Ms. Anderson and Ms. Moore:

UC

Enclosed are Order Nos. 01-101 and 01-102, Site Cleanup Requirements for the Meade Street Operable Unit in Richmond. The Orders were adopted by the Regional Board in its September 19, 2001 hearing. If you have any questions regarding this matter, please contact me at (510) 622-2343, or by e-mail at csf@rb2.swrcb.ca.gov.

Sincerely,

Cecilio S. Felix
Associate Engineering Geologist

Enclosure: Order Nos. 01-101 and 01-102

cc: Mailing List

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
SAN FRANCISCO BAY REGION

ORDER NO. 01-102

SITE CLEANUP REQUIREMENTS FOR:

UNIVERSITY OF CALIFORNIA BERKELEY
ZENECA INC.

UNIVERSITY OF CALIFORNIA RICHMOND FIELD STATION
1301 SOUTH 46th STREET
RICHMOND, CONTRA COSTA COUNTY

MEADE STREET OPERABLE UNIT
SUBUNIT 2

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

SITE LOCATION AND OWNER

1. Site location: The University of California Richmond Field Station (UCRFS) site is located at 1301 South 46th Street in Richmond, south of Interstate 580, and along the San Francisco Bay shoreline in Richmond, California (refer to Figure 1). The site is bound by industrial areas to the north, east, and west. To the south of the site is the East Bay Regional Park District's Bay Trail. The site consists of approximately 100 acres and is used for academic research and activities by the University. The UCRFS site, the adjacent Zeneca, Inc. (Zeneca) site, and portions of the adjacent Stege Marsh comprise the area designated as the Meade Street Operable Unit (refer to Figure 2).

2. Site owner: Portions of the UCRFS site were formerly owned by the California Cap Company, which produced blasting caps on the eastern portion of the site. In 1950, the site was acquired by University of California Berkeley (UC Berkeley). The site is utilized by UC Berkeley for academic and research programs administered by the College of Engineering, the Forest Products Lab, and other departments. As current owner of the site, UC Berkeley is responsible for releases originating at the site and is hereinafter named as a discharger. Zeneca, which is the current owner of the adjoining property that was the source of pyrite cinders used as fill at the site, is also named as a discharger. UC Berkeley and Zeneca are collectively referred to hereinafter as the dischargers.

PURPOSE OF ORDER

3. Site Cleanup Requirements: This order prescribes Site Cleanup Requirements (SCRs) for Subunit 2 of the Meade Street Operable Unit, which consists of the UCRFS site including a portion of the adjacent Western Stege Marsh. The order includes general provisions and tasks necessary to contain and remediate soil and groundwater pollution at the site and is being issued pursuant to Section 13304 of the California Water Code.

4. Implementation of remedial measures: This order requires additional site investigation and implementation of remedial measures for Subunit 2 of MSOU, which consists of the upland portion of the UCRFS site and the adjacent Western Stege Marsh. The dischargers are required to submit conceptual remediation and risk management plans which propose site screening criteria, and risk assessments which evaluate exposure of human and ecological receptors to impacted soil and groundwater at the site and propose remedial actions and risk management practices to eliminate or significantly reduce the potential for exposure of human or ecological receptors to impacted soil and groundwater at the site.

5. Coordinated cleanup: This order, in conjunction with Site Cleanup Requirements for the adjacent Zeneca site, located immediately to the east, comprise a coordinated plan which addresses impacts to upland areas and wetland areas of both the UCRFS site and the Zeneca site.

SITE DESCRIPTION

6. Upland area: The site comprises approximately 100 acres and is relatively flat. The site consists of two main areas: the upland area on the northern portion of the site, and Western Stege Marsh at the southern portion of the site. The uplands area consists of buildings and various ornamental trees, shrubs, and lawn areas. Most of the current and historic site development is located on the eastern portion of the upland area. A sea wall and fill areas are also located in the southern portion of the upland area.

7. Western Stege Marsh: The adjacent Western Stege Marsh consists of approximately 10 acres. The inner portion of Western Stege Marsh (inner marsh) is bounded to the south by the East Bay Regional Park District's paved Bay Trail. Meeker Slough flows through the western portion of the inner marsh. The inner marsh is vegetated primarily with saltgrass, pickleweed, cordgrass, and reed.

SITE HISTORY

8. Explosives manufacturing: In approximately 1870, various companies began producing chemicals and explosives on the property. The California Cap Company acquired the site

in 1877 and established several facilities for the manufacture of explosives. California Cap Company's operations on-site included production of mercury fulminate, blasting caps, and shells. California Cap Company also had facilities for testing and storing explosives. Production of explosives ceased in 1948 prior to UC Berkeley's purchase of the property in 1950. California Cap Company removed all production facilities and attempted to remove hazardous materials at the site.

9. UC Berkeley use: During the 1950's, UC Berkeley erected a number of new buildings in the upland area to accommodate research programs, including administration buildings and the Forest Products Laboratory where wood preservatives were tested. Current facilities at the UCRFS site include the Forest Products Laboratory, research facilities for seismic engineering, fire testing, hydraulic modeling, soil mechanics, sanitary engineering, environmental health, and library storage facilities.

10. Pyrite cinders: Stauffer Chemical Company generated pyrite cinders as a byproduct of their sulfuric acid manufacturing operations from approximately 1919 through 1962. Sometime during this period, pyrite cinders were deposited on the southeast portion of the UCRFS site and the adjacent portion of Western Stege Marsh. Cinders were also placed directly into Stege Marsh in the vicinity of a seawall, breakwater, and a pier. Pyrite ore contains primarily pyrite (FeS_2), and lesser amounts of chalcopyrite ($CuFeS_2$), sphalerite (ZnS), and magnetite (Fe_3O_4). Various other metals such as arsenic and lead, and inorganics are also commonly associated with pyrite ore utilized by Stauffer. UC Berkeley constructed roads, utilities, and research ponds on, or using the pyrite cinders that were deposited in this area.

REGULATORY STATUS

11. No previous SCRs were adopted for the site.

OPERABLE UNITS AND DISCHARGERS NAMED

12. Operable Unit/subunit structure: The area containing the UCRFS site and the adjacent Zeneca sites and their groundwater pollution plumes is referred to as the Meade Street Operable Unit (MSOU). The MSOU has been subdivided into two subunits: Subunit 1 consists of the area of the Zeneca site and the adjacent portion of Eastern Stege Marsh; Subunit 2 consists of the UCRFS site and the adjacent portion of Western Stege Marsh. The subunit boundaries are shown in Figure 2. Subunit 2 is further subdivided into Subunits 2A and 2B. Subunit 2A consists of the cinder fill area located in the southeastern portion of the upland area of the site and the eastern portion of the Western Stege Marsh. Subunit 2B consists of the remainder of the upland portion of the UCRFS site and the western portion of Western Stege Marsh.

13. Dischargers named: Zeneca and University of California Berkeley, as the sources of pollution in Subunit 2A of MSOU, are both named dischargers responsible for addressing pollution within Subunit 2A. University of California Berkeley, as the source of pollution within the area of Subunit 2B of MSOU, is the discharger named responsible for addressing pollution within Subunit 2B. Zeneca and University of California Berkeley are wholly responsible for addressing pollution in the subunit(s) to which they are named and complying with the requirements of this Orders.

14. Future modification of order: As additional information is generated in the MSOU and its subunits, the Board may modify the dischargers named in this order.

SITE GEOLOGIC AND HYDROGEOLOGIC SETTING

14. General geology: The Subunit 2 site geology consists primarily of alluvial sediments that were deposited at the site from the Berkeley Hills, located east and northeast of the facility. The hydrogeologic evaluations indicate that the sediments in the upper 80 to 100 feet beneath the facility can be subdivided into four units: fill, Bay Sediments, Quaternary Alluvium, and Yerba Buena mud. Fill material consists of clean soil, concrete, and cinders, a byproduct of sulfuric acid production at the adjacent Zeneca site, and ranges from zero to approximately 15 feet thick. Fill is generally thicker in the southern part of the facility adjacent to the San Francisco Bay. Bay sediments are in the southern portion of the site, south of the San Francisco Bay shoreline. Bay sediments are primarily composed by fine-grained silty sand with smaller amounts of mud and peat, and range from approximately 5 feet to 9 feet thick. Beneath the Bay Sediments lie Quaternary Alluvium, which consists of interbedded gravel, sand, silt, and clay units. The Quaternary Alluvium ranges from approximately 3 to 11 feet thick. Within the Quaternary Alluvium are upper and lower water bearing units; an aquitard has not been consistently observed between the units. The lowermost layer observed is the Yerba Buena Mud. The Yerba Buena Mud is laterally extensive and is approximately 40-50 feet thick. The top of the Yerba Buena Mud is present at depths of approximately 25-30 feet below ground surface in the northern portion of the site, and at approximately 35-45 below groundwater surface in the southern portion of the site.

15. Hydrogeology: Two hydrogeologic units have been identified at the site: the water-bearing sand and gravel in the Upper Horizon, and the water bearing sand and gravel in the Lower Horizon. The Upper Horizon is typically found ranging from approximately 10 to 20 feet below ground surface, and the sand and gravel units in the Upper Horizon appears to be mostly continuous laterally across the site. The Lower Horizon is encountered above the Yerba Buena Mud at depths ranging from approximately 25 to 40 feet below ground surface. The sand and gravel units in the Lower Horizon vary in thickness from less than 2 feet thick to 8 feet thick. Groundwater within the Upper

Horizon and the Lower Horizon generally flows southwesterly toward the Bay, and has a relatively low gradient. The groundwater deeper than approximately 25 feet below ground surface is considered a potential drinking water source. The primary sources of recharge to the shallow groundwater units are through direct infiltration of on-site precipitation in upgradient areas, and tidal seepage from the Bay.

SOIL AND GROUNDWATER CONTAMINATION

16. Releases in UCRFS site: Extensive sampling was conducted on-site in order to evaluate soil and groundwater impacts associated with operations on-site. The sampling and site history data indicate that significant soil and groundwater contamination at the site was caused by releases at sources on the southern portion of the uplands areas, including the California Cap facilities associated with the production of mercury fulminate used to make blasting caps for detonating explosives. The data also indicate that the soil and groundwater on the southeast portion of the site has been significantly impacted by pyrite cinders. Pyrite cinders have also been found in small isolated pockets in other areas of the upland portion of the site. However, these isolated pockets of pyrite ciders have not significantly impacted soil and groundwater. The chemicals detected in soil and groundwater reflect historic site and chemical use and storage practices and may reflect off-site releases.

17. Soil in uplands area: Investigations show that some of the pyrite cinders primarily in the southeastern portion of the site have oxidized, resulting in pH levels as low as 3.4 in soil. Investigations also indicate elevated concentrations of metals in soil, including arsenic (160 ppm maximum, 44 ppm mean), lead (850 ppm maximum, 60 ppm mean), copper (4,600 ppm maximum, 508 ppm mean), and mercury (5,300 ppm maximum, 49 ppm mean). Pesticides detected in soil include DDT (380 ppb maximum, 53 ppb mean), and DDD (1,600 ppb maximum, 50 ppb mean). PCBs were also detected in sediment within the western storm drain at concentrations up to 42 ppm.

18. Groundwater in uplands area: Sampling indicates that groundwater has been significantly impacted by operations at the site. Elevated metals and inorganics concentrations in groundwater include: arsenic (17 ppb maximum, 4 ppb mean), copper (4,100 ppb maximum, 148 ppb mean), mercury (5.9 ppb maximum, 0.5 ppb mean), nickel (470 ppb maximum, 56 ppb mean), selenium (10 ppb maximum, 4 ppb mean), and zinc (12,000 ppb maximum, 1033 ppb mean). Pesticides detected along the eastern property boundary in groundwater include DDT (1.5 ppb maximum, <0.1 ppb mean) and endrin (1.8 ppb maximum, <0.1 ppb mean). PCBs were also detected in groundwater (1.3 ppb maximum, 0.52 ppb mean).

19. Western Stege Marsh impacts: Western Stege Marsh has been impacted by releases on Subunit 2 and the placement of pyrite cinders in the uplands area and into the marsh areas. The benthic community of the marsh has been significantly impaired by the low pH conditions, metals, PCBs, and pesticides detected in sediment samples. The pH of the marsh water has been measured as low as 2.2. Metals in sediment include: arsenic (1,200 ppm maximum, 226 mean), copper (22,000 ppm maximum, 815 ppm mean), lead (800 ppm maximum, 147 ppm mean), mercury (430 ppm maximum, 16 ppm mean), nickel (140 ppm maximum, 52 ppm mean), and zinc (8,800 ppm maximum, 903 ppb mean). Pesticides detected in marsh sediment include: DDD (1,600 ppb maximum, 25 ppb mean), DDT (380 ppb maximum, 39 ppb mean), and DDE (620 ppb maximim, 6 ppb mean). PCBs were also detected in the marsh at levels of up to 1,600 ppm. Water samples obtained from Western Stege Marsh include elevated concentrations of metals and inorganics and pesticides, including: arsenic (260 ppb maximum, 46 ppb mean), copper (30,000 ppb maximum, 3,030 ppb mean), mercury (5.9 ppb maximum, 0.19 ppb mean), nickel (1,200 ppb maximum, 153 ppb mean), zinc (55,000 ppbmaximum, 7,217 ppb mean), and DDT (1.5 ppb maximum, <0.1 ppb mean). PCBs were also detected in water at levels up to 0.8 ppb.

20. Impacts at the adjacent Zeneca site from use of pyrite cinders as fill: The adjacent Zeneca site has also been significantly impacted by the use of pyrite cinders as fill. The thickness of the cinder fill at the Zeneca site is up to 15 feet thick. As observed at the UCRFS site, oxidation of sulfur associated with cinders has resulted in low pH conditions and elevated metals in soil and groundwater at the Zeneca site and in the adjacent Eastern Stege Marsh.

21. Impacts at Zeneca site from other on-site Zeneca sources: The Zeneca site has also been impacted by releases associated with other historic on-site operations. Other operations at the Zeneca include the research and production of pesticides and fertilizers. Releases associated with Zeneca on-site operations have impacted soil and groundwater at the Zeneca site with metals, VOCs, SVOCs, and pesticides.

22. Basis for Cleanup Standards

a. State Board Resolution 68-16: State Board Resolution No. 68-16, "Statement of Policy with Respect to Maintaining High Quality of Waters in California," applies to this discharge and requires attainment of background levels of water quality, or the highest levels of water quality which is reasonable if background levels of water quality cannot be restored. Cleanup levels other than background must be consistent with the maximum benefit to the people of the State, not unreasonably affect present and anticipated beneficial uses of such water, and not result in exceedance of applicable water quality objectives. The previously-cited cleanup plan indicates that restoration of water quality to background levels is not

necessary to protect beneficial use of groundwater at the site and potential site receptors. This order and its requirements are consistent with Resolution No. 68-16.

b. State Board Resolution 92-49: State Board Resolution No. 92-49, "Policies and procedures for Investigation and Cleanup and Abatement of Discharges Under Water Code Section 13304," applies to this discharge. This order and its requirements are consistent with the provisions of Resolution No. 92-49 as amended.

c. Board Resolution 89-39: Board Resolution No. 89-39, "Sources of Drinking Water," defines potential sources of drinking water to include all groundwater in the region, with limited exceptions for areas of high TDS, low yield, or naturally-high contaminant levels. Based on site investigations, groundwater within the upper aquifer zone is brackish and is therefore not considered a potential source of drinking water. However, the deeper aquifers beneath the site are not brackish and are therefore considered a potential source of drinking water.

d. Beneficial uses as specified by the Basin Plan: The Board adopted a revised Water Quality Control Plan for the San Francisco Bay Basin Plan (Basin Plan) on June 21, 1995. This updated and consolidated plan represents the Board's master water quality control planning document. The revised Basin Plan was approved by the State Water Resources Control Board and the Office of Administrative Law on July 20, 1995, and November 13, 1995, respectively. A summary of regulatory provisions is contained in Title 23, California Code of Regulations, Section 3912. The Basin Plan defines beneficial uses and water quality objectives for waters of the State, including surface waters and groundwaters.

The beneficial uses of San Francisco Bay include:

a. wildlife habitat;
b. navigation;
c. water contact recreation;
d. non-contact water recreation;
e. commercial and sport fishing;
f. preservation of rare and endangered species;
g. estuarine habitat;
h. fish migration;
i. fish habitat;
j. industrial service supply; and
k. shellfish harvesting.

The existing and potential beneficial uses for Stege Marsh include:

a. estuarine habitat
b. preservation of rare and endangered species
c. water contact recreation
d. non-contact water recreation
e. fish spawning
f. wildlife habitat

The existing and potential beneficial uses for groundwater in the vicinity of Subunit 2 include:

a. municipal and domestic water supply
b. industrial process water supply
c. industrial service water supply
d. agricultural water supply
e. freshwater replenishment to surface water

e. Future Changes to Cleanup Standards: The goal of this remedial action is to restore the beneficial uses of groundwater underlying and adjacent to the site. Results of cleanup at other sites suggest that full restoration of beneficial uses to groundwater as a result of active remediation at this site may not be possible. If full restoration of beneficial uses is not technologically nor economically achievable within a reasonable period of time, then the discharger may request modification of the cleanup standards or establishment of a containment zone, a limited groundwater pollution zone where water quality objectives are exceeded. Conversely, if new technical information indicates that cleanup standards can be surpassed, the Board may decide that further cleanup action should be taken. Cleanup standards will also be reassessed if residential land use is proposed for the Upland Area in the future and as warranted by additional site data.

MONITORING PROGRAMS

23. Groundwater Monitoring – Only one groundwater monitoring well is located on the site (MW-1). Submittal of workplans for the installation and monitoring of additional wells is a requirement of Tasks 2.b and 4.c of this order. Additional wells at the site are necessary to more completely characterize groundwater conditions and to monitor the effectiveness of remedial measures.

24. Surface Water Monitoring – Surface water monitoring is necessary to evaluate the conditions within Stege Marsh and the effectiveness of remedial measures. Submittal of surface water monitoring plans is required in Tasks 3.b and 5.a of this order.

25. CEQA exemption: This order for Site Cleanup Requirements is exempt from the provisions of the California Environmental Quality Act (CEQA) pursuant to Section 15321, Title 14 of the California Code of Regulations.

26. Other plans and permits: The dischargers are required to implement a soil management plan and to comply with NPDES Industrial and Construction Activity Storm Water permits, and a stormwater pollution prevention plan.

27. Public notice: The Board has notified the dischargers and interested agencies and persons of its intent to adopt revised, updated Site Cleanup Requirements for the dischargers and has provided them with an opportunity for a public hearing and an opportunity to submit their written views and recommendations.

28. Board hearing: The Board, in a public meeting heard and considered all comments pertaining to the discharge.

IT IS HEREBY ORDERED pursuant to Section 13304 of the California Water Code, that the dischargers, their agents, successors and assigns shall cleanup and abate the effects described in the above findings as follows:

A. PROHIBITIONS

1. The discharge of wastes or hazardous substances in a manner which will significantly degrade water quality or adversely affect the beneficial uses of the waters of the State is prohibited.

2. Further significant migration of wastes or hazardous substances through subsurface transport to waters of the State, and migration of wastes or hazardous substances at levels which may affect human or ecological receptors, is prohibited.

3. Activities associated with subsurface investigation, cleanup in a manner causing significant adverse migration of wastes or hazardous substances is prohibited.

B. TASKS

As described in Finding 13 of this Order, both Zeneca and UC Berkeley are dischargers responsible for addressing pollution within Subunit 2A, and UC Berkeley is the discharger responsible for addressing pollution within Subunit 2B. Thus, Zeneca and UC Berkeley are the dischargers responsible for completing Tasks B.1, B.2, B.3, B.6, B.7, B.8, and B.9. UC Berkeley is the discharger responsible for completing Tasks B.4 and B.5.

1. **HUMAN HEALTH RISK ASSESSMENT FOR SUBUNIT 2, INCLUDING AREAS 2A AND 2B**

COMPLIANCE DATE: October 31, 2001

The dischargers shall submit a technical report, acceptable to the Executive Officer, which documents the results of the risk assessment for both the upland portion as well as the entire portion of Western Stege Marsh (both Subunits 2A and 2B). The risk assessment must present Tier 2 site-specific target levels for human health and ecological receptors that have been identified at the site. Both direct toxicity and bioaccumalutive impacts must be evaluated and considered in the development of the ecological SSTLs. Based on the results of the risk assessment, areas of concern must be identified and presented in the report.

UPLAND AREA OF SUBUNIT 2A

2.a. **RESULTS OF ADDITIONAL SOIL AND GROUNDWATER INVESTIGATION**

COMPLIANCE DATE: October 31, 2001

The dischargers shall submit a technical report, acceptable to the Executive Officer, which provides the results of soil and groundwater investigations performed since the Field Sampling and Analysis results submitted in December 2000. If necessary, the report shall propose additional soil and/or groundwater sampling in order completely define the extent of pollution in Subunit 2A.

2b. **GROUNDWATER SAMPLING AND ANALYSES MONITORING PLAN**

COMPLIANCE DATE: October 31, 2001

The dischargers shall submit a technical report, acceptable to the Executive Officer, which proposes installation of groundwater wells necessary to monitor the extent of groundwater contamination and evaluate the effectiveness of site cleanup in MSOU Subunit 2A. The workplan shall specify at a minimum, well location, well construction, sampling methods, and quality assurance controls. The discharger shall propose sampling frequency, methodology, and parameters, and laboratory analytical methods.

2.c. **CONCEPTUAL REMEDIAL ACTION PLAN**

COMPLIANCE DATE: December 15, 2001

The dischargers shall submit a technical report, acceptable to the Executive Officer, which provides a conceptual remedial action plan for addressing soil and groundwater pollution within the upland portion of Subunit 2A. The conceptual remedial measures shall be protective of water quality and human and ecological receptors. A site conceptual model shall be provided in the technical report. The report shall also consider all existing sampling data for the marshland and propose additional sampling if necessary.

2.d. **REMEDIAL DESIGN DETAILS FOR SOIL AND GROUNDWATER NEUTRALIZATION AND METALS TREATMENT**

COMPLIANCE DATE: January 31, 2002

The dischargers shall submit a technical report, acceptable to the Executive Officer, which provides the remedial design for addressing metal and metalloid pollution and acidic conditions in soil and groundwater in the upland portion of MSOU Subunit 2A. The report shall take into consideration cleanup methodologies considered in the upland portion of MSOU Subunit 1, and provide for coordinated cleanup within MSOU. The report shall include detailed design criteria, construction details, and procedures and a schedule for implementation of the remedial measures, and a Residual Risk Management Plan to address any residual risks post remediation.

2.e. **IMPLEMENTATION OF SOIL AND GROUNDWATER REMEDIAL MEASURES**

COMPLIANCE DATE: OCTOBER 31, 2003

The dischargers shall submit a technical report, acceptable to the Executive Officer, which documents implementation of the remedial measures for addressing soil and groundwater pollution associated with cinder fill in the upland portion of MSOU Subunit 2A, as described in the technical report described in Task 2.d. The report shall describe any variances between the remedial design specified in the technical report described in Task 2.d and the remedial measures actually implemented.

2.f. **WORKPLAN FOR EVALUATING REMEDIAL ACTION EFFECTIVENESS**

COMPLIANCE DATE: January 31, 2004

The dischargers shall submit a workplan, acceptable to the Executive Officer, which proposes methods to evaluate the effectiveness of remedial actions implemented within the upland area of MSOU Subunit 2A. The report shall

evaluate the current field conditions and the groundwater and surface water monitoring program, and recommend new groundwater monitoring wells, surface water sampling locations, or other confirmation sampling locations. The report shall provide for collection and analyses of data sufficient to evaluate remedial action effectiveness 1 year and 3 years after implementation.

2.g. **1-YEAR EVALUATION OF REMEDIAL ACTION EFFECTIVENESS**

COMPLIANCE DATE: January 31, 2005

The dischargers shall submit a technical report, acceptable to the Executive Officer, which documents implementation of the technical workplan specified in Task 2.f, as necessary to address soil and groundwater pollution within the upland portion of MSOU Subunit 2A. The report shall provide the results of the remedial action evaluation, and if necessary, propose modifications to improve the existing remedial measures or evaluation and implementation of alternative remedial measures.

2.h. **3-YEAR EVALUATION OF REMEDIAL ACTION EFFECTIVENESS**

COMPLIANCE DATE: January 31, 2007 and every 3 years thereafter

The dischargers shall submit a technical report, acceptable to the Executive Officer, which documents implementation of the technical workplan specified in Task 2.f, as necessary to address soil and groundwater pollution within the upland area of MSOU Subunit 12A. The report shall provide the results of the remedial action evaluation, and if necessary, propose modifications to improve the existing remedial measures or evaluation and implementation of alternative remedial measures.

WESTERN STEGE MARSH AREA OF SUBUNIT 2A

3.a. **RESULTS OF ADDITIONAL SOIL AND GROUNDWATER INVESTIGATION**

COMPLIANCE DATE: October 31, 2001

The dischargers shall submit a technical report, acceptable to the Executive Officer, which provides the results of soil and groundwater investigations performed since the Field Sampling and Analysis results submitted in December 2000. If necessary, the report shall propose additional soil and/or groundwater sampling in order completely define the extent of pollution in the area of Western Stege Marsh in MSOU 2A.

3.b. **SAMPLING AND ANALYSES MONITORING PLAN**

COMPLIANCE DATE: October 31, 2001

The dischargers shall submit a technical report, acceptable to the Executive Officer, which proposes any additional surface water and sediment sampling necessary to monitor the extent of contamination within the Stege Marsh area of Subunit 2A. The workplan shall specify at a minimum, sample location, sampling methods, and quality assurance controls. The workplan shall specify at a minimum, sample locations, sampling methods, and quality assurance controls. The discharger shall propose sampling frequency, methodology, and parameters, and laboratory analytical methods.

3.c. **CONCEPTUAL REMEDIAL ACTION PLAN**

COMPLIANCE DATE: July 31, 2002

The dischargers shall submit a technical report, acceptable to the Executive Officer, which provides a conceptual remedial action plan for addressing soil and groundwater pollution within the upland portion of Subunit 2A. The conceptual remedial measures shall be protective of water quality and human and ecological receptors. A site conceptual model shall be provided in the technical report. The report shall also consider all existing sampling data for the marshland and propose additional sampling if necessary.

3.d. **REMEDIAL DESIGN DETAILS FOR SOIL AND GROUNDWATER NEUTRALIZATION AND METALS TREATMENT**

COMPLIANCE DATE: March 31, 2003

The dischargers shall submit a technical report, acceptable to the Executive Officer, which provides the remedial design for addressing metal and metalloid pollutants and acidic conditions in soil and groundwater in the Stege Marsh area of MSOU Subunit 2A. The report shall take into consideration cleanup methodologies considered in the Stege Marsh portion of MSOU Subunit 1, and provide for coordinated cleanup within MSOU. The report shall include detailed design criteria, construction details, and procedures and a schedule for implementation of the remedial measures, and a Residual Risk Management Plan to address any residual risks post remediation.

3.e. **IMPLEMENTATION OF REMEDIAL MEASURES**

COMPLIANCE DATE: OCTOBER 31, 2003

The dischargers shall submit a technical report, acceptable to the Executive Officer, which documents implementation of the remedial measures for addressing pollution within the Stege Marsh area of MSOU Subunit 2A, as described in the technical report described in Task 3.d. The report shall describe any variances between the remedial design specified in the technical report described in Task 3.d and the remedial measures actually implemented.

3.f. **WORKPLAN FOR EVALUATING REMEDIAL ACTION EFFECTIVENESS**

COMPLIANCE DATE: April 30, 2004

The dischargers shall submit a workplan, acceptable to the Executive Officer, which proposes methods to evaluate the effectiveness of remedial actions implemented within the Stege Marsh area of MSOU Subunit 2A. The report shall evaluate the current field conditions in the mashland and recommend new surface and sediment sampling locations, or other confirmation sampling locations. The report shall provide for collection and analyses of data sufficient to evaluate remedial action effectiveness 1 year and 3 years after implementation.

3.g. **1-YEAR EVALUATION OF REMEDIAL ACTION EFFECTIVENESS**

COMPLIANCE DATE: April 30, 2005

The dischargers shall submit a technical report, acceptable to the Executive Officer, which documents implementation of the technical workplan specified in Task 3.f, as necessary to address pollution within the Stege Marsh area of MSOU Subunit 2A. The report shall provide the results of the remedial action evaluation, and if necessary, propose modifications to improve the existing remedial measures or evaluation and implementation of alternative remedial measures.

3.h. **3-YEAR EVALUATION OF REMEDIAL ACTION EFFECTIVENESS**

COMPLIANCE DATE: April 30, 2007 and every 3 years thereafter

The dischargers shall submit a technical report, acceptable to the Executive Officer, which documents implementation of the technical workplan specified in Task 3.f, as necessary to address pollution within the Stege Marsh area of MSOU Subunit 2A. The report shall provide the results of the remedial action evaluation, and if necessary, propose modifications to improve the existing remedial measures or evaluation and implementation of alternative remedial measures.

UPLAND AREA OF SUBUNIT 2B

4.a. **WORKPLAN FOR ADDITIONAL SOIL AND GROUNDWATER INVESTIGATION AND GROUNDWATER SAMPLING AND ANALYSES PLAN**

COMPLIANCE DATE: December 15, 2001

The discharger shall submit a technical report, acceptable to the Executive Officer, which proposes additional soil and groundwater sampling necessary to completely define the extent of pollution in the upland portion of Subunit 2B associated with on-site activities. The report should also propose installation of groundwater wells necessary to monitor the extent of groundwater contamination and evaluate the effectiveness of site cleanup in the upland portion of Subunit 2B. The workplan shall specify at a minimum, well location, well construction, sampling methods, and quality assurance controls.

4.b. **RESULTS OF ADDITIONAL SOIL AND GROUNDWATER INVESTIGATION**

COMPLIANCE DATE: July 31, 2002

The discharger shall submit a technical report, acceptable to the Executive Officer, which provides the results of investigations implemented as described in the technical report required in Task 4.a. If necessary, the report shall propose additional soil and/or groundwater sampling in order to completely define the extent of pollution in the upland portion of Subunit 2B.

4.c. **REMEDIAL ACTION PLAN**

COMPLIANCE DATE: January 31, 2003

The discharger shall submit a technical report, acceptable to the Executive Officer, which provides a remedial action plan for the upland portion of Subunit 2B . The report shall include detailed design criteria, construction details, and procedures and schedule for implementation of the remedial measures, as well as a residual Risk Management Plan for pollutants that may remain on-site post remediation.

4.d. **IMPLEMENTATION OF REMEDIAL ACTION PLAN**

COMPLIANCE DATE: September 30, 2003

The discharger shall submit a technical report, acceptable to the Executive Officer, which documents implementation of the remedial measures for addressing soil and groundwater pollution in the upland area of Subunit 2B, as

described in the technical report described in Task 4.c. The report shall describe any variances between the remedial design specified in the technical report described in Task 4.d and the remedial measures actually implemented.

4.e. **WORKPLAN FOR EVALUATING REMEDIAL ACTION EFFECTIVENESS**

COMPLIANCE DATE: December 31, 2003

The discharger shall submit a workplan, acceptable to the Executive Officer, which proposes methods to evaluate the effectiveness of remedial actions implemented within the upland area of Subunit 2B. The report shall evaluate the current field conditions and the groundwater and surface water monitoring program, and recommend new groundwater monitoring wells, surface water sampling locations, or other confirmation sampling locations. The report shall provide for collection and analyses of data sufficient to evaluate remedial action effectiveness 1 year and 3 years after implementation.

4.f. **1-YEAR EVALUATION OF REMEDIAL ACTION EFFECTIVENESS**

COMPLIANCE DATE: January 31, 2005

The discharger shall submit a technical report, acceptable to the Executive Officer, which documents implementation of the technical report specified in Task 4.e, as necessary to address noncinder-associated soil and groundwater pollution within Subunit 2. The report shall provide the results of the remedial action evaluation, and if necessary, propose modifications to improve the existing remedial measures or evaluation and implementation of alternative remedial measures.

4.g. **3-YEAR EVALUATION OF REMEDIAL ACTION EFFECTIVENESS**

COMPLIANCE DATE: January 31, 2007 and every 3 years thereafter

The discharger shall submit a technical report, acceptable to the Executive Officer, which documents implementation of the technical report specified in Task 4.e., as necessary to address noncinder-associated soil and groundwater pollution within Subunit 2. The report shall provide the results of the remedial action evaluation, and if necessary, propose modifications to improve the existing remedial measures or evaluation and implementation of alternative remedial measures.

STEGE MARSH AREA OF SUBUNIT 2B

5.a. SAMPLING AND ANALYSES MONITORING PLAN

COMPLIANCE DATE: December 15, 2001

The discharger shall submit a technical report, acceptable to the Executive Officer, which proposes any additional surface water and sediment sampling necessary to monitor the extent of contamination within the Stege Marsh area of Subunit 2A. The workplan shall specify at a minimum, sample location, sampling methods, and quality assurance controls. The workplan shall specify at a minimum, sample locations, sampling methods, and quality assurance controls. The discharger shall propose sampling frequency, methodology, and parameters, and laboratory analytical methods.

5.b. CONCEPTUAL REMEDIAL ACTION PLAN

COMPLIANCE DATE: July 31, 2002

The discharger shall submit a technical report, acceptable to the Executive Officer, which provides a conceptual remedial action plan for addressing sediment, pore water, and surface water contamination within the Western Stege Marsh area of Subunit 2B. The conceptual remedial measures shall be protective of water quality and potential human and ecological receptors. A site conceptual model shall be provided in the technical report. The report shall also consider all existing sampling data for the marshland and propose additional sampling if necessary.

5.c. REMEDIAL ACTION PLAN

COMPLIANCE DATE: February 28, 2003

The discharger shall submit a technical report, acceptable to the Executive Officer, which provides design details of remedial measures for the Western Stege Marsh area of Subunit 2B, as described in Task 5.b. The report shall include detailed design criteria, construction details, and procedures and schedule for implementation of the remedial measures.

5.d. IMPLEMENTATION OF REMEDIAL ACTION PLAN

COMPLIANCE DATE: March 31, 2004

The discharger shall submit a technical report, acceptable to the Executive Officer, which documents implementation of the remedial measures for

addressing pollution within the Western Stege Marsh area of Subunit 2B, as proposed in Provision 5.c. The report shall describe any variances between the remedial design specified in the technical report described in Task 5.c and the remedial measures actually implemented.

5.e. **WORKPLAN FOR EVALUATING REMEDIAL ACTION EFFECTIVENESS**

COMPLIANCE DATE: April 30, 2004

The discharger shall submit a workplan, acceptable to the Executive Officer, which proposes methods to evaluate the effectiveness of remedial actions implemented within Western Stege Marsh area of Subunit 2B. The report shall evaluate the current field conditions and the existing monitoring program, and recommend new confirmation sampling locations. The report shall provide for collection and analyses of data sufficient to evaluate remedial action effectiveness 1 year and 3 years after implementation.

5.f. **1-YEAR EVALUATION OF REMEDIAL ACTION EFFFECTIVENESS**

COMPLIANCE DATE: April 30, 2005

The discharger shall submit a technical report, acceptable to the Executive Officer, which documents implementation of the technical report specified in Task 5.d, as necessary to address pollution within Western Stege Marsh area of Subunit 2B. The report shall provide the results of the remedial action evaluation, and if necessary, propose modifications to improve the existing remedial measures or evaluation and implementation of alternative remedial measures.

5.g. **3-YEAR EVALUATION OF REMEDIAL ACTION EFFFECTIVENESS**

COMPLIANCE DATE: April 30, 2007 and every 3 years thereafter

The discharger shall submit a technical report, acceptable to the Executive Officer, which documents implementation of the technical report specified in Task 5.d, as necessary to address pollution within the Western Stege Marsh area of Subunit 2B. The report shall provide the results of the remedial action evaluation, and if necessary, propose modifications to improve the existing remedial measures or evaluation and implementation of alternative remedial measures.

MONITORING REPORT

6.a. WELL INSTALLATION REPORT

COMPLIANCE DATE: **45 days following completion of well installation activities**

The discharger shall submit a technical report, acceptable to the Executive Officer, that provides well construction details, geologic boring logs, and well development logs for all new wells installed as part of the present or future Self Monitoring Program (Attachment A).

SITE MAINTANENCE

7.a. CHANGE IN SITE CONDITIONS

NOTIFICATION DUE DATE: **Immediately upon occurrence**

REPORTING DUE DATE: **30 days after initial notification**

The dischargers shall immediately notify the Board of any flooding, ponding, settlement, equipment failure, slope failure, exposure of waste, or other change in site conditions that could impair water quality and shall immediately make repairs. Within 30 days, the dischargers shall prepare and submit a technical report, acceptable to the Executive Officer, documenting the corrective measures taken.

7.b. STORMWATER CONTROL PLANS

COMPLIANCE DATE: **October 15 of the year of construction or prior to construction if commencing between October 15 and May 15**

For each proposed development greater than 1 acre in size, the dischargers shall submit a Notice of Intent to the State Water Resources Control Board, prepare and submit a Storm Water Pollution Prevention Plan acceptable to the Executive Officer, and implement Best Management Practices (BMPs) for the control of storm water, in accordance with requirements specified in the State Water Resources Control Board General Permit for Storm Water Discharges Associated with Construction Activities (NPDES Permit No. CAS000002).

SITE DEVELOPMENT

8.a. **DRAFT DEED RESTRICTION**

COMPLIANCE DATE: December 31, 2003

The dischargers shall submit a draft deed restriction, acceptable to the Executive Officer, which prevents and minimizes activities at the site which may exacerbate water quality impacts or which may result in exposure of human or ecological receptors to soil and/or groundwater contamination at the site. The deed restriction must provide a mechanism for the appropriate notification of on-site workers of environmental hazards and prevent the use of significantly impacted soil and groundwater.

8.b. **RECORDING OF DEED RESTRICTION**

COMPLIANCE DATE: March 31, 2004

The dischargers shall submit documentation showing that an approved deed restriction, resulting from Provision 8.a. was recorded as final.

D. PROVISIONS

1. Contractor/consultant qualifications: All hydrogeological plans, specifications, technical reports and documents shall be signed by or stamped with the seal of a State registered geologist, registered engineer, registered hydrogeologist, or certified engineering geologist.

2. Lab qualifications: All samples shall be analyzed by a State certified laboratory or laboratory accepted by the Regional Board using approved EPA methods for the type of analysis to be performed. All laboratories or the consultant shall be required to maintain quality assurance/quality control records for Regional Board review.

3. Good operation and maintenance (O&M): The Dischargers shall maintain in good working order, and operate in the normal standard of care, any facility or control system installed to achieve compliance with the requirements of this Order.

4. Document distribution: Copies of all correspondence, reports, and documents pertaining to compliance with the Prohibitions and Provisions of this Order shall

also be provided to (a) the non-lead discharger for the specific provision or activity. The Executive Officer may modify this distribution list as needed.

5. Delayed compliance: If the dischargers are delayed, interrupted, or prevented from meeting one or more of the completion dates specified for the above tasks, the dischargers shall promptly notify the Executive Officer and the Board may consider revisions to this Order.

6. Access to site and records: The dischargers shall permit the Regional Board or its authorized representative, upon presentation of credentials:

   a. Immediate entry upon the premises on which wastes are located or in which any required records are kept.
   b. Access to copy any records required under the terms and conditions of this order.
   c. Inspection of any treatment equipment, monitoring equipment, or monitoring methods required by this order or by any other California State Agency.
   d. Sampling of any discharge or groundwater governed by this order.

7. Reporting of changed owner or operator: The dischargers shall file a technical report on any changes in site occupancy or ownership associated with the property described in this Order.

8. Reporting of hazardous substance release: If any hazardous substance is discharged in or on any waters of the State, or discharged or deposited where it is, or probably will be, discharged in or on any waters of the State, the dischargers shall report such discharge to the Regional Board by calling (510) 622-2343 during regular office hours (Monday through Friday, 8:00 am to 5:00 pm). A written report shall be filed with the Board within five working days. The report shall describe: the nature of the hazardous substance, estimated quantity involved, duration of incident, cause of release, estimated size of affected area, nature of effect, corrective actions taken or planned, schedule of corrective actions planned, and persons/agencies notified. This reporting is in addition to reporting to the Office of Emergency Services required pursuant to the Health and Safety Code.

9. Reporting and correction of non-compliance: The dischargers shall report any noncompliance that may endanger public health or the environment. Any such information shall be provided orally to the Executive officer within 24 hours from the time the dischargers become aware of the circumstances. A written submission shall also be provided within five days of the time the dischargers become aware of the circumstances. The written submission shall contain a description of the noncompliance and its cause; the period of noncompliance,

including exact dates and times, and if the noncompliance has not been corrected; the anticipated time it is expected to continue and steps taken or planned to reduce, eliminate, and prevent recurrence of the noncompliance. The Executive Officer, or an authorized representative, may waive the written report on a case-by-case basis if the oral report has been received within 24 hours [CWC Sections 13263 and 13267].

10. Cost recovery: The Dischargers shall be liable, pursuant to Section 13304 of the California Water Code, to the Board for all reasonable costs actually incurred by the Board to investigate unauthorized discharges of waste and to oversee cleanup of such waste, abatement of the effects thereof, or other remedial actions, required by this Order. If the Dischargers addressed by this Order are enrolled in a State Board-managed reimbursement program, reimbursement shall be made pursuant to this Order and according to procedures established in that program. Any disputes raised by dischargers over the reimbursement amounts or methods used in that program shall be consistent with the dispute resolution procedures of that program.

11. Periodic SCR review: The Board will review this Order periodically and may revise it when necessary. The dischargers may request revisions and upon review the Executive Officer may recommend that the Board revise these requirements.

12. Self Monitoring Program: The dischargers shall comply with the Self Monitoring Plan as attached to this Order and as may be amended by the Executive Officer.

I, Loretta K. Barsamian, Executive Officer, do hereby certify that the foregoing is a full, complete, and correct copy of an Order adopted by the California Regional Water Quality Control Board, San Francisco Bay Region, on September 19, 2001.

Loretta K. Barsamian
Executive Officer

Figures: Figure 1 - Site Location Map
Figure 2 - Subunit 2, UCRFS site

Attachment A: Self Monitoring Plan

FAILURE TO COMPLY WITH THE REQUIREMENTS OF THIS ORDER MAY SUBJECT YOU TO ENFORCEMENT ACTION, INCLUDING BUT NOT LIMITED TO IMPOSITION OF ADMINISTRATIVE CIVIL LIABILITY UNDER WATER CODE SECTIONS 13268 OR 13350, OR REFERRAL TO THE ATTORNEY GENERAL FOR INJUNCTIVE RELIF OR CIVIL CRIMINAL LIABILITY

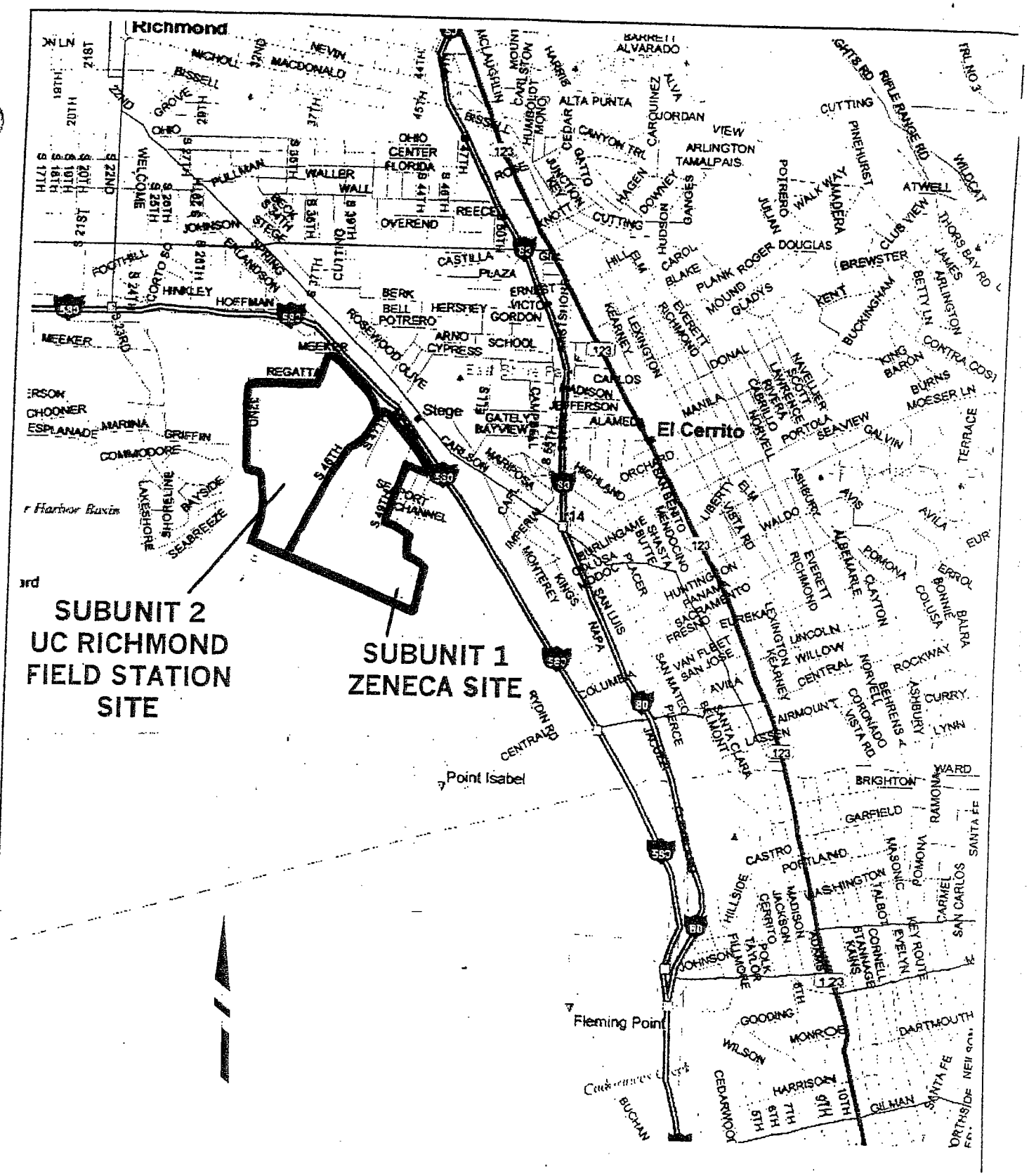
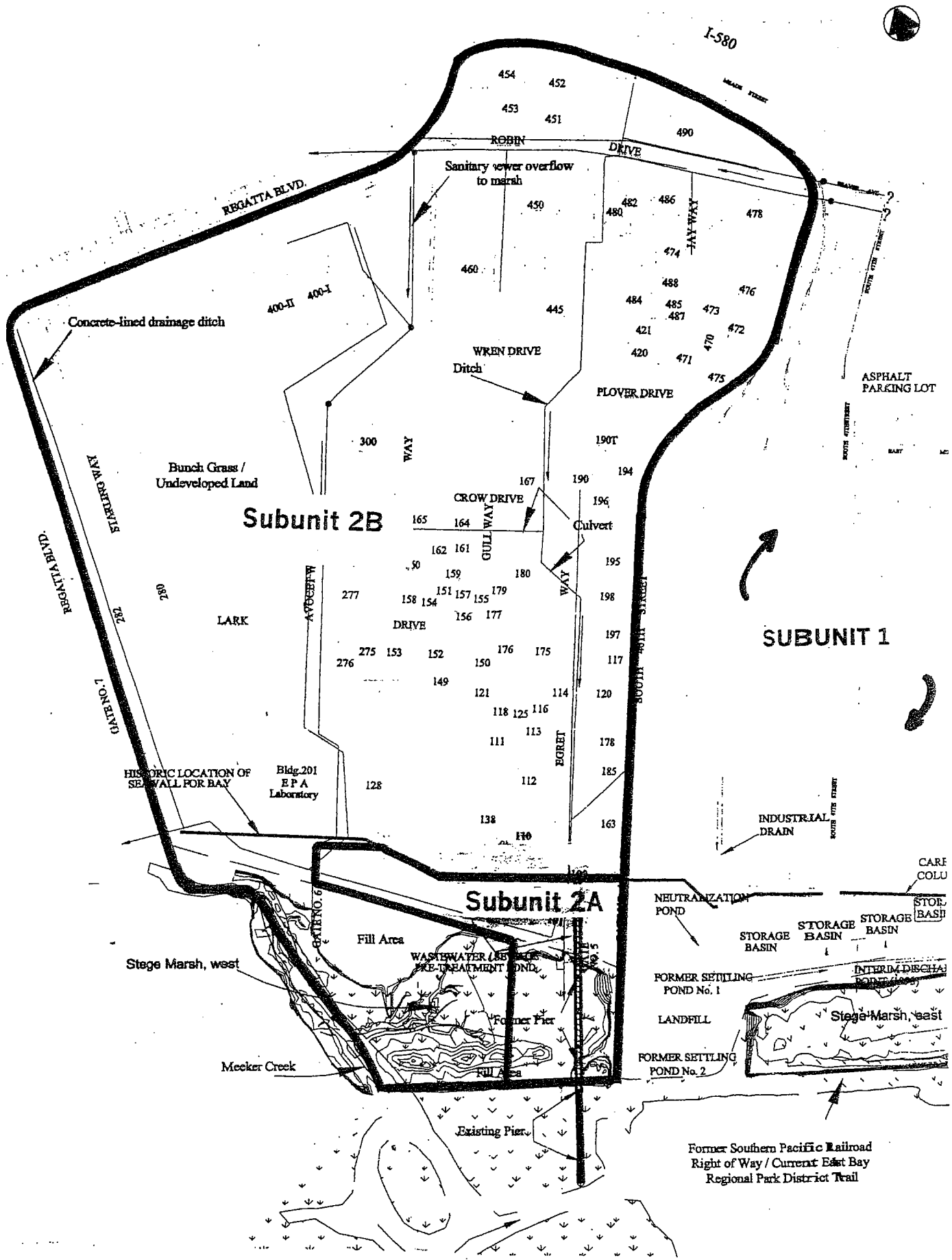


FIGURE 1
LOCATION MAP

MEADE STREET OPERABLE UNIT AND SUBUNITS

SOURCE: DeLORME STREET ATLAS USA VERSION 6.0

J:\ENGCAD\7545\LFRDWGS\7545SV100.CDR 122799


I-580
ROBIN
DRIVE
Sanitary sewer overflow to marsh
REGATTA BLVD.
Concrete-lined drainage ditch
WREN DRIVE
Ditch
PLOVER DRIVE
ASPHALT PARKING LOT
Bunch Grass / Undeveloped Land
Subunit 2B
CROW DRIVE
Culvert
SUBUNIT 1
LARK
DRIVE
HISTORIC LOCATION OF SEAWALL FOR BAY
Bldg.201 EPA Laboratory
INDUSTRIAL DRAIN
Subunit 2A
NEUTRALIZATION POND
STORAGE BASIN
STORAGE BASIN
STORAGE BASIN
Fill Area
Stege Marsh, west
WASTEWATER (SEWAGE) PRE-TREATMENT POND
FORMER SETTLING POND No. 1
LANDFILL
Stege Marsh, east
Former Pier
Meeker Creek
FORMER SETTLING POND No. 2
Existing Pier
Former Southern Pacific Railroad Right of Way / Current East Bay Regional Park District Trail

SUBUNIT 2

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
SAN FRANCISCO BAY REGION

SELF-MONITORING PROGRAM FOR:

UNIVERSITY OF CALIFORNIA BERKELEY
ZENECA, INC.

UNIVERSITY OF CALIFORNIA RICHMOND FIELD STATION
1301 SOUTH 46th STREET
RICHMOND
CONTRA COSTA COUNTY

MEADE STREET OPERABLE UNIT
SUBUNIT 2

1. **Authority and Purpose**: The Board requests the technical reports required in this Self-Monitoring Program pursuant to Water Code Sections 13267 and 13304. This Self-Monitoring Program is intended to document compliance with Board Order No.01-102 (site cleanup requirements).

2. **Groundwater and Surface Water Monitoring**: The dischargers shall measure groundwater elevations quarterly in all monitoring wells, and shall collect and analyze representative samples of groundwater and surface water according to the following table: (Groundwater monitoring wells and surface water sample locations are to be proposed by the dischargers in accordance with Task 2.b, 3b, 4.c, and 5.a of this Order.)

Well # or Station #	Sampling Frequency	Analyses	Well # or Station #	Sampling Frequency	Analyses
TBP	quarterly	TBP	TBP	quarterly	TBP
TBP	quarterly	TBP	TBP	quarterly	TBP
TBP	quarterly	TBP	TBP	quarterly	TBP
TBP	quarterly	TBP	TBP	quarterly	TBP
TBP	quarterly	TBP	TBP	quarterly	TBP

TBP: To Be Proposed by Discharger per Task 2.b, 3.b, 4.c, and 5.a

The dischargers shall sample any new monitoring or extraction wells quarterly and analyze groundwater samples for the same constituents as shown in the above table. The discharger may propose changes in the above table; any proposed changes are subject to Executive Officer approval.

3. **Quarterly Monitoring Reports**: The dischargers shall submit quarterly monitoring reports to the Board no later than 30 days following the end of the quarter (e.g. report for first quarter of the year due April 30). The first required quarterly monitoring report shall be due on January 31, 2002. Additional quarterly reports shall comply with the following schedule.

Quarter	Months Covered	Report Due Date
First Quarter	January, February, March	April 30th
Second Quarter	April. May, June	July 31st
Third Quarter	July, August, September	October 30th
Fourth Quarter	October, November, December	January 31st

Each quarterly report shall include:

a. Transmittal Letter: The transmittal letter shall identify and discuss any violations of the Order and/or the Self-Monitoring Program during the reporting period and actions taken or planned to correct the problem. A detailed description of the violation and the actions taken or planned to correct the violation shall be further described in the body of the monitoring report. The letter shall be signed by the discharger's principal executive officer or his/her duly authorized representative, and shall include a statement by the official, under penalty of perjury, that the report is true and correct to the best of the official's knowledge.

b. Groundwater Elevations: Groundwater elevation data shall be presented in tabular form, and a groundwater elevation map shall be prepared for each monitored water-bearing zone. Historical groundwater elevations shall be included in the fourth quarterly report each year.

c. Groundwater Analyses: Groundwater sampling data shall be presented in tabular form, and an isoconcentration map should be prepared for one or more key contaminants for each monitored water-bearing zone, as appropriate. The report shall indicate the analytical method used, detection limits obtained for each reported constituent, and a summary of QA/QC data. Historical groundwater sampling results shall be included in the fourth quarterly report each year. The report shall describe any significant increases in contaminant concentrations since the last report, and any measures proposed to address the increases. Supporting data, such as lab data sheets, need not be included (however, see record keeping - below).

d. Groundwater Extraction: If applicable, the report shall include groundwater extraction results in tabular form, for each extraction well and for the site as a whole, expressed in gallons per minute and total groundwater volume for the quarter. The report shall also include contaminant removal results, from groundwater extraction wells and from other remediation systems (e.g. soil vapor extraction), expressed in units of chemical mass per day and mass for the quarter. Historical mass removal results shall be included in the fourth quarterly report each year.

e. Status Report: The quarterly report shall describe relevant work completed during the reporting period (e.g. site investigation, interim remedial measures) and work planned for the following quarter.

4. **Violation Reports**: If the dischargers violate requirements in the Site Cleanup Requirements, then the discharger shall notify the Board office by telephone as soon as practicable once the discharger has knowledge of the violation. Board staff may,

depending on violation severity, require the discharger to submit a separate technical report on the violation within five working days of telephone notification.

5. **Other Reports**: The discharger shall notify the Board in writing prior to any site activities, such as construction or underground tank removal, which have the potential to cause further migration of contaminants or which would provide new opportunities for site investigation.

6. **Record Keeping**: The dischargers or their agents shall retain data generated for the above reports, including lab results and QA/QC data, for a minimum of six years after origination and shall make them available to the Board upon request.

7. **SMP Revisions**: Revisions to the Self-Monitoring Program may be ordered by the Executive Officer, either on his/her own initiative or at the request of the dischargers. Prior to making SMP revisions, the Executive Officer will consider the burden, including costs, of associated self-monitoring reports relative to the benefits to be obtained from these reports.

I, Loretta K. Barsamian, Executive Officer, hereby certify that this Self-Monitoring Program was adopted by the Board on September 19, 2001.

Loretta K. Barsamian
Executive Officer

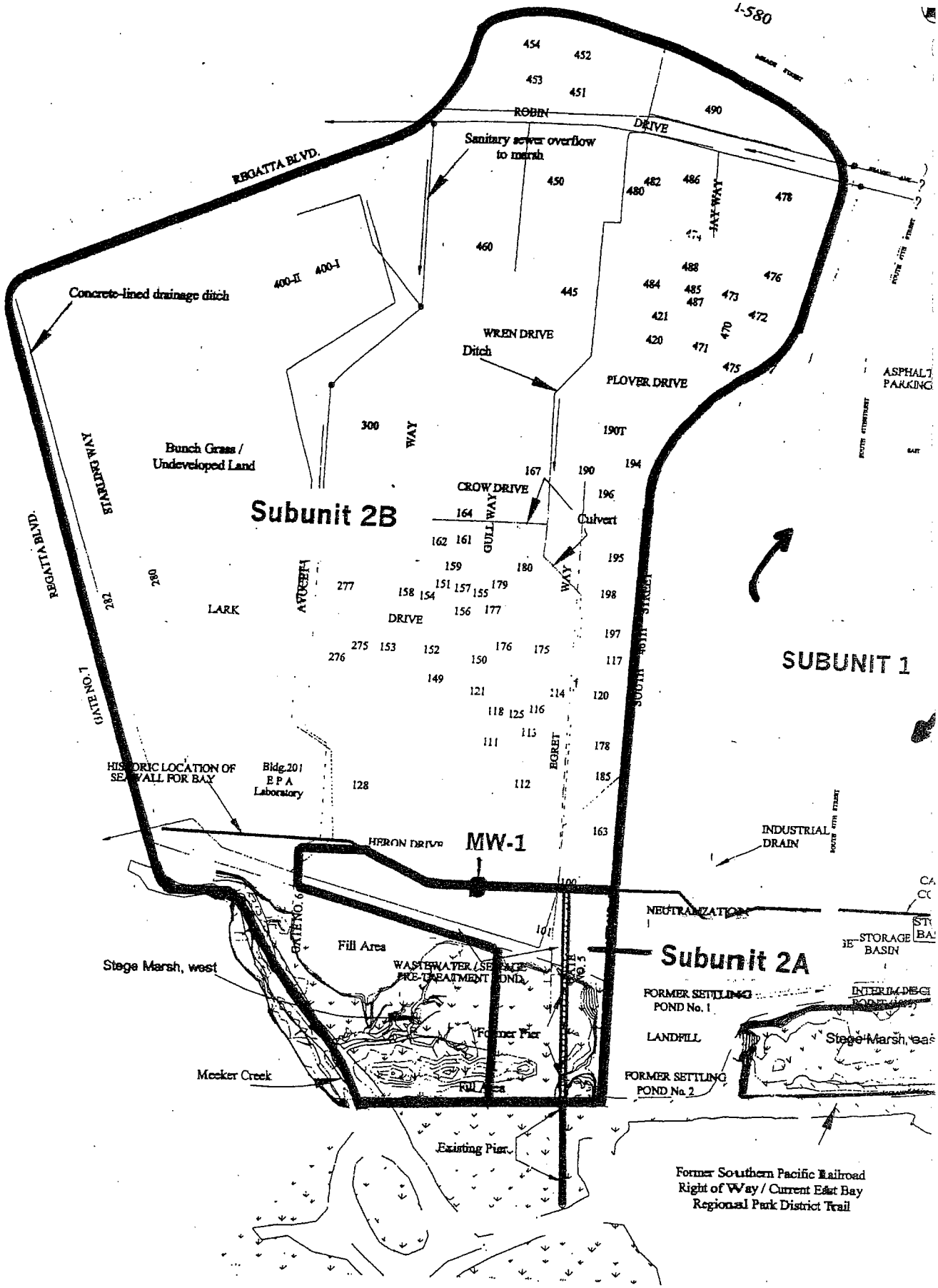


FIGURE 1 - MONITORING WELL LOCATION

SUBUNIT 2 - UCRES SITE

APPENDIX B

PACIFIC ECORISK ENVIRONMENTAL CONSULTING & TESTING

May 28, 2002

Diane Mims
URS Corp.
500 12th Street, Suite 200
Oakland, CA 94607-4041

Dear Ms. Mims:

The results of the initial sieving and collection of invertebrates from the sediment core samples collected from Richmond Field Station on June 1, 2001, are summarized in this letter report. Briefly, very few of the samples contained any invertebrates, with the few that did only having 1-2 organisms, some of those potentially being of terrestrial origin (e.g., the snails). I will assume that this is as far as this part of the project will go.

A copy of the Chain of Custody record for these samples is attached as Appendix A to this report.

If you have any questions, please contact me at (925) 313-8080.

Sincerely,

Scott Ogle

R. Scott Ogle, Ph.D.

Collection of invertebrates from the Richmond Field Station sediment core samples	
Sample ID	Invertebrates Collected
SM103	2 insects (Coleoptera, possibly terrestrial)
SM105	1 insects (Coleoptera, possibly terrestrial)
SM109	0
B4MA	0 (much fibrous plant material in samples)
B6MA	2 gastropods (snails, possibly terrestrial; much fibrous plant material in samples

835 Arnold Drive, Suite 104 Martinez, CA 94553 Phone: 925.313.8080 Fax: 925.313.8089

Appendix A

Chain of Custody Record for the Collection and Delivery of Richmond Field Station Sediment Samples

Pacific EcoRisk

URS 500 12th Street, Suite 200 Oakland, CA 94607-4014 (510) 893-3600

Chain of Custody Record

PROJECT NO. UC Berkeley RFS

SAMPLERS: (Signature) Elaine K. Mims

DATE	TIME	SAMPLE NUMBER	Sample Matrix (S)oil, (W)ater, (A)ir	EPA Method	EPA Method	EPA Method	EPA Method	Ampelisca	Mytilus Ed.	Benthic Survey	Macoma			Number of Containers	REMARKS (Sample preservation, handling procedures, etc.)
6/1/01	2:10	SM103-Toxicity						✓	✓					1	All samples should first be checked for pH - Call before starting any tests!
6/1/01	2:10	SM103-Benthic Survey								✓				3	
6/1/01	2:10	SM103-Bioaccumulation									✓			3	
6/1/01	2:30	SM104-Bioaccumulation									✓			3	
6/1/01	2:10	SM105-Toxicity						✓	✓					1	
6/1/01	2:10	SM105-Benthic Survey								✓				3	Please send Macoma to Tox Scan for chemical analysis.
6/1/01	12:05	SM106-Toxicity						✓	✓					1	
6/1/01	12:35	SM109-Bioaccumulation									✓			3	May Need to Buffer Please call on pH
6/1/01	12:35	SM109-Benthic Survey								✓				3	
6/1/01	12:20	SM119-Toxicity						✓	✓					1	
6/1/01	1:06	SM126-Toxicity						✓	✓					1	In plastic bag-SM125-Tox test only
6/1/01	11:50	B4MA-Toxicity						✓	✓					1	
6/1/01	11:50	B4MA-Benthic Survey								✓				3	
6/1/01	11:00	B6MA-Toxicity						✓	✓					1	
6/1/01	11:00	B6MA-Benthic Survey								✓				3	
6/1/01	10:46	SD3MA-Toxicity						✓	✓					1	

Note: All depths 0-6" & 0-4" for Benthic Survey

TOTAL NUMBER OF CONTAINERS

RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)	RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)
Elaine K. Mims	6/1/01 3:30	X K. Jacky			

METHOD OF SHIPMENT:	SHIPPED BY: (Signature)	COURIER: (Signature)	RECEIVED FOR LAB BY (Signature)	DATE/TIME
Lab Courier		X		

APPENDIX C

APPENDIX C

Evaluation of the Zeneca Richmond Facility
as Salt Marsh Harvest Mouse Habitat,
dated November 13, 2001

H.T. HARVEY & ASSOCIATES
ECOLOGICAL CONSULTANTS

November 13, 2001

Ms. Jane Anderson
Zeneca Inc.
1391 South 49th Street
Richmond, CA 94804-4610

RE: Evaluation of the Zeneca Richmond Facility as Salt Marsh Harvest Mouse Habitat.

Dear Ms. Anderson

I visited the Zeneca Richmond site on November 2, 2001 in the company of William Carson, Senior Project Engineer and Katherine Kobrin, Staff Scientist, both of LFR. For ease of description in the following report I describe east and west as being parallel to the Bay Trail at the south edge of the site and north as being perpendicular to it even though all these "compass" directions are approximately 20 degrees off of the true ones.

1. The vegetation of the site

A. The Cinder Land Fill is covered with upland ruderal vegetation while the Surge Pond Area is either barren or covered with asphalt or plastic-lined ponds. Neither of these areas supports salt marsh harvest mouse (*Reithrodontomys raviventris*) habitat.

B. West Stege Marsh extends from the western edge of the Cinder Land Fill to the vicinity of Meeker Creek. The western portion of the marsh is composed of a mixture of pickleweed (*Salicornia virginica*) and cordgrass (*Spartina foliosa*) whereas the eastern portion of the marsh is covered with a monoculture of saltgrass (*Distichlis spicata*). The pickleweed/cordgrass area covers the western two-thirds of the south side and about one half of the north side of the site. Escape cover of the mouse is better on the western, southwestern and northwestern portions of the marsh where it is a combination of grasses, gumplant (*Grindelia* ssp.) and Pampas grass (*Cortaderia* sp.) (which is of little use to salt mash harvest mice). The escape

western end of East Stege and the eastern end of West Stege, are covered with either pure saltgrass or open water and iron-rich mud. My experience from directing numerous trapping projects in the San Pablo and Suisun Bays in the 1960's through the 1980's for H. T. Harvey (and for BioSystems Analysis, Inc. in the Collinsville area in the 70's) is that while salt marsh harvest mice are found in deep and thick mixtures of pickleweed, alkali heath (*Frankenia salina*) and saltgrass they seldom if ever are found in monocultures of saltgrass. I have found the same thing to be true in the marshes of the South San Francisco Bay. Hence it is my opinion that even if salt marsh harvest mice were present in the Stege marshes, and it seems unlikely that they are, they would not likely be found in the saltgrass-dominated areas.

We visited the marsh on a high tide of approximately 6.5 feet and I was told by William Carson that the highest tides of each year overtop the marsh plain with a foot of water. During such high tides the areas of escape cover adjacent to the saltgrass areas of the marsh would provide little effective cover since they are relatively steep and open and not very wide.

3. Conclusions

While it is not known if salt marsh harvest mice are present in the Stege Marshes, there are a number of facts that suggest that it is unlikely. I do not think that even if they are present in the Stege marshes that salt marsh harvest mice would frequent the areas noted in the Joint Aquatic Resource Permit Application for the Zeneca Richmond Facility as areas of "Potential Excavation or Remediation" (Levine-Fricke, 2001). These areas include the eastern third of the West Stege Marsh ending at or near the diagonal line west of the E 1,471,000 line on the Topographic Survey map dated 12/10/97 with drawings superimposed by LFR, and the western portion of East Stege Marsh, west of a line drawn southward from South 49th Street. It is my opinion that the removal of soil and vegetation from these areas is unlikely, for the reasons given earlier in this report, to result in "take" of salt marsh harvest mice and that if there was accidental "take" that it would be very small.

Sincerely,

Howard Shellhammer, Ph.D.
Senior Associate

cc: Bill Carson – LFR
Richard Nichols - LFR
Katherine Kobrin - LFR
Ron Duke – H.T. Harvey & Associates
Julie Klingmann – H.T. Harvey & Associates