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DEPARTMENT OF LAND AND NATURAL RESOURCES
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'98 SEP 28 P4:04

REF:LD/WL-EK

SEP 28 1998

TO: Mr. Gary Gill, Director
Office of Environmental Quality Control

FROM: for Michael D. Wilson, Chairperson
Board of Land and Natural Resources

SUBJECT: **Finding of No Significant Impact (FONSI), for Ala Wai Canal Dredging Honolulu, Oahu, Hawaii**

The State Department of Land and Natural Resources has reviewed the comments received during the 30-day public comment period which began on May 28, 1998. The agency has determined that this project will not have significant environmental effects and has issued a FONSI. Please publish this notice in the October 8, 1998 OEQC Environmental Notice. ✓

We have enclosed a completed OEQC Publication Form and four copies of the final EA. Please call Mr. Andrew Monden at 587-0230 if you have any questions.

Enclosures

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1998-10-08-OA-FEA-
Ala Wai Canal Dredging

Ala Wai Canal Dredging

Honolulu, Oahu, Hawaii

FINAL ENVIRONMENTAL ASSESSMENT

Federal Aid Project No. STP-0300(038)

U.S. Department of Transportation, Federal Highway Administration
and
State of Hawaii Department of Land and Natural Resources

Cooperating Agency:
U.S. Army Corps of Engineers

Prepared for:

City and County of Honolulu
Department of Transportation Services/Department of Design and Construction

Prepared by:

Belt Collins Hawaii
680 Ala Moana Boulevard, First Floor
Honolulu, Hawaii 96813

October 1998

Ala Wai Canal Dredging
Final Environmental Assessment

Federal Aid Project No. STP-0300 (038)

Submitted Pursuant to the National Environmental Policy Act (NEPA),
42 U.S.C. 4332 (2) (c), 49 U.S.C. 303, and
Chapter 343, Hawaii Revised Statutes (HRS)

U.S. Department of Transportation
Federal Highway Administration
and
State of Hawaii
Department of Land and Natural Resources

Cooperating Agency
U.S. Army Corps of Engineers

The following persons may be contacted for additional information concerning this document:

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Abstract: The proposed action is to dredge the Ala Wai Canal and a portion of the Manoa-Palolo Drainage Canal. The purpose of the proposed action is to increase water depth in the proposed dredge areas. Removal of accumulated sediment in these areas is needed to restore sediment holding capacities, decrease risk of flooding in surrounding areas during high intensity storm events, and improve conditions for recreational use of the Ala Wai Canal and its environs. No significant environmental impacts are anticipated from the proposed action. Short-term effects from dredging activities during construction include: resuspension of bottom sediment; removal of the benthic communities in dredged areas; inconvenience to recreational users of canal waters and certain park land parcels; increase in ocean traffic; use of parking stalls in staging areas; and increased air emissions from fuel combustion for powering equipment. Long-term impacts will be positive, including improved drainage capacity, and improved navigation for recreation in the canal.

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ACRONYM LIST

ACOE	U.S. Army Corps of Engineers
AWG	Agency Working Group
CDUA	Conservation District Use Application
CFS	cubic feet per second
CWA	Clean Water Act
CY	cubic yards
CZM	Coastal Zone Management
DBEDT	State Department of Business, Economic Development, and Tourism
DBT	dibutyltin
DDC	City Department of Design and Construction
DDD	dichlorodiphenyldichloroethane
DDE	dichlorodiphenyldichloroethene
DLNR	State Department of Land and Natural Resources
DLU	City Department of Land Utilization
DNL	Day-night sound level
DOBOR	DLNR, Division of Boating and Ocean Recreation
DOH	State Department of Health
DOT	State Department of Transportation
DP	City & County of Honolulu's Development Plan
DPR	City Department of Parks and Recreation
DPW	City Department of Public Works
DTS	City Department of Transportation Services
EA	environmental assessment
EIS	environmental impact statement
EPA	U.S. Environmental Protection Agency
FAA	Federal Aviation Administration
FHWA	Federal Highway Administration
FONSI	Finding of No Significant Impact
HAR	Hawaii Administrative Rules
HRS	Hawaii Revised Statutes
ISTEA	Intermodal Surface Transportation Efficiency Act of 1991
LUO	Land Use Ordinance
MPH	miles per hour
MPDC	Manoa-Palolo Drainage Canal
MPRSA	Marine Protection, Research and Sanctuaries Act
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NMFS	National Marine Fisheries Service
NOI	Notice of Intent
NOTAM	Notice to Airmen
NOTMAR	Notice to Mariners
NPDES	National Pollutant Discharge Elimination System
NRB	DOH, Noise and Radiation Branch

NRHP	National Register of Historic Places
NWR	National Wildlife Refuge
ODMDS	Ocean Dredged Material Disposal Site
OEQC	State Office of Environmental Quality Control
ORMA	Ocean Recreation Management Area
OSWM	DOH, Office of Solid Waste Management
PAH	polycyclic aromatic hydrocarbon
PCB	polychlorinated biphenyl
PUC	Primary Urban Center
RCRA	Resource Conservation and Recovery Act
SHPO	State Historic Preservation Officer
SHWB	DOH Solid and Hazardous Waste Branch
SLTH	Sunn, Low, Tom & Hara, Inc.
SMA	Special Management Area
SMF	Soil Management Facility
SMP	SMA Use Permit
TAG	Technical Advisory Group
TBT	tributyltin
TCLP	Toxicity Characteristic Leaching Procedure
TOC	total organic carbon
TONS/YR	tons per year
USC	United States Code
USFWS	U.S. Fish and Wildlife Service
WQC	Water Quality Certification
WQLS	Water Quality-Limited Segment
WRDA	Water Resources Development Act

EXECUTIVE SUMMARY

Proposed Action. The Ala Wai Canal is a two-mile long, man-made waterway located in Waikiki, Oahu, Hawaii. The proposed action is to dredge the Ala Wai Canal and a portion of the Manoa-Palolo Drainage Canal (MPDC). The proposed action is made up of six components: 1) limits of dredging, 2) dredge method, 3) sediment transportation, 4) work support areas, 5) sediment processing, and 6) sediment placement.

Purpose and Need. The Ala Wai Canal serves as a drainage way and sedimentation basin for streams draining a 16.3 square mile watershed. The build-up of sediment in these areas is increasing and the ability to hold sediment is decreasing over time. The build-up of sediment affects the canal's ability to contain runoff due to storm events, increasing the risk of flooding in surrounding areas. The purpose of the proposed action is to increase water depth in the proposed dredge areas. Removal of accumulated sediment in these areas is needed to restore sediment holding capacities, decrease risk of flooding in surrounding areas during high intensity storm events, and improve conditions for recreational use of the Ala Wai Canal and its environs.

Alternatives. Multiple options have been evaluated for each of the six components comprising the proposed action. Not all of the options below have been found suitable in this evaluation. Project alternatives are composed of at least one suitable option for each component.

Component 1, limits of dredging, is expressed in terms of the maximum dredge depths considered, which range from 6 to 12 feet below mean sea level. Dredge depths up to the maximum are considered as options.

Component 2, dredge method, has two options – hydraulic (suction) or mechanical (crane bucket or backhoe).

Component 3, sediment transportation, has two options – pipeline for hydraulic dredging, or scows for mechanical dredging.

Component 4, work support areas, requires the use of two land-based sites, one above and one below the McCully Street Bridge shore-side support activities. It also requires use of an area in the waterway below the Ala Moana Boulevard Bridge for locating a barge onto which sediment will be transferred for transport away from the canal. Operationally feasible sites above the bridge are a site adjacent to the Ala Wai Golf Course at the Kapahulu end of the Ala Wai Canal, and Ala Wai Neighborhood Park A. Operationally feasible sites below the bridge are the privately-owned vacant lot across from the Hawaii Convention Center, and a portion of the Magic Island parking lot. The preferred options for shore-side support areas are Ala Wai Neighborhood Park A, and the Magic Island parking lot. The only option for barge mooring is the corner of the Ala Wai Boat Harbor turning basin.

Component 5, sediment processing, has options such as use of gravity dewatering basins, mechanical dewatering, additives during placement, and evaporation.

Component 6, sediment placement, has one ocean disposal option and three upland options. The ocean option is the South Oahu Ocean Dredged Material Disposal Site (ODMDS), the designated

ocean disposal location closest to the Ala Wai Canal. Upland options that were evaluated include the Reef Runway at Honolulu International Airport for use as fill, state park lands at Sand Island for use as fill, and the City and County of Honolulu's formerly operating Waipahu Ash Landfill at Waipio Peninsula for use as cover. The South Oahu ODMDS and the Reef Runway are the preferred options. The Waipio Peninsula and Sand Island sites will not be pursued at this time, as they were not found suitable for this purpose without further study and evaluation.

The No Action Alternative is not to dredge the Ala Wai Canal and not to dredge the MPDC. None of the six components of dredging would be implemented, and the purpose of the project would not be realized.

Selected Alternative. Only those options that individually and collectively have no substantial impacts have been selected. The selected options are shown in Table ES-1 below. In some cases, operating constraints are imposed to further reduce impacts. These include specifying allowable operating hours, contractor coordination with user groups for ongoing recreational use of the canal, and environmental regulatory requirements. A general discussion of operating constraints is contained in Chapter 3. A detailed table of operating constraints is presented at the end of Chapter 4.

TABLE ES-1: SELECTED ALTERNATIVE

Component	Selected Options
Limits of Dredging	Maximum dredge depths vary between -6 and -12 feet MSL
Dredge Method	Either mechanical or hydraulic
Sediment Transport Method	For mechanical, transport by small scow to ocean going barge For hydraulic, transport by hydraulic pipeline to ocean going barge
Work Support Areas	Ala Wai Neighborhood Park A (staging area only) Magic Island (staging area and barge mooring)
Sediment Processing and Disposal or Reuse	Ocean disposal (South Oahu ODMDS) Reuse at the Reef Runway

Affected Environment and Potential Effects. Impacts evaluated include direct short-term, long-term, indirect, and cumulative potential impacts of the options considered. The proposed action will not have any significant impacts. Potential impacts for the selected options are summarized below by topic.

Biota. One endangered species, the common moorhen, was recorded in the dredge area during a 1997 survey. The shoreline habitat along the MPDC used by the common moorhen may be affected during dredging. This shoreline habitat is of low quality, and suitable alternate habitat is available in the vicinity. No species of concern exist within the disposal sites.

Short-term effects on marine biota will occur from increased turbidity in the water column at the dredge site and removal of common benthic communities associated with the bottom of the canal. The increased turbidity will be localized and temporary. Recolonization of bottom communities will occur after dredging.

Impact on habitat of endemic and indigenous goby (*'o'opu)* species will not be significant because dredging is limited to below the Date Street Bridge and migration routes will be only temporarily

interrupted. Eggs from spawning gobies that are washed into the Ala Wai Canal may be affected by dredging. The worst-case scenario would be loss of a recruitment class during the dredging period. This is not anticipated to affect goby populations over the long-term.

Long-term positive effects on marine biota in the canal are anticipated from the removal of accumulated organic material and improved water quality. Cumulative positive effects of the proposed action on canal biota would result from the proposed action in conjunction with ongoing projects in the watershed to improve water quality. Potential negative cumulative effects will occur if storm events or construction dewatering discharges are concurrent with dredging events, leading to increased water turbidity. The turbidity attributable to dredging will be small in comparison to that caused by natural storm events and will dissipate. Biota in the canal are habituated to turbidity since it is a regular occurrence.

Transportation of sediment by barge would cross the month of the Ala Wai Canal and Harbor where threatened green sea turtles have been observed, and the humpback whale marine sanctuary at the end of Magic Island. Transport and transfer of sediments for upland placement at the Reef Runway would occur in the vicinity where threatened green sea turtles have been observed. The transit through the marine sanctuary would not be in conflict with any regulations or management issues related to the sanctuary, and it is unlikely that only one to two daily barge trips would affect the whales or the sea turtles.

Pollutants in the Ala Wai Canal. Short-term negative effects on water quality in the canal are expected from the temporary resuspension of sediment at the specific area where dredging takes place. Suspended sediment will be contained with silt curtains. Long-term water clarity and quality improvements are expected as a result of the proposed action.

At the barge transfer site to be located at Magic Island, the potential exists for spills and over topping. This will be prevented by contract specifications to ensure adequate free board in barges and use of silt curtains.

Potential impacts from placement at the South Oahu ODMDS will not be substantial. This site is an EPA-designated site with existing environmental documentation and only sediment found suitable by the EPA and ACOE will be disposed there.

Dewatering to surface waters at the upland sites will not be allowed, so water quality will not be affected by this activity. Surface runoff during processing for upland placement will be controlled through the use of containment. Processing of sediment will involve mixing with lime or other binding agents. Potential leaching, if any, of contaminants from sediment into groundwater or dispersal as fugitive dust are also prevented by these measures. The need for liners or covers will be determined during design and permitting.

Public Health. Contamination of fish in the canal is an existing condition. The risk to public health from consuming fish during dredging could marginally increase. This would be a short-term effect from increased sediment resuspension in the water column in areas where sediments may contain bioavailable contaminants. In the long-term, the risk will diminish. By use of silt curtains, the areas affected during dredging will be contained to a relatively small size, and sediments will disperse and settle again. In all cases, consumption of fish from the canal is not healthful and signs will be posted to indicate the potential health risk. Long-term health benefits will be derived from removal

of sediment include potentially less bacterial concentration in the water and, with deepening of the canal, somewhat lower resuspension potential by surface (wind, current) disturbance.

Once removed from the marine environment, sediments will be out of the potential food chain. ACOE and EPA will allow only sediments tested to pose acceptable risk in the marine food chain for ocean disposal. Exposure to dredged sediments at the upland placement site would be prevented. Contaminants are expected to remain bound to sediments following processing and placement at the reuse site. No discharge of dewatering effluent will be allowed to marine waters.

Recreation. Short-term effects of dredging are expected to constrain, but not eliminate, recreational activities in the canal, Ala Wai Neighborhood Park A, Ala Wai Boat Harbor, and Ala Wai Channel during construction. Shore-side and water areas used for recreation will be avoided where possible. Access to canoe launching areas and other popular access points will be kept open, or alternative areas for access will be found when dredging occurs adjacent to the site. The existing bike path at Ala Wai Neighborhood Park A will be temporarily rerouted and replaced to its original position and relandscaped upon completion of dredging. At any one time, the proposed staging area at this site will affect shoreline access for approximately 100 feet of the length of the canal.

Staging operations at Magic Island would temporarily block about 10 percent of the available car parking stalls and 20 percent of the bus stalls in the east parking lot. The barge will obstruct a portion of about 150 feet of shoreline usually used by fishermen. The area at the eastern corner of Magic Island, used as a canoe and kayak launching site, would be temporarily constricted but not blocked. These effects will be temporary for the period of construction and will not preclude use and appreciation of the park and waterway.

Some recreational events in the Ala Wai Channel will be temporarily affected, where space available for use could be reduced, but these activities will not be displaced altogether. The dredge will be moored to allow continued access to the ocean for recreational users. The mooring cables and buoys will be clearly marked day and night to prevent hazards. In case of hydraulic dredging, the pipeline will be sunk to the bottom where access to berths or piers would be affected.

The State Department of Land and Natural Resources (DLNR) will provide a liaison between the dredging contractor and canal users to ensure communication and coordinate activities.

One to two ocean barge trips are expected per day. The ocean disposal site is remote from recreational activity; barge transport to it will not affect recreational craft once offshore, other than as a navigating vessel under tow. At the Reef Runway site, the barge would pass through the southeastern end of the thrill craft zone Ocean Recreation Management Area (ORMA). Thrill craft, such as jet skis, would need to stay clear of the barge or maneuver around it, but use of the ORMA will not be inhibited. Access by recreational users to the shoreline along the Reef Runway will be maintained during the project.

Long-term effects on recreational activities occurring in the project area are expected to be positive. Water use activities in the canal should be enhanced once the project is complete, due to the removal of shoal areas, which is expected to improve water quality and allow navigation over the width and length of the canal.

Socioeconomics. Activities and buildings in the project area that generate revenue for the state are tourism in Waikiki, the Ala Wai Golf Course, and the Hawaii Convention Center. The Ala Wai Canal and Magic Island and their vicinity are heavily used for recreational purposes, which, at times, are revenue-generating events. Tourism or property values are not expected to be impacted by the proposed action. Construction jobs, for implementation of the proposed action, will be generated.

Transportation. Areas potentially affected by dredging and sediment transport include the major roadways, Ala Wai Boat Harbor, Ala Wai Channel, and the waters adjacent to Honolulu International Airport. The proposed action is expected to have limited, non-substantial short-term effects on transportation due to the small daily number of truck trips on public roads and barge trips for ocean transport. Air transportation impacts from use of the Reef Runway are not anticipated.

Air Quality. Emissions due to internal combustion from construction vehicles and equipment will occur; none are anticipated to have a substantial effect on ambient air quality. There may be some odor from sediment and other items dredged from the canal. Debris will be removed daily or contained in a closed dumpster. These effects will be temporary, and odors will be dispersed by prevailing tradewinds. Fugitive dust at the upland placement site will be prevented through the handling and processing of materials.

Noise. The existing noise environment along the Ala Wai Canal is typical of an urban setting. Ambient noise levels in the vicinity of the Ala Wai Canal and Reef Runway upland placement site are affected by existing levels of vehicle and air traffic, respectively. Noise levels will temporarily increase due to use of equipment associated with dredging but will be attenuated to conform to regulatory requirements, or a permit or variance obtained. Nighttime operations at the dredge site will be avoided.

Aesthetics. No long-term visual impacts will occur because the project does not involve construction of permanent structures. Visual impacts along the Ala Wai Canal due to dredging will be limited to views of the canal itself, and will not impact views of the Koolau Mountains or of Diamond Head. These temporary impacts during dredging will not be substantial.

Utilities. Various utility lines cross the Ala Wai Canal and MPDC, with most associated with bridge structures. There are two utility easements crossing the Ala Wai Canal, including one for electrical lines where the depth of installed lines is not known. The depth of these lines will be verified during design. In addition, Sheraton Hotels may need to relocate their water line, which crosses the canal within planned dredging depths. No interruption of public service for normal use or damage to the storm drain system or to water, sewer, gas, electrical, cable television, or telephone lines are anticipated due to the proposed action.

Cultural Resources. The Ala Wai Canal and the Kalakaua Avenue Bridge have been declared eligible for the National Register of Historic Places. Dredge design will incorporate a setback of at least five feet from the canal edge in the Ala Wai Canal to protect shoreline walls and foundations, and will incorporate a stable cut-slope grade. The Ala Wai Canal and the MPDC (south of the Date Street Bridge) were dredged as part of the original construction and have previously been maintenance dredged, so subsurface archaeological resources are unlikely to be present in the affected area. There are no archaeological resources in the sites evaluated for dredging support or for upland processing and placement.

Land Use Compatibility. The dredging project is part of the maintenance activity to maintain the sediment holding capacity of the Ala Wai Canal and is consistent with the purpose of the canal. However, small park areas will be used for construction support. Because this activity is temporary and does not preclude the principal land use, conflict with existing land use policies or plans would not result. The proposed project is consistent with the environmental policies established in Chapter 344, HRS. The proposed project is consistent with the objectives and provisions of the City and County of Honolulu's General Plan and the Primary Urban Center Development Plan.

The Ala Wai Canal is an estuary in which accumulated sediment will be removed under the proposed action in order to restore sediment holding capacities, decrease risk of flooding in surrounding areas during high intensity storm events, and improve conditions for recreational use of the Ala Wai Canal and its environs. The Ala Wai Canal and Magic Island are within the 100-year flood inundation zone. For the proposed dredging project, areas within tsunami zones include the lower portion of the Ala Wai Canal, all of Magic Island, all of the Ala Wai Boat Harbor, and the Reef Runway. Although a 100-year flood or tsunami would affect dredging activity, it is unlikely that these events would occur during the approximate one-year period of dredging. After material is placed, it will be stabilized as structural fill along the shore of the Reef Runway, and the subsequent long-term risk of wash off during a tsunami will be no greater than for the surrounding fill material. In case of floods or tsunamis during construction, dredging activities would cease and equipment would be secured in work support areas. The dredging barge would be secured to the shore of the Ala Wai Canal in Area 2 (outside of the tsunami evacuation zone). If merited, the barge moored at Magic Island would be towed out to sea to avoid damage. The dredging crew would follow standard community emergency procedures, and evacuation would progress as required.

Environmental Justice. The Ala Wai Canal is used by a diverse cross-section of the community. However, certain minorities are more likely to be fishing or crabbing in the canal and consuming their catch. This practice potentially exposes some minority and low-income populations to adverse health effects from contaminated fish and crabs caught in the canal. This is an existing condition that would not be substantially changed by the dredging. However, the existing concentration of chemicals in these food species is already unhealthful. To ensure that people are aware of the potential contamination of fish and crabs from the Ala Wai Canal, signs will be posted along all portions of the canal where fishing occurs. These signs will be multi-lingual.

Cultural Practices. Outrigger canoeing, which is a traditional Hawaiian water sport and mode of transportation, may face temporary obstacles at some canoe entry points and to practicing and racing in the Ala Wai Canal. To accommodate canoeing, coordination of the dredging activity with the canoe clubs and the City Department of Parks and Recreation Canoe Council will help to limit these constraints and provide temporary alternatives. The long-term impact of dredging will be positive for canoeing since removal of shallow areas will make more of the Ala Wai Canal passable for canoes.

Comments and Coordination. Because the proposed action makes use of federal transportation funds and park space, and because cultural resources eligible or listed on the National Register of Historic Places are present, compliance with the Section 4(f) provisions under the Department of Transportation Act is required. The proposed action has been evaluated and found not to adversely affect park use or historic resources, and thus a formal Section 4(f) evaluation is not required. Other permits and approvals required include a Coastal Zone consistency determination; Endangered Species Act consultation; National Historic Preservation Act consultation; Department

of the Army permit associated with dredging, transport, and disposal of sediment; State Water Quality Certification; Department of Transportation Permit and Federal Aviation Administration Notice of Proposed Construction or Alteration; Conservation District Use Application and Permit for Work in Ocean Waters; State Department of Health permits for clean air, solid waste, and noise; and City and County special management area permit with shoreline setback variance. Consultation with and comments received from agencies, citizen groups, and individuals have been documented and responded to as applicable.

1. INTRODUCTION

The Ala Wai Canal is a two-mile long, man-made waterway located in Waikiki, Oahu, Hawaii. (Figure 1-1). Constructed in the 1920s, the canal was designed to serve as a drainage way. It has subsequently become important as a sediment deposition basin that reduces the discharge of sediments from the watershed into the nearshore coastal waters of Waikiki. Current use of the canal and its banks includes the recreational activities of sightseeing, walking, jogging, biking, canoe paddling, kayaking, fishing, and crabbing. Directly *mauka* of the canal (toward the mountains—northeast of the Ala Wai Canal) are parks, apartment buildings, Ala Wai Elementary School, Iolani School, Ala Wai Golf Course, Ala Wai Community Garden, Hawaii Convention Center, and a bike path located between the McCully Street Bridge and Manoa-Palolo Drainage Canal (MPDC). On the *makai* side (toward the ocean—southwest of the Ala Wai Canal) is Ala Wai Boulevard, a tree-lined sidewalk bordering the canal and the high-density apartment, commercial, and resort areas that constitute Waikiki. At the mouth of the Ala Wai Canal is the Ala Wai Boat Harbor, two yacht clubs, and Ala Moana and Magic Island parks. All of these uses adjacent to and in the Ala Wai Canal are considered in the discussion of impacts (Chapter 4).

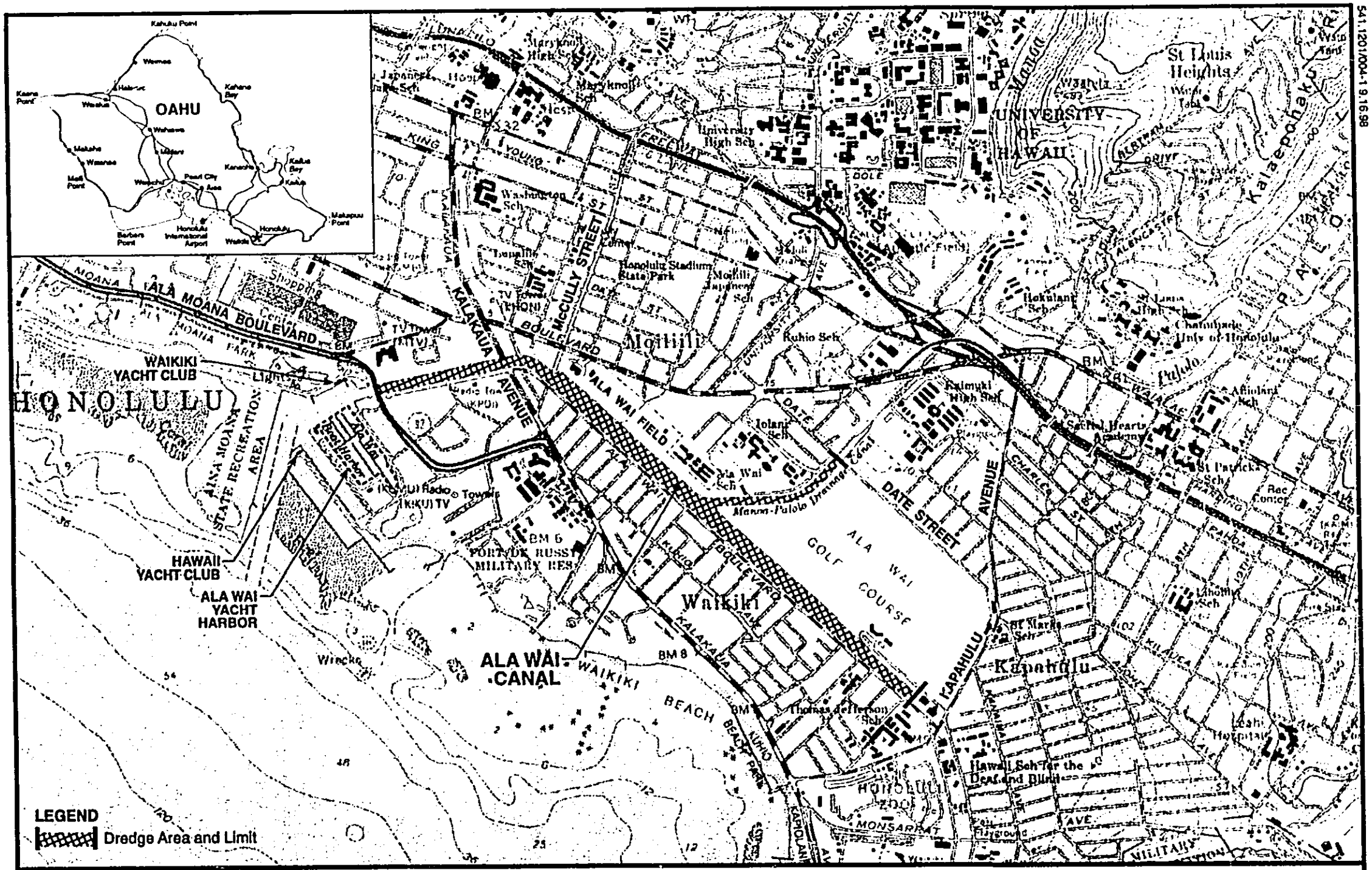
Ala Wai Canal and the historic walls lining the canal are owned by the State of Hawaii. The promenades on the *mauka* side of the Ala Wai Canal are owned by the State, and Executive Ordered to the City and County of Honolulu (City); the promenades on the *makai* side are owned by the City. The promenades on both sides of the Ala Wai Canal are maintained by the City Department of Parks and Recreation (DPR). The MPDC is maintained by the City Department of Public Works.

The Ala Wai Canal is a sedimentation basin for streams draining the canal's 16.3 square mile watershed. Large quantities of sediment are transported via storm water runoff into the canal, particularly during periods of high intensity rainfall. Because the canal is much wider and deeper than its tributary streams, water velocity is reduced upon entering, resulting in deposition of sediment. The MPDC is the major tributary of the Ala Wai Canal and is the major source of sediment, trash, and debris; a large sediment shoal exists at the confluence, where water depths are only about one foot.

The proposed action is to dredge the Ala Wai Canal and a portion of the MPDC. The location under consideration for dredging has been divided into four areas, as shown in Table 1-1.

TABLE 1-1: PROPOSED DREDGE AREAS

Area	Location	Segment Limits
1	Ala Wai Canal	Ala Moana Boulevard Bridge to McCully Street Bridge
2	Ala Wai Canal	McCully Street Bridge to 400 feet southeast of the Manoa-Palolo Drainage Canal confluence
3	Ala Wai Canal	400 feet southeast of the Manoa-Palolo Drainage Canal confluence to the Kapahulu Avenue end
4	Manoa-Palolo Drainage Canal	Ala Wai Canal to Date Street Bridge



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Source of base map: USGS 1983 Honolulu Quadrangle

Figure 1-1
LOCATION MAP

Ala Wai Canal Dredging Environmental Assessment
Belt Collins Hawaii
October 1998

1.1 PROPOSED ACTION

The proposed action is to dredge the Ala Wai Canal. The proposed action is made up of six components as described in Table 1-2. Any given action alternative for dredging consists of one or more option for each component.

From an engineering standpoint, multiple options exist for each of these components, but not all options are technically feasible given project-specific limitations, and various component options are incompatible with one another.

The purpose of the proposed action is to increase water depth in the proposed dredge areas. Removal of accumulated sediment in these areas is needed to restore sediment holding capacities, decrease risk of flooding in surrounding areas during high intensity storm events, and improve conditions for recreational use of the Ala Wai Canal and its environs.

TABLE 1-2: PROJECT ALTERNATIVES - SIX COMPONENTS

Component	Component Description
1. Limits of dredging	Locations within canal to be dredged Water depth in canal upon completion of dredging
2. Dredge method	Means by which sediment is removed from canal bottom
3. Sediment transportation	How sediment is transported from within canal to mouth of Ala Wai Canal, and from mouth of Ala Wai Canal to disposal/re-use site
4. Work support areas	Use of shore-side areas in or near Ala Wai Canal for: • Construction work area (fabricating, assembly, repair of materials and equipment) • Storage of construction materials and equipment • Temporary storage of bulky items removed from canal • Truck access and turnaround for material delivery and for daily pickup of bulky items for transport to disposal or salvage facility (one truckload per day) • Contractor's office trailer Use of area near mouth of Ala Wai Canal for: • Mooring a large barge (100- to 150-feet long and 30- to 40-feet wide), with smaller support scows (30-feet long by 15-feet wide) and boats • Activities supporting barge and scow or pipeline operations
5. Sediment processing	May be needed to dewater and/or stabilize sediment prior to transport or placement
6. Sediment placement	Reuse or disposal of dredged sediment in ocean or on land

1.2 OVERVIEW OF ALTERNATIVES AND POTENTIAL IMPACTS

The No Action alternative is not to dredge. Potential impacts of this alternative are reduced water quality and reduced functioning of the canal for recreation, sediment capture, and drainage.

Options comprising the spectrum of action alternatives are:

- Dredge limits (see Figures 1-2 and 1-3)—up to 12 feet below mean sea level (-12 feet MSL) in Area 1, up to –10 feet MSL in Area 2, up to –six feet MSL in most of Area 3, and up to –10 feet MSL in Area 4. To address depressions in Area 3, the upper boundary of Area 2 may be extended about 1,100 feet into Area 3 and this portion dredged to –10 feet MSL, or the depressions may be filled with sediment dredged from the Ala Wai Canal and/or the MPDC. Potential impacts relate to the volume and characteristics of the material to be disposed, and the area and extent of disruption to recreational uses during dredging.

- Dredge method—mechanical or hydraulic. Potential impacts relate primarily to compatible transportation options, requirements for dewatering, and water quality.

- Transport—scow, barge, pipeline, or truck. Potential impacts are primarily interference with navigation and traffic.

- Use of waters and shore-side lands for dredging support operations (staging and material transfer) (see Figure 1-2)—Ala Wai Neighborhood Park A, a site adjacent to the Ala Wai Golf Course at the Kapahulu end of the Ala Wai Canal, a privately-owned vacant lot on Kalakaua Avenue across from the Hawaii Convention Center, and a portion of the Magic Island parking lot. Potential impacts are temporary disruption of existing land uses and requirements for landscape restoration.

- Processing—dewatering, odor control, and/or chemical management. Potential impacts are primarily to water quality.

- Placement—ocean and/or upland (as fill at the Reef Runway, as fill at Sand Island State Recreation Area, or as cover at Waipahu Ash Landfill, the City's incinerator ash landfill at Waipio Peninsula). Potential impacts are primarily to water quality and compatibility with adjacent and future land uses.

Only certain combinations of options are feasible. For example, the hydraulic dredge method requires that sediment be transported by pipeline and dewatered prior to or during final placement. Impacts of any particular set of options comprising a feasible alternative will need to be evaluated based on the collective effect of the options. Further details on the impacts are contained in Chapter 4 and summarized in Table 4-7.

Alternatives are comprised of the feasible combinations of options for each of these six components.

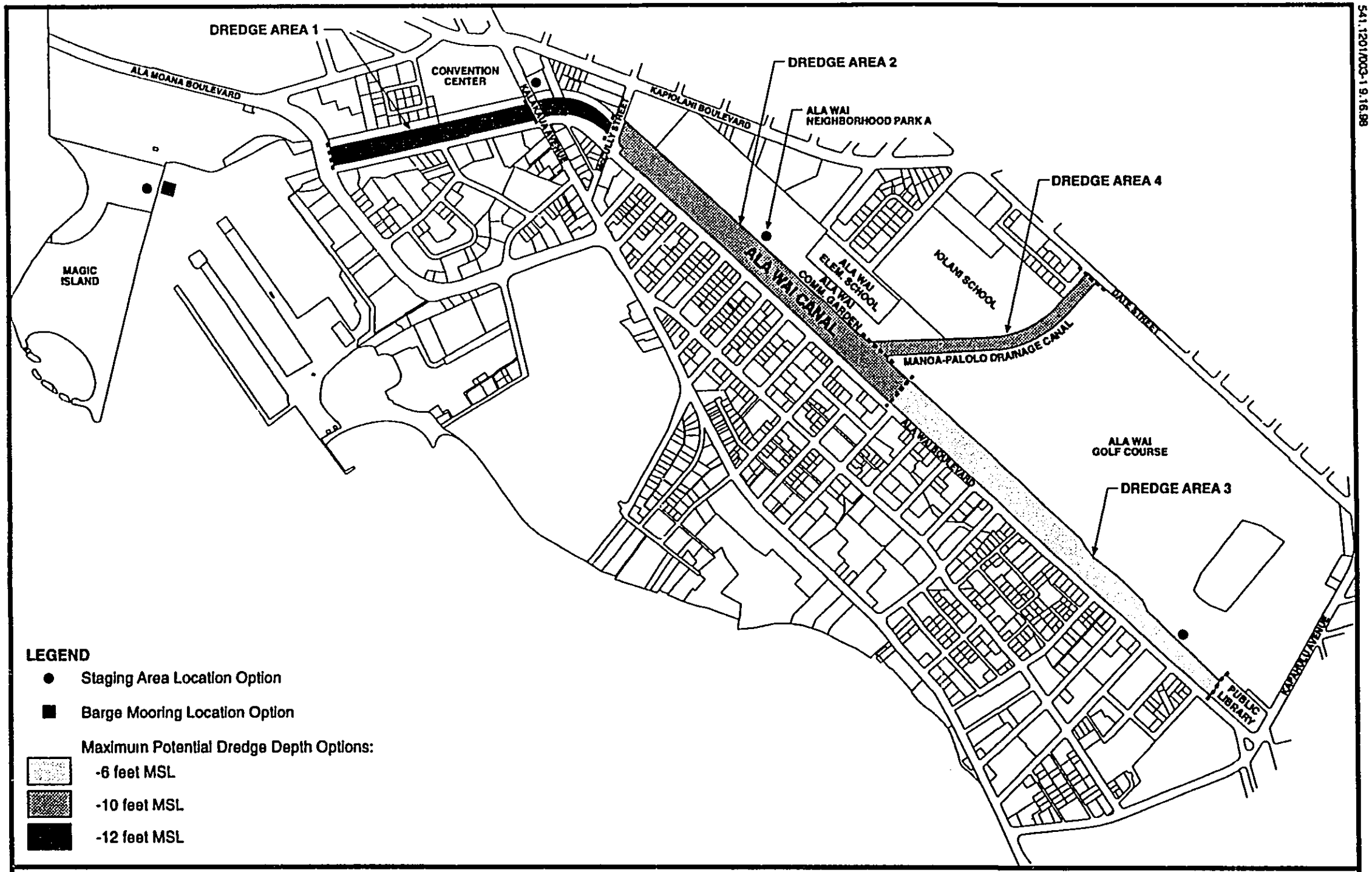

Figure 1-2
DREDGE DEPTH AND SHORE-SIDE SUPPORT AREA OPTIONS

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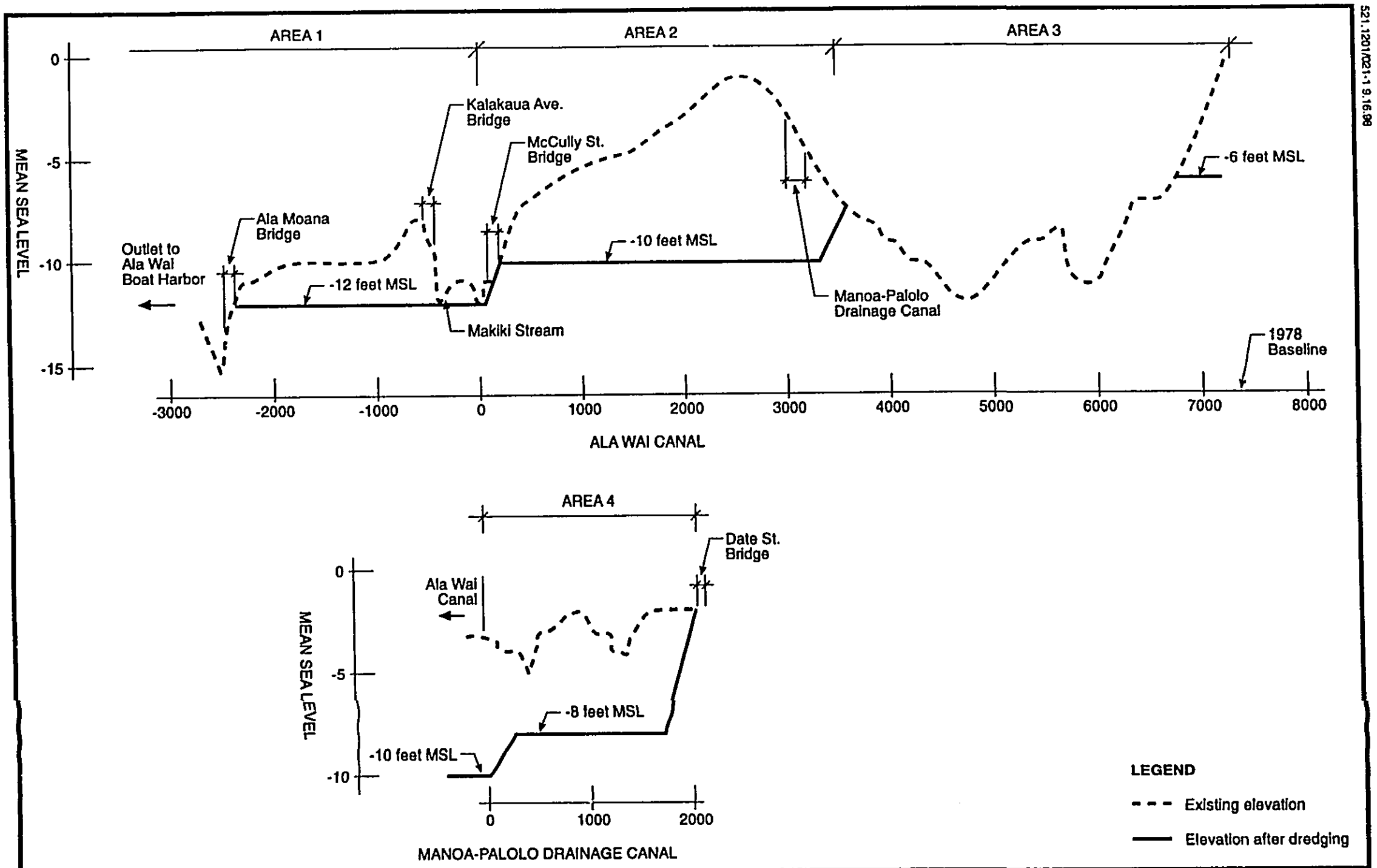

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Figure 1-3
SCHEMATIC CENTERLINE PROFILE
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1.3 PURPOSE OF DOCUMENT

This document satisfies the requirements of three statutes and their implementing regulations. The three statutes are: (1) the National Environmental Policy Act of 1969 (NEPA); (2) Environmental Impact Statements, Hawaii Revised Statutes Chapter 343 HRS 343); and (3) United States Code, Title 49, Section 303 of the Department of Transportation Act of 1966 (49 USC 303, widely referred to as Section 4[f]). The first two are applicable because of the use of federal, state, and local funds for planned construction work. The third is applicable because of the planned use of Federal Highway Administration (FHWA) funds.

The State Department of Transportation (DOT) would be the recipient of the federal funds, and the Department of Land and Natural Resources (DLNR) has jurisdiction over the maintenance of the Ala Wai Canal.

Through an intergovernmental agreement, the City Department of Transportation Services (DTS) is managing the EA project. As of July 1, 1998, management of the project has been transferred to the Department of Design and Construction (DDC). Upon completion of the EA, project management responsibility will pass from the City to DLNR.

FHWA funding for the EA is due to the potential contribution from roadways to storm water runoff into the Ala Wai Canal. FHWA funding for the dredging activity will be determined in the final design phase.

The peak discharge contribution of roadways was found to be approximately 15 percent of the discharge from the entire Ala Wai Canal watershed. The estimate of roadway contribution is based on a storm event that would occur once every 100 years. Specifically, the design curves for peak discharge versus drainage area from the City and County of Honolulu, Department of Public Works' Storm Drainage Standards (1988) were used. To use these curves, the size of the area of interest is estimated and the peak discharge determined from the appropriate design curve. In addition, the Rational Method, where peak flow rate is calculated as a function of groundwater type, drainage area, and rainfall intensity, was also applied. Peak discharge was estimated for roadways in the watershed and for the entire watershed using both approaches.

1.3.1 Environmental Assessment

Under both NEPA and HRS 343, the purpose of an EA is to evaluate whether or not an action may have a significant environmental impact. Based on the analysis contained in an EA, the decision-makers will determine either:

- That the proposed action will not significantly affect the environment, in which case a Finding of No Significant Impact (FONSI; also known as a Negative Declaration under HRS 343) will be issued; or

- That the proposed action may significantly impact the environment, in which case preparation of an environmental impact statement (EIS) will be required.

Criteria by which to determine whether or not potential impacts are significant are defined by regulations implementing NEPA[1] and HRS 343.[2] Both sets of criteria require consideration of long-term, short-term, and cumulative effects of the proposed action.

NEPA regulations require that consideration of significance include both context and intensity. Context means that the significance of an action varies with the setting of the proposed action and must be analyzed in several contexts such as society as a whole, the affected region, the affected interests, and the locality. Intensity refers to the severity of impact, considering the following: beneficial and adverse effects; unique characteristics of the geographic area; whether the action is related to other actions with individually insignificant but cumulatively significant impacts; whether the action threatens a violation of federal, state, or local law, or requirements imposed for the protection of the environment; the degree to which the effects on the quality of the human environment are likely to be highly controversial, uncertain or involve unique or unknown risks; and the degree to which the action may establish a precedent for future actions, adversely affect cultural or historical resources, or adversely affect an endangered or threatened species or its critical habitat.

HRS 343 regulations state that, in most instances, an action shall be determined to have a significant effect on the environment if it: involves an irrevocable commitment to loss or destruction of any natural or cultural resource; curtails the range of beneficial uses of the environment; conflicts with the state's long-term environmental policies or goals and guidelines; substantially affects the economic or social welfare of the community or state; substantially affects public health; involves substantial secondary impacts such as population changes or effects on public facilities; involves a substantial degradation of environmental quality; cumulatively has considerable effect on the environment or involves a commitment for larger actions; substantially affects a rare, threatened, or endangered species or its habitat; detrimentally affects air or water quality or ambient noise levels; affects or is likely to suffer damage by being located in an environmentally sensitive area; substantially affects scenic vistas and viewplanes; or requires substantial energy consumption.

1.3.2 Section 4(f) Evaluation

FHWA, as an agency of the U.S. Department of Transportation, must comply with the "4(f)" provision of the Department of Transportation Act. A Section 4(f) determination is needed for the proposed action. However, a 4(f) evaluation may not be required, as discussed in Chapter 5, because analysis of the action's effects in the context of surrounding recreational and historical resources indicate no applicable uses of 4(f) property. Consultation with DPR and the State Historic Preservation Officer (SHPO) has confirmed that there will be 'no effects' on recreational and historic resources (see Appendix G).

1.4 PUBLIC AND AGENCY REVIEW

Requirements for soliciting input by the public and agencies during the environmental assessment process are summarized in Table 1-3.

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1 As promulgated in implementing regulations of the Council on Environmental Quality (CEQ). The definition of "significantly" is contained in 40 CFR 1508.27.

2 As promulgated in implementing rules of the Department of Health. Significance criteria are listed in HAR 11-200-12.

TABLE 1-3: PUBLIC AND AGENCY REVIEW

Activity	NEPA[3]	HRS 343[4]	Activity Concluded
Scoping	Consult with interested agencies and others.	Consult with agencies having jurisdiction, and with citizen groups and individuals that may be affected.	Notice of public meeting sent to potentially affected individuals and agencies. Public meeting held on January 22, 1998.
Draft Environmental Assessment (EA)	Notice of availability of draft EA for public inspection. Written comments due within 30 days of publication of notice.	30-day period for public review and for submitting written comments. Proposing agency respond in writing to all comments received or postmarked during the 30-day review period.	Notice of Availability published May 7 and 8, 1998. 30-day public comment period May 8, 1998 to June 8, 1998. Public meeting held within the 30-day comment period, on June 2, 1998. Notice of public meeting sent to potentially affected or interested entities.

In addition to the public at large, two groups, an Agency Working Group and a Technical Advisory Group, provided input during the EA process:

- Agency Working Group (AWG)—project proponents, environmental regulators, and potentially affected agencies. The purpose of meeting with this group was to identify and address agency concerns and issues, coordinate among project proponents who have a stake in the project, and coordinate among agencies with regulatory or other jurisdictional interests. This does not preclude or replace discussions with individual agencies on specific issues related to a particular agency's jurisdiction.

- Technical Advisory Group (TAG)—a pre-existing group composed of persons with technical knowledge and expertise relating to the Ala Wai Canal. The purpose of interacting with this group was to utilize an existing source of technical information and expertise in developing appropriate solutions.

1.5 DETERMINATION UNDER HRS CHAPTER 343

The Ala Wai Canal Dredging will not have any significant effect in the context of HRS Chapter 343, HRS and HAR Section 11-200-12. Therefore, a Finding of No Significant Impact (FONSI) will be issued. A brief summary of findings to support this determination follows, with a listing in Table 1-4.

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[3] As prescribed in implementing regulations of the U.S. Department of Transportation, in Code of Federal Regulations, Title 23, Part 771.119 (23 CFR 771.119).

[4] As prescribed in implementing rules of the State of Hawaii Department of Health in Hawaii Administrative Rules Section 11-200-9.1 (HAR 11-200-9.1).

TABLE 1-4: ANALYSIS OF SIGNIFICANCE UNDER HRS 343

Significance Criterion*	Does Project Meet Criterion?
1. Involves an irrevocable commitment to loss or destruction of any natural or cultural resource	No
2. Curtails the range of beneficial uses of the environment	No
3. Conflicts with the state's long-term environmental policies or goals and guidelines as expressed in chapter 344, HRS, and any revisions thereof and amendments thereto, court decisions, or executive orders	No
4. Substantially affects the economic or social welfare of the community or State	No
5. Substantially affects public health	No
6. Involves substantial secondary impacts, such as population changes or effects on public facilities	No
7. Involves a substantial degradation of environmental quality	No
8. Is individually limited but cumulatively has considerable effect upon the environment or involves a commitment for larger actions	No
9. Substantially affects a rare, threatened, or endangered species, or its habitat	No
10. Detrimentally affects air or water quality or ambient noise levels	No
11. Affects or is likely to suffer damage by being located in an environmentally sensitive area such as a flood plain, tsunami zone, beach, erosion-prone area, geologically hazardous land, estuary, fresh water, or coastal waters	No
12. Substantially affects scenic vistas and viewplanes identified in county or state plans or studies	No
13. Requires substantial energy consumption	No

* From HAR 11-200-12.

According to the Department of Health Rules (HAR 11-200-12), an applicant or agency must determine whether an action may have a significant impact on the environment, including all phases of the project, its expected consequences, its cumulative impact with other projects, and its short and long-term effects. In making the determination, the Rules establish "Significance Criteria" to be used as a basis for identifying whether significant environmental impacts will occur. According to the Rules, an action shall be determined to have a significant impact on the environment if it meets any one of the following criteria:

(1) Involves an irrevocable commitment to loss or destruction of any natural or cultural resource. There will not be an irrevocable commitment to loss or destruction of any natural or cultural resource. The Ala Wai Canal and the Kalakaua Avenue Bridge have been declared eligible for the National Register of Historic Places. Dredge design will incorporate a setback of at least five feet from the canal edge in the Ala Wai Canal to protect shoreline walls and foundations, and will incorporate a stable cut-slope grade.

The Ala Wai Canal and the MPDC (south of the Date Street Bridge) were dredged as part of the original construction and have been previously maintenance dredged, so subsurface archaeological resources are unlikely to be present in the affected area. There are no archaeological resources in the sites evaluated for dredging support or for upland processing and placement.

(2) Curtails the range of beneficial uses of the environment. The proposed action will not curtail the range of beneficial uses of the environment. Rather, dredging accumulated sediment will enhance recreational uses of the Ala Wai Canal. Re-use of the sediment as fill material at the Reef Runway site will help to conserve use of natural building materials.

(3) Conflicts with the state's long-term environmental policies or goals and guidelines as expressed in Chapter 344, HRS, and any revisions thereof and amendments thereto, court decisions, or executive orders. The proposed project is consistent with the environmental policies established in Chapter 344, HRS. As for City policies, the proposed project is consistent with the objectives and provisions of the City and County of Honolulu's General Plan and the Primary Urban Center Development Plan. The project is especially supportive of the proposed visions of the draft revisions to the Primary Urban Center's Development Plans for enhancing the Ala Wai Canal for recreational use.[5]

(4) Substantially affects the economic or social welfare of the community or State. The proposed action will not substantially affect the economic or social welfare of the community or State. Funds for dredging the Ala Wai Canal were appropriated by the State Legislature in 1997. A total of approximately $10 million was appropriated. The total estimated costs for the project are less than the appropriated amount.

(5) Substantially affects public health. The proposed action will not substantially affect public health. Contamination of fish in the Ala Wai Canal, and the public health risk this present to those who consume the fish, is an existing condition. This risk may marginally increase as a short-term effect from increased resuspension, due to dredging, of sediments in the water column where sediments contain bioavailable contaminants. In the long-term, the risk will diminish. Long-term health benefits derived from removal of sediment include potentially less bacterial concentration in the water and, with deepening of the canal, somewhat lower resuspension potential by surface (wind, current) disturbance.

(6) Involves substantial secondary impacts, such as population changes or effects on public facilities. No substantial secondary impacts will be involved. There will be temporary, short-term impacts that will result in disruption and inconveniences to recreational facilities, but in the long-term the proposed action will benefit recreational activities related to the use of the Ala Wai Canal.

(7) Involves a substantial degradation of environmental quality. No substantial degradation of environmental quality will occur at the Ala Wai Canal, MPDC, work support areas, barge mooring site, or disposal/reuse sites. Turbidity in the canal may increase temporarily due to dredging operations but will be limited in area due to operating constraints. Dewatering to surface waters at the upland sites will not be allowed, so water quality will not be affected by this activity. Long-term water clarity and quality improvements are expected as a result of the proposed action.

(8) Is individually limited but cumulatively has considerable effect upon the environment or involves a commitment for larger actions. Implementation of the proposed project will not cause any significant cumulative effects in combination with any currently ongoing or planned projects. The proposed action does not involve a commitment for larger actions.

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[5] Comment letter from the City Planning Department dated May 19, 1998 (see Appendix H).

(9) Substantially affects a rare, threatened, or endangered species, or its habitat. The proposed action will not substantially affect a rare, threatened, or endangered species or its habitat. One endangered species, the common moorhen, was seen during a 1997 survey on the banks of the MPDC. The shoreline habitat on the banks of the MPDC used by the common moorhen may be affected during dredging. This shoreline habitat is of low quality, and suitable alternate habitat is available in the vicinity. Transport and transfer of sediments for upland placement at the Reef Runway would occur in the vicinity where threatened green sea turtles have been seen. One to two daily barge trips would not substantially affect any sea turtles that may be in the vicinity.

(10) Detrimentally affects air or water quality or ambient noise levels. None of the estimated emissions from the dredging and supporting equipment are anticipated to have a substantial adverse effect on air quality. Water quality in the Ala Wai Canal will be temporarily affected by dredging activities in the water (increased turbidity controlled by use of silt curtains), but will improve in the long-term after dredging is completed. Ambient noise levels in the vicinity of the Ala Wai Canal and Reef Runway upland placement site are affected by existing noise from vehicle and air traffic, respectively. Noise levels will temporarily increase due to use of equipment associated with dredging but will be attenuated to conform to regulatory requirements or a permit or variance obtained. The proposed action will not detrimentally affect air or water quality or ambient noise levels.

(11) Affects or is likely to suffer damage by being located in an environmentally sensitive area such as a flood plain, tsunami zone, beach, erosion-prone area, geologically hazardous land, estuary, fresh water, or coastal waters. The Ala Wai Canal is an estuary in which accumulated sediment will be removed under the proposed action in order to restore sediment holding capacities, decrease risk of flooding in surrounding areas during high intensity storm events, and improve conditions for recreational use of the Ala Wai Canal and its environs. The Ala Wai Canal and Magic Island are within the 100-year flood inundation zone. For the proposed dredging project, areas within tsunami zones include the lower portion of the Ala Wai Canal (Area 1), all of Magic Island, all of the Ala Wai Boat Harbor, and the Reef Runway. Although dredging activity would be affected by a 100-year flood or tsunami, it is unlikely that these events would occur during the approximate one-year period of dredging. After material is placed, it will be stabilized as structural fill along the shore of the Reef Runway, and the subsequent long-term risk of wash off during a tsunami will be no greater than for the surrounding fill material.

(12) Substantially affects scenic vistas and viewplanes identified in county or state plans or studies. No long-term visual impacts will occur because the project does not involve construction of permanent structures. Visual impacts along the Ala Wai Canal due to dredging will be limited to views of the canal itself, and will not impact views of the Koolau Mountains or of Diamond Head. These temporary impacts during dredging will not be substantial.

(13) Requires substantial energy consumption. Energy will be consumed to operate the equipment associated with the dredging activity. This energy consumption will not be substantial.

2. PURPOSE OF AND NEED FOR ACTION

2.1 PURPOSE OF THE PROPOSED ACTION

The Ala Wai Canal serves as a drainage way and sedimentation basin for streams draining a 16.3 square mile watershed. Approximately 54 percent of the watershed is developed, with residential, agricultural, commercial, park, and resort land uses. Large quantities of sediment are washed into the canal, particularly during high intensity rainfall events. Sources of sediment in this watershed include steep-sloped, undeveloped lands at the upper elevations. In general, these undeveloped portions of the watershed contribute the majority of the sediment load to the canal, with the watershed streams serving as conveyors of the eroded soil.

Because the Ala Wai Canal is much wider and slower moving than its tributary streams, the flow velocity decreases after entering the canal and results in sediment deposition. This occurs primarily near the confluence with the Manoa-Palolo Drainage Canal (MPDC), where a large sediment delta has formed, the top of which is at an elevation of about two feet below mean sea level (–two feet MSL).

In addition to serving the physical functions of a drainage way and sedimentation basin, the Ala Wai Canal is an important recreational resource. Recreational use of the area includes sightseeing, walking, jogging, canoe paddling, kayaking, fishing, and crabbing. More than 30 canoe clubs practice in the Ala Wai Canal, where the flat water is ideal for training and its outlet to the ocean allows for long distance training.

The purpose of the proposed action is to remove sediment from the Ala Wai Canal and MPDC. This will increase water depths in the proposed dredge areas, which will restore sediment holding capacities, decrease risk of flooding in surrounding areas during high intensity storm events, and improve conditions for recreational use of the Ala Wai Canal and its environs.

An additional anticipated indirect outcome of dredging is improved water quality in the canal. There are other ongoing or planned projects that directly address water quality improvement for the Ala Wai Canal; these other projects are not part of the proposed action.

2.2 NEED FOR THE PROPOSED ACTION

Dredging the Ala Wai Canal is needed to restore its sediment holding and flood control capacities. The canal's bathymetry and sediment accumulation rates show that the build-up of sediment is increasing and that its ability to hold sediment is decreasing over time. The build-up of sediment affects the canal's ability to contain runoff due to storm events, increasing the risk of flooding in surrounding areas.

The build-up of sediment also negatively affects the water quality of the canal and the effectiveness of the canal as a recreational resource. The sediment is recognized as a principal contributor in causing the Ala Wai Canal to exceed State water quality standards.[6] Accumulated sediment in the

[6] DOH (1996a) letter to EPA on total maximum daily loads (TMDLs) for Ala Wai Canal. State of Hawaii, Department of Health. August 6, 1996.

canal is also a source of pollutants via resuspension and regeneration.[7] Dredging the canal will help to address these issues as well, as discussed in Chapter 4.

2.2.1 Canal Depths

The Ala Wai Canal was constructed in the 1920s and has been dredged for maintenance purposes twice, in 1966 and 1978:[8]

- Original construction: The canal varies in width from 150 to 250 feet. It is unlined and has vertical walls rising above most of its banks. The section of the canal extending seaward 500 feet from the Ala Moana Boulevard Bridge was excavated to –25 feet MSL, the section from the Ala Moana Boulevard Bridge to the 45 degree bend at the Makiki Stream confluence was dredged to between –10 feet and –13 feet MSL, and the section from the Makiki Stream to the Kapahulu end was dredged to between –10 feet and –20 feet MSL.

- Maintenance dredging: In 1966 the City and County of Honolulu dredged the canal to an elevation of –six feet MSL in the shoal area. Dredging operations covered 1,750 feet from the Kapahulu side of the MPDC towards the ocean. In addition, 500 feet of the MPDC was dredged upstream of the confluence with the Ala Wai Canal.

- In 1978 the State dredged a 3,500-foot-long section of the canal (between McCully Street Bridge and the MPDC confluence) to –10 feet MSL; a total of 115,000 cubic yards of sediment was removed.[9] Approximately 200 feet of the MPDC was also dredged to provide a transition into the Ala Wai Canal.

The most recent bathymetric survey of the canal was conducted in January and October 1997 by Sea Engineering Inc. The survey results are summarized in Table 2-1 and illustrated in Figures 2-1A through 2-1D.

Summarized in descriptive terms, bottom elevations along the Ala Wai Canal gradually rise from the McCully Street Bridge to the confluence with the MPDC. The shoal is immediately downstream of the confluence with the MPDC. It is approximately 800 feet long and greater than 150 feet wide, with a water depth of about only two feet. Immediately upstream of the confluence, depths within the Ala Wai Canal drop substantially (by about six to eight feet), with a localized depression existing opposite the Ala Wai Golf Course.

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7 Edward K. Noda and Associates (April 1993) *Environmental Assessment and Negative Declaration: Ala Wai Canal Improvement, Honolulu, Oahu, Hawaii.* Job No. 31-OL-I. This document states that regenerated nitrogen (as ammonium) due to microbial activity and phosphate appear to be released from the sediment in the Ala Wai Canal at the Kapahulu end.

8 Except where noted, the details on original construction and maintenance dredging are from Edward K. Noda and Associates (1992b) *Ala Wai Canal Improvement Project Feasibility Report. Report R-89b.* Prepared for the State of Hawaii, Department of Land and Natural Resources, Division of Water and Land Development. Job No. 31-OL-I.

9 Monden, Andrew (1996) *History and Proposed Dredging of Ala Wai Canal, Waikiki.* Presentation, Pacific Chapter of the Western Dredging Association Annual Meeting, Honolulu, Hawaii, November 6, 1996.

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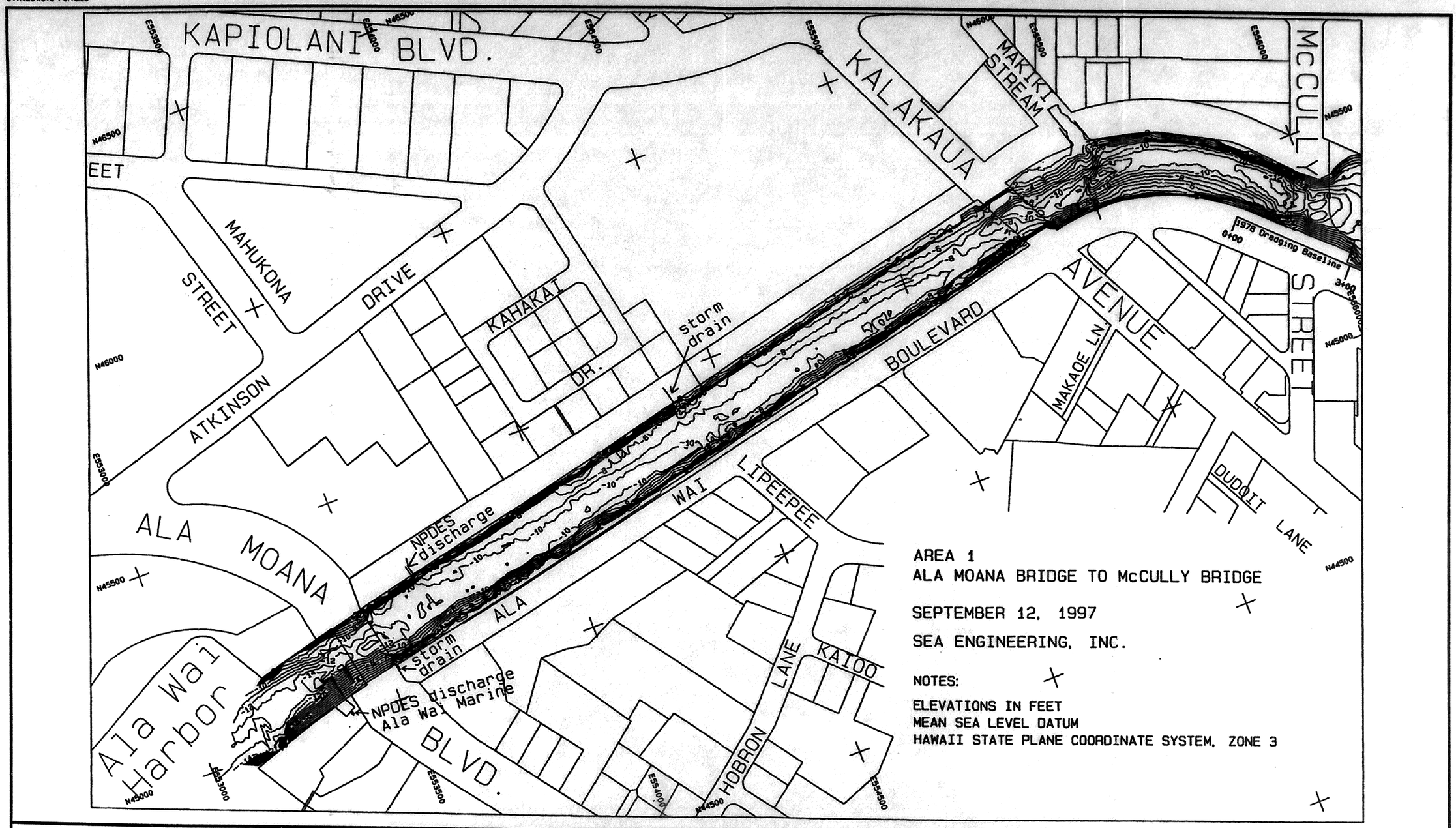

AREA 1
ALA MOANA BRIDGE TO McCULLY BRIDGE

SEPTEMBER 12, 1997

SEA ENGINEERING, INC.

NOTES:

ELEVATIONS IN FEET
MEAN SEA LEVEL DATUM
HAWAII STATE PLANE COORDINATE SYSTEM, ZONE 3

NORTH

0 100 200 400
SCALE IN FEET

Figure 2-1A
BATHYMETRIC SURVEY OF ALA WAI CANAL: AREA 1
Ala Wai Canal Dredging Environmental Assessment
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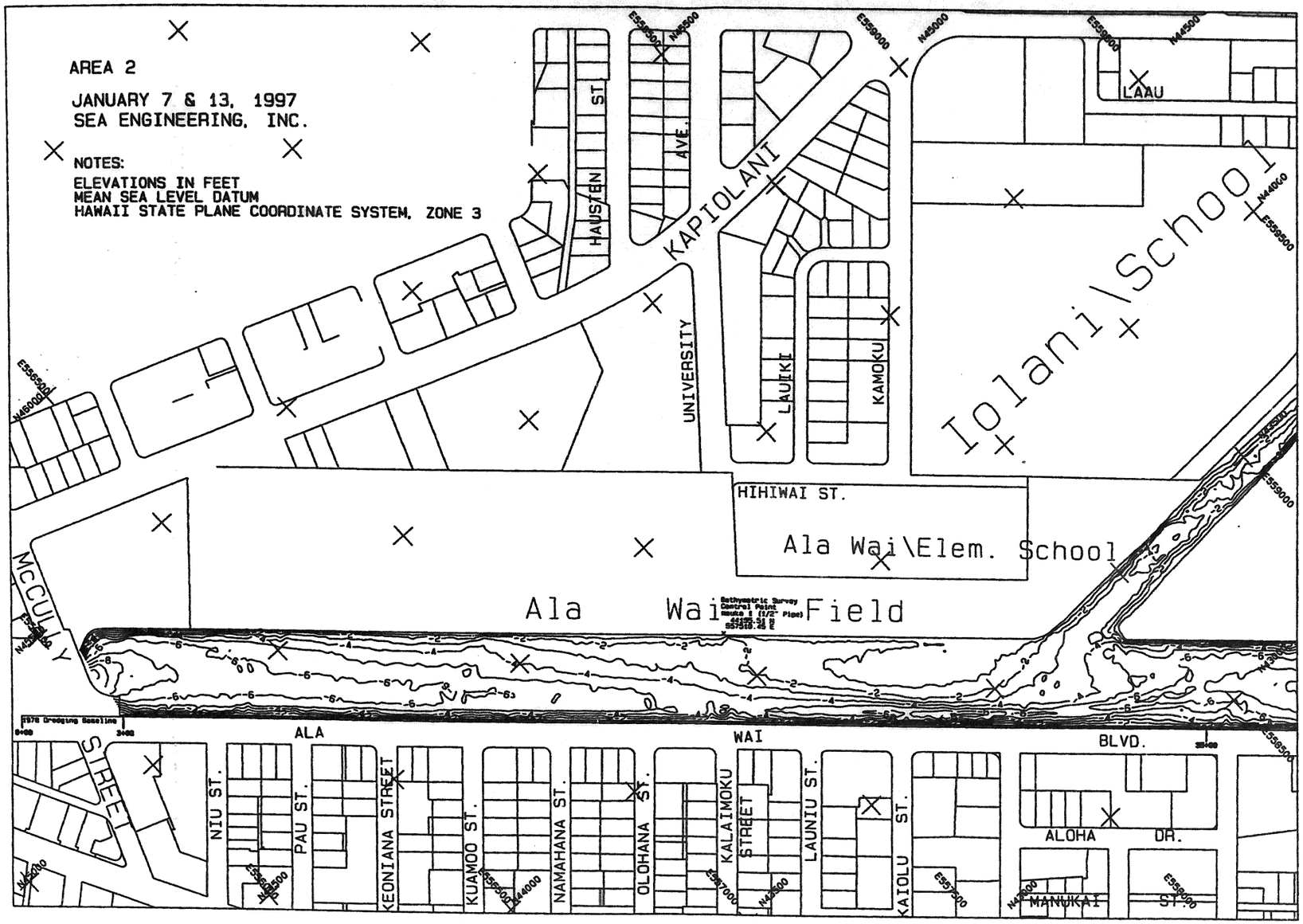

NORTH

0 150 300 600
SCALE IN FEET

Figure 2-1B
BATHYMETRIC SURVEY OF ALA WAI CANAL: AREA 2
Ala Wai Canal Dredging Environmental Assessment
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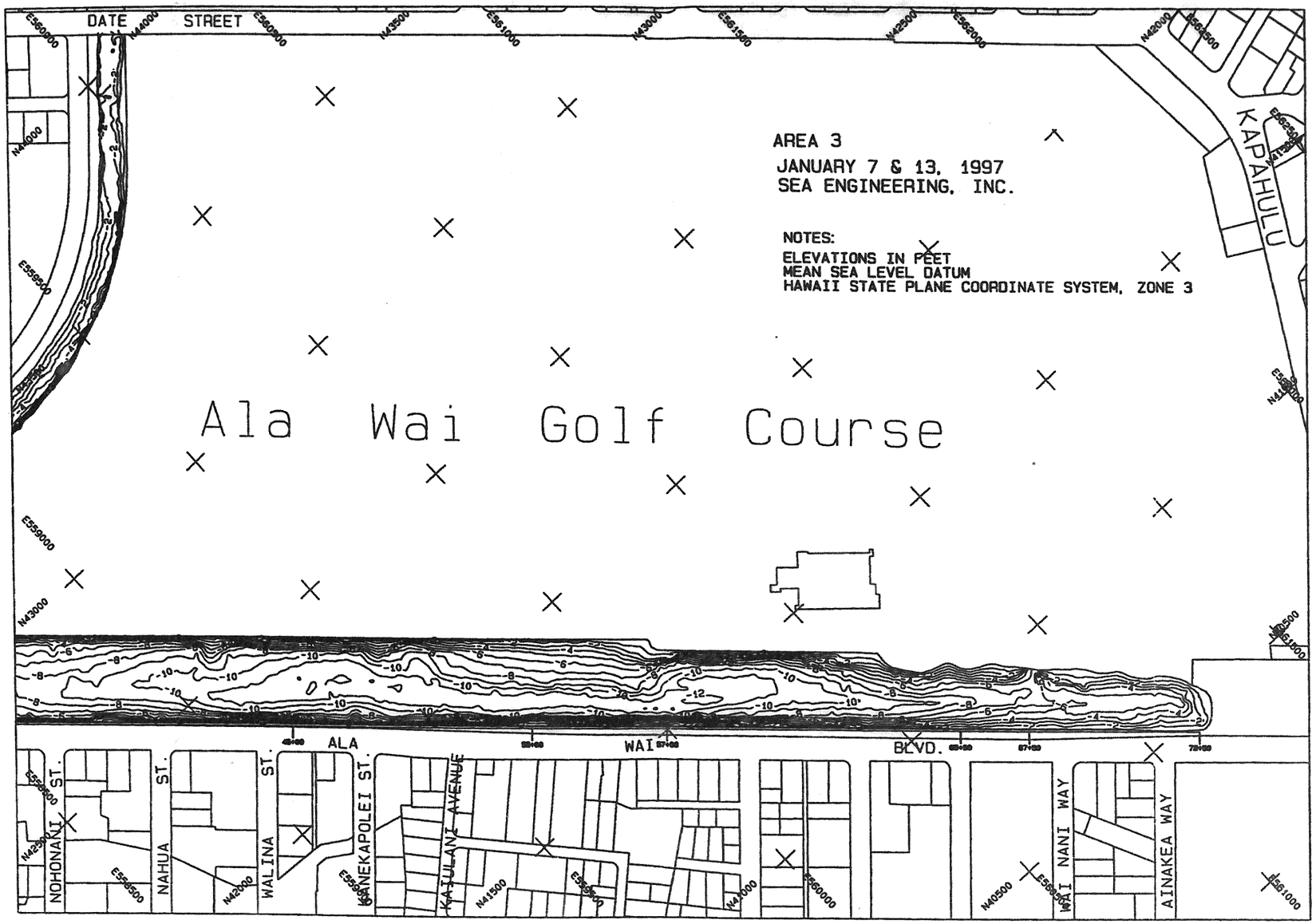

Figure 2-1C
BATHYMETRIC SURVEY OF ALA WAI CANAL: AREA 3
Ala Wai Canal Dredging Environmental Assessment
Belt Collins Hawaii
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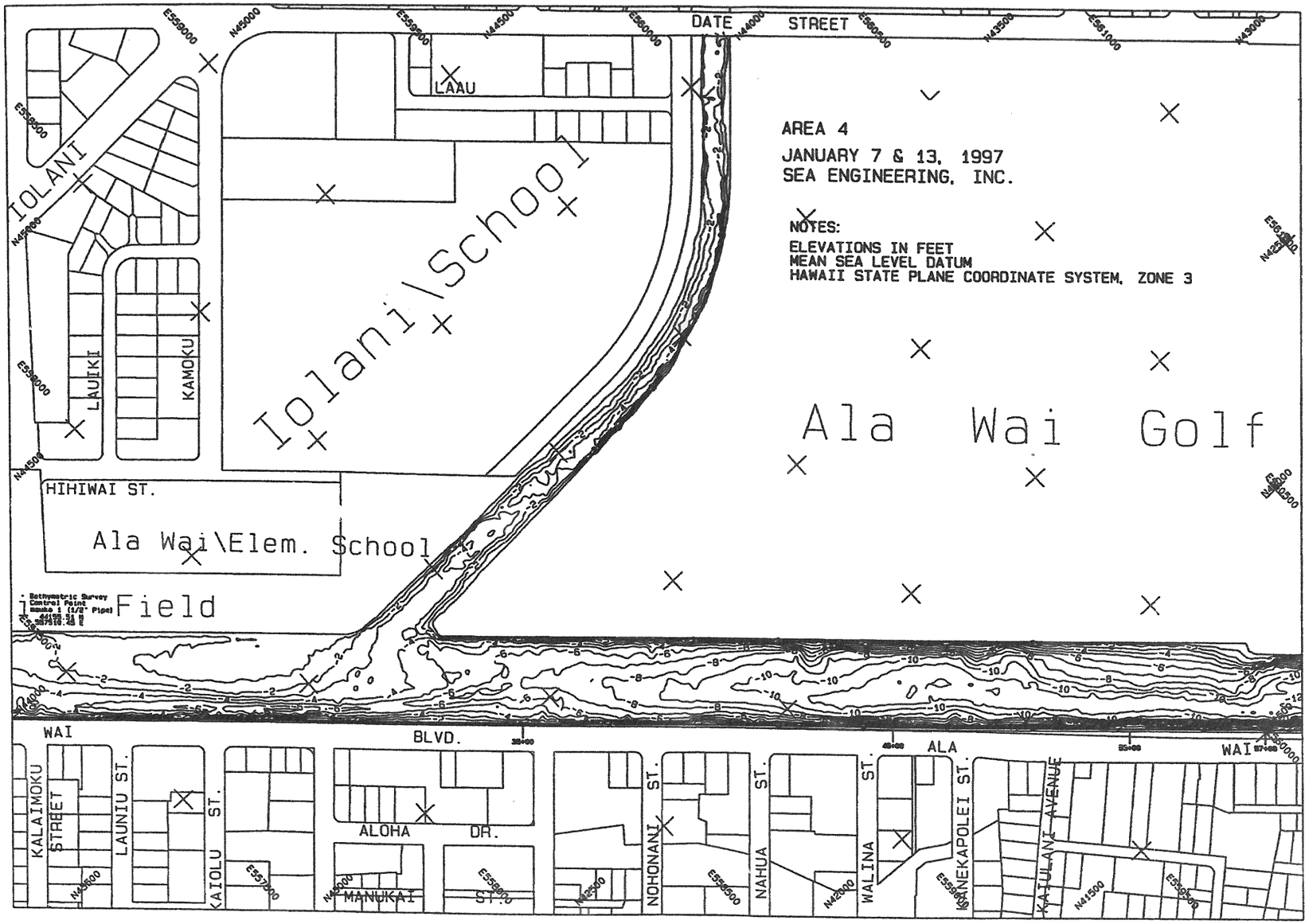

NORTH

0 150 300 600
SCALE IN FEET

Figure 2-1D
BATHYMETRIC SURVEY OF ALA WAI CANAL: AREA 4
Ala Wai Canal Dredging Environmental Assessment
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TABLE 2-1: BATHYMETRY SUMMARY

Location	Approximate Channel Bottom Elevation
Ala Wai Canal: McCully Street Bridge	-10 feet MSL
Ala Wai Canal: Confluence with Manoa-Palolo Drainage Canal	-2 feet MSL
Ala Wai Canal: Upstream of confluence with Manoa-Palolo Drainage Canal	-8 feet to -10 feet MSL
Manoa-Palolo Drainage Canal: Upstream of the confluence with Ala Wai Canal	-4 feet MSL
Manoa-Palolo Drainage Canal: Date Street Bridge	-2 feet MSL

In addition to the presence of sediment buildup, especially in the shoal area, the presence of depressions negatively affects water circulation. The Ala Wai Canal is a long, narrow, salinity-stratified estuary where circulation is affected by storm events and tides. During heavy rainfall-runoff events or strong tradewind conditions, the surface layer will flow towards the ocean regardless of the tidal phase. The underlying layer is largely tidally influenced, with currents flowing into the canal during flood tide and out of the canal during ebb tide. During substantial rainfall events, runoff and stream flow into the canal causes the entire water column to flow seaward independent of tidal phase. Tidal currents within the canal are slight, do not lead to a natural flushing of the canal, and do little to circulate water, especially in localized depressions present within the canal. Depending on the dredge depths chosen, dredging could serve to even out the bottom surface of the Ala Wai Canal for more favorable water circulation.

2.2.2 Sediment Accumulation

In general, sediment is transported in streams and drainage ways by the flow of water. Sediment suspended in flowing water can settle to the bottom of a stream or drainage way, depending on the velocity of flow and size of the sediment particles. The slower the flow and the bigger the particles, the more settling occurs. Therefore, the accumulation of sediment can be characterized based on the amount and rate of sediment accumulation, the geometry of the Ala Wai Canal and MPDC, and on the sizes of particles accumulated in them. Sediment accumulation is a complex process; for the purposes of this document it is described below in simplified terms based on existing information for the Ala Wai Canal and MPDC.

Based on a comparison of the 1997 bathymetry and 1978 design dredge depths, the annual average sedimentation rate in Area 2 (Ala Wai Canal between the McCully Street Bridge and MPDC confluence), which includes the shoal area, is about 6,500 cubic yards per year. Other estimates based on previous bathymetric surveys range from about 8,000 to 10,500 cubic yards per year. [10]

[10] • Edward K. Noda and Associates (1992b) *Ala Wai Canal Improvement Project Feasibility Report. Report R-89b.* Prepared for the State of Hawaii, Department of Land and Natural Resources, Division of Water and Land Development. Job No. 31-OL-I.

• Gonzales, F.I. (1971) *Descriptive Study of the Physical Oceanography of the Ala Wai Canal.* Hawaii Institute of Geophysics Report HIG-71-7. University of Hawaii.

• Laws, E.A. *et al.* (1991) *Hypereutrophication of the Ala Wai Canal: Prospects for Cleanup. Research Report.* University of Hawaii at Manoa, Department of Oceanography. Unpublished.

As sediment accumulates in the canal, volume available for water decreases and the flow velocity increases, which means that less sediment will settle out in the canal.

The area of the shoal at the MPDC has historically experienced the greatest amount of sediment accumulation. Of the existing streams discharging into the canal, the MPDC contributes the greatest flow and carries the most sediment. At the confluence with the Ala Wai Canal, the velocity of flow from the MPDC is reduced as it enters the wider and deeper Ala Wai Canal. The resulting drop in flow velocity reduces the water's capacity to carry suspended particles, which consequently settle out and, over time, result in the creation of the shoal.

Particle size distribution in the canal was analyzed and reported in 1977[11] and 1997,[12] with different definitions of what constitutes clays, silts, sand, and gravel (listed in order of increasing size). In general terms, the 1977 analysis found that Ala Wai Canal sediment in the deep, calm water upstream of the MPDC was predominantly fine-grained particles. The area of the highest flow velocity, the Ala Wai Canal near the MPDC, exhibited the greatest proportion of sand sized particles. The proportion of silt to sand increased with distance downstream from the confluence of the MPDC. The 1997 analysis found that the particle size of sediments collected in the Ala Wai Canal in the shoal area was predominately fine-grained. At the Kapahulu end of the canal, there was a wider distribution of sands, silts, and clays. In the MPDC the particles were mostly sand and gravel.

In the future, the accumulation of sediment in the Ala Wai Canal and MPDC could be reduced by implementation of best management practices with regard to erosion and generation of contaminants in the watershed. The implementation of best management practices would not remove existing sediment that has already accumulated in the Ala Wai Canal and MPDC, and therefore is not an alternative to the proposed action. However, implementation of best management practices could in the future reduce the volume of sediment and/or associated pollutants that are transported or accumulated. Examples of plans by others to implement best management practices include promulgation of local ordinances to require use of non-metallic brake pads to reduce metals entering the Ala Wai Canal, stream bank restoration for erosion control, construction of sediment retention structures, and tax incentives for building owners to install roof gutters which direct rainfall runoff from the roof toward the street to reduce the source of termiticides.[13]

There are options for managing sediment in the Ala Wai Canal that, similar to the best management practices mentioned above, are not alternatives to the proposed action. These options include 1) consideration of design criteria to prolong the duration between dredging events, or 2) scheduling maintenance dredging events at routine intervals. The first option could consider, as an example, dredging deeper in those areas of the canal where sedimentation rates are higher. This approach

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[11] Sunn, Low, Tom & Hara, Inc. (1977) *Negative Declaration and Environmental Impact Assessment for the Proposed Ala Wai Dredging.* Prepared for the State of Hawaii, Department of Land and Natural Resources, Oahu, Hawaii.

[12] • Belt Collins Hawaii, MEC Analyticai Systems, and Sea Engineering, Inc. (January 8, 1998) *Ala Wai Canal Conceptual Design and Environmental Assessment, Dredge Sediment Characterization, Tier II Sampling and Analysis Plan* . Prepared for City and County of Honolulu Department of Transportation Services.

• Belt Collins Hawaii, MEC Analytical Systems, and Sea Engineering, Inc. (January 8, 1998) *Ala Wai Canal Conceptual Design and Environmental Assessment, Dredge Sediment Characterization, Final Tier II Laboratory and Data Report.* Prepared for City and County of Honolulu Department of Transportation Services.

[13] Comment letter from Ala Wai Canal Technical Advisory Committee dated June 8, 1998. (See Appendix H.)

would have to account for the tradeoffs between sedimentation rates versus available water depths, as generally an increase in water depth corresponds to an increase in sedimentation rates. This approach differs from the one used to determine the maximum dredge depths for the proposed action, in which the goal is to improve the hydraulic condition of the canal in the event of a 100-year storm (see Section 2.2.3). The second option has been addressed in a previous study, which recommends that the Ala Wai Canal be dredged every 10 years or that the MPDC be dredged every three years so that sedimentation within the Ala Wai Canal is reduced.[14]

2.2.3 Flood Control

Given the annual rate of sediment deposition in the canal, continued loss of drainage capacity will occur, resulting in flooding from storm events with more frequent return periods.[15] This section discusses the flow rates and flood capacity in the Ala Wai Canal, based on previous studies. It should be noted that the State Department of Land and Natural Resources (DLNR) plans to conduct a flood control study of the Ala Wai Canal with funds available as of July 1, 1998 subject to governor approval.

Hydrology

The Ala Wai Canal receives storm water from three subwatersheds: Manoa-Palolo, Makiki, and Kapahulu. Boundaries for the three subwatersheds, as designated in the 1994 analysis, are provided in Figure 2-2. The combined watershed area is approximately 16.3 square miles.[16] The canal is located on the leeward side of the island of Oahu, where the climate is relatively dry, mild, and seasonably uniform. The average rainfall for the project area is less than 30 inches per year, but substantially greater rainfall occurs in the upper reaches of the watershed.

Hydrologic analyses were performed in 1977, and again in 1994, as part of the Sunn, Low, Tom & Hara (SLTH), and the Edward K. Noda and Associates (Noda) studies, respectively. Estimated storm water runoff discharges into the Ala Wai Canal, as computed in these reports, are presented in Table 2-2.

Note that discharge rates presented in the two referenced reports were computed using two different methods. In the Noda report, flow rates for the various return year storms[17] were developed based on statistical analysis of (recorded historical flow) data from USGS Stream Gage Station No. 2471. The methodology used is described in the "Guidelines for Determining Flood Flow Frequency," Bulletin 17B, revised September 1981, by the U.S. Water Resources Council.

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14 Edward K. Noda and Associates (1992d) *A Maintenance Plan for the Ala Wai Canal. Report R-89d.* Prepared for the State of Hawaii, Department of Land and Natural Resources, Division of Land and Water Development. Job No. 31-OL-I.

15 Edward K. Noda and Associates (1994) *Ala Wai Canal Improvement Project, Storm Water Capacity Study.*

16 Sunn, Low, Tom & Hara, Inc. (1977) and Edward K. Noda and Associates (1994) in Belt Collins Hawaii et al. (March 27, 1997) *Ala Wai Canal Dredging Conceptual Design and Environmental Assessment, Dredge Sediment Characterization, Draft Tier II Sampling and Analysis Plan.* Prepared for City and County of Honolulu Department of Transportation Services.

17 Definitions: A 2-year storm is one that statistically will occur once every 2 years; a 5-year storm is one that statistically will occur once every 5 years; a 10-year storm is one that statistically will occur once every 10 years; etc.

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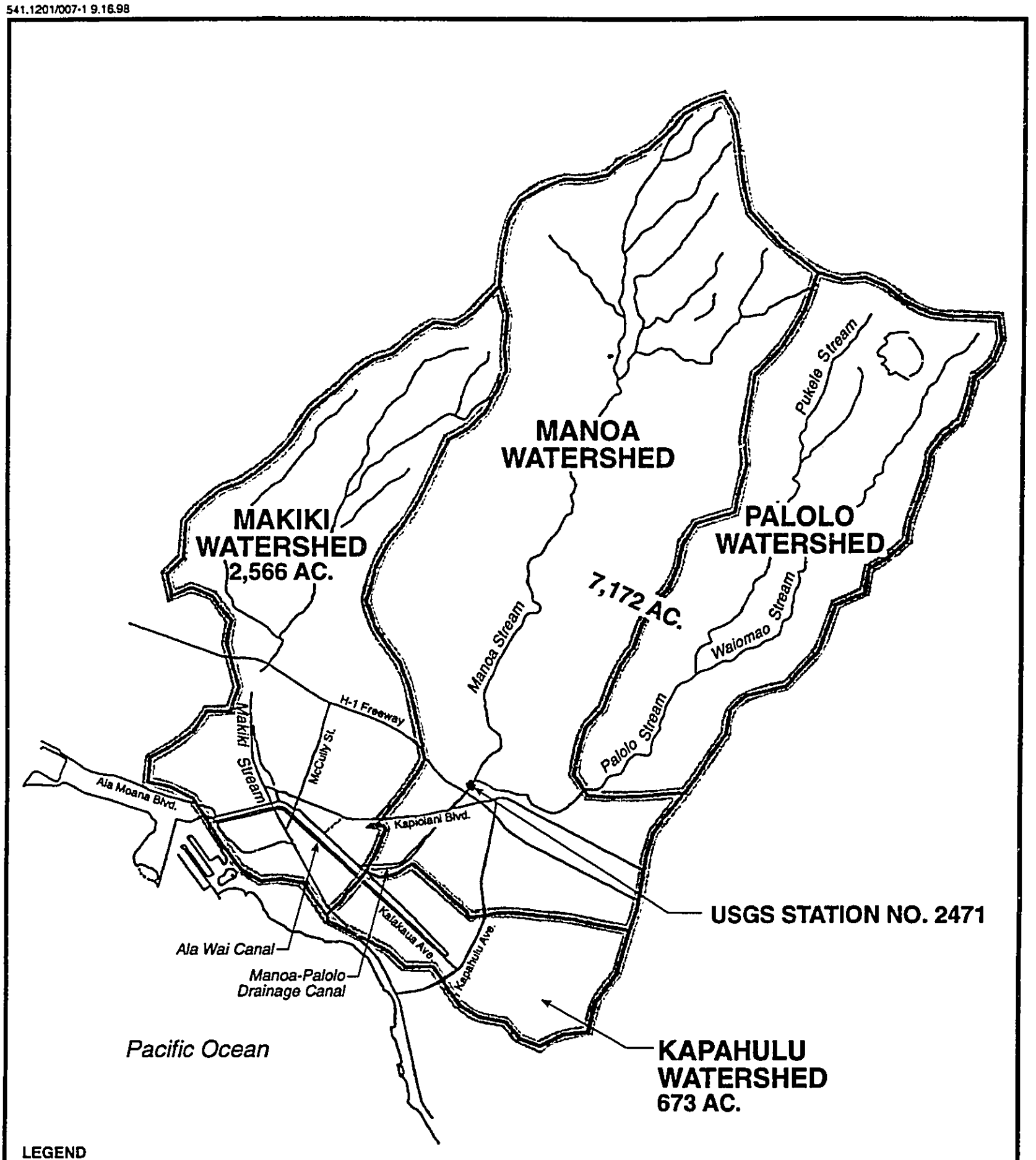

LEGEND

Subwatershed boundaries

Source: Edward K. Noda and Associates, 1994

Figure 2-2
SUBWATERSHEDS OF THE ALA WAI CANAL WATERSHED

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TABLE 2-2: PEAK RUNOFF DISCHARGE RATES

Storm Return Interval[a] (Years)	Peak Discharge Rates (cubic feet per second [cfs])			
	Subwatersheds (Drainage Area, Acres)[b]			Total (10,411)
	Manoa-Palolo (7,172)	Makiki (2,566)	Kapahulu (673)	
2	3,368	1,391	440	5,200
5	5,906	2,517	829	9,252
10	7,761	3,341	1,115	12,218
50	12,104	5,319	1,823	19,247
100	14,009	6,219	2,161	22,389
SLTH (Drainage Standard Peak)[c]	13,500	7,800	2,100	23,400

[a] Rates for the two-, five-, 10-, 50-, and 100-year return intervals from Noda (1994).

[b] Drainage area acreage from Noda (1994). SLTH report subwatershed boundaries differ from Noda (1994). Resulting drainage areas used in SLTH's computation of flow rates are as follows: Manoa-Palolo 7,858 acres, Makiki 2,098 acres, and Kapahulu 464 acres respectively, for a total of 10,420 acres.

[c] SLTH report (1977), based on City Drainage Standards for areas greater than 100 acres.

The 1977 SLTH report data was developed based on the City and County of Honolulu, Drainage Design Standards peak discharge versus drainage area curves (in use at that time). The reference flow curve used was developed based on maximum recorded flood peaks recorded for the region.

Hydraulics

A hydraulic analysis of the Ala Wai Canal was conducted in 1994.[18] The purpose of this study was to assess the relative effectiveness of dredging to increase the canal storm water flow carrying capacity. The study evaluated flood elevations relative to existing canal bank elevations for both existing and post-dredge conditions (Figures 2-3 and 2-4). Various dredging schemes were evaluated for the two-, five-, 10-, and 100-year storm events. As the volume of sediment in the canal has increased since 1994, the hydraulic analysis may under-represent 1998 hydraulic conditions (Figure 2-3). However, the 1994 hydraulic analysis of the various dredge depth alternatives is independent of existing canal bottom conditions and therefore continues to be relevant for this report.

Results of the existing hydraulic conditions (as studied in 1994) are summarized in Figure 2-3. The computer analysis of the canal model indicated that the canal can marginally handle a 10-year or more frequent storm event, but cannot handle the 100-year storm event.[19] To address this inadequacy, further analyses were conducted (in the same 1994 report) to determine an effective

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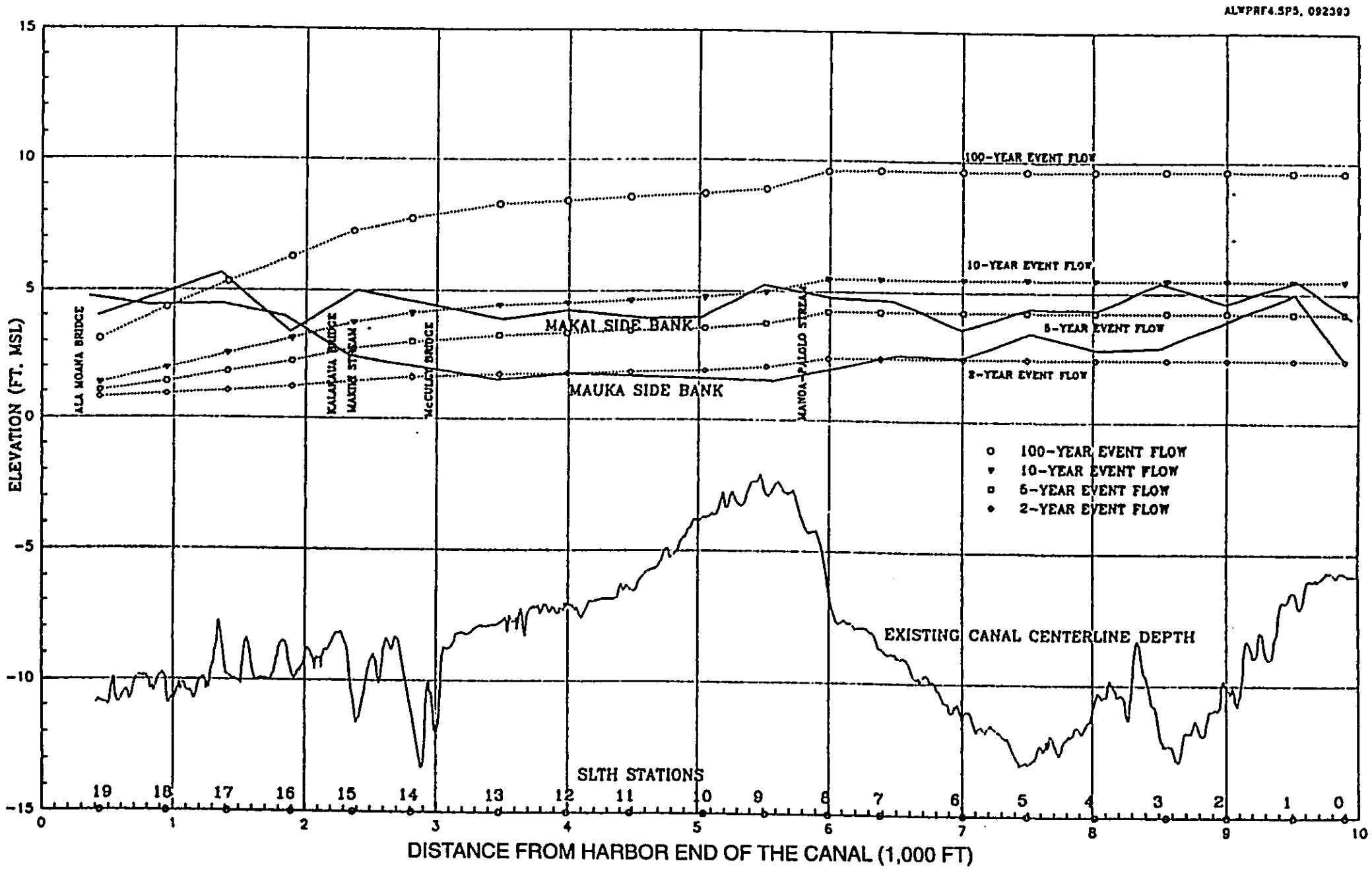
18 Edward K. Noda and Associates (1994) *Ala Wai Canal Improvement Project, Storm Water Capacity Study.*

19 As noted in Edward K. Noda and Associates (1994), canal *makai* and *mauka* bank top elevations were plotted based on data from the Sunn, Low, Tom & Hara, Inc. (1977) "Preliminary Engineering Report." As further noted in Edward K. Noda and Associates (1994), although "bank top elevations may not represent the present conditions since they were surveyed over 15 years ago, they can serve as a reference to examine the canal water levels."



Source: Edward K. Noda and Associates, Inc. (1/26/94) *Ala Wai Canal Improvement Project Storm Water Capacity Study*

Figure 2-3
ALA WAI CANAL STORM WATER LEVELS FOR THE EXISTING BATHYMETRY CONDITION

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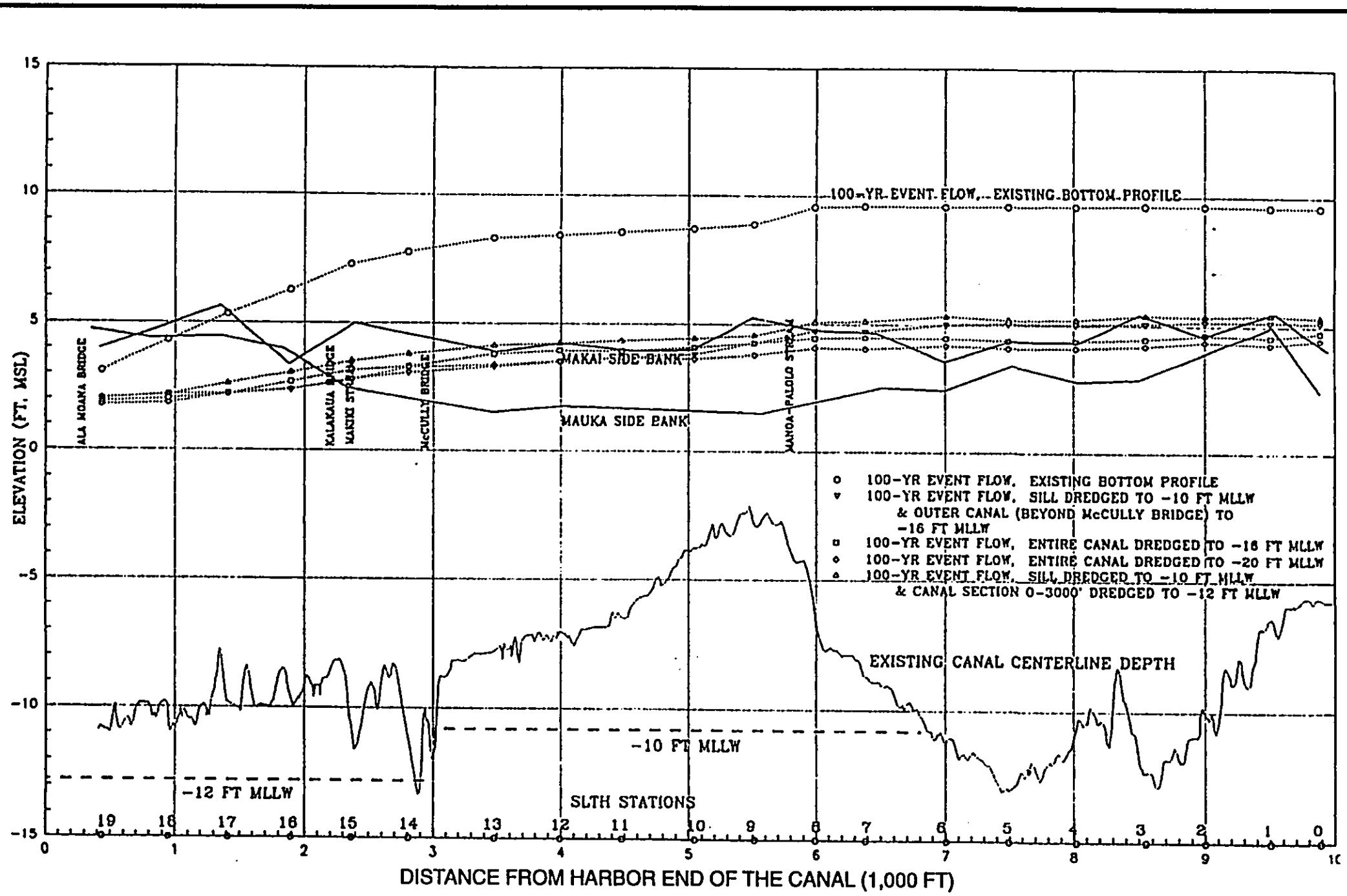

Source: Edward K. Noda and Associates, Inc. (1/26/94) *Ala Wai Canal Improvement Project Storm Water Capacity Study*

Figure 2-4
ALA WAI CANAL STORM WATER LEVELS BASED ON DEEPENING THE SILL AND DOWNSTREAM SECTION

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dredging scheme.[20] Figure 2-4 summarizes the results (comparing 100-year storm water surface elevations for various dredging alternatives).

The 1994 study concluded that dredging the 3,000-foot-long section of the canal downstream of McCully Street Bridge (Area 1) to 12 feet below mean low-low water (–12 feet MLLW) and the 4,000-foot section of the canal upstream of the McCully Street Bridge (Area 2) to –10 feet MLLW should lower the 100-year flood water level to the approximately four feet to five feet MSL elevation of the *makai* bank top. Based on the details of the analysis performed, it appears the maximum targeted dredge depth in Areas 1 and 2, which are about one foot shallower, will also have the same result.

2.3 GENERAL DESCRIPTION OF THE ACTION'S TECHNICAL, ECONOMIC, SOCIAL, AND ENVIRONMENTAL CHARACTERISTICS

Technical Characteristics

The purpose of the proposed action, dredging the Ala Wai Canal and MPDC, will be accomplished by the use of dredging and transportation equipment. The limits of dredging within the Ala Wai Canal are the Ala Moana Boulevard Bridge and the Kapahulu Avenue end of the canal. The limits of dredging within the MPDC are the Ala Wai Canal and the Date Street Bridge. The presence of dredge equipment in the canals will be limited to the vicinity where sediment is being excavated ("dredge site"). Transportation equipment (pipelines or scows) will traverse the length of the canals from the dredge site to a barge moored near Magic Island. Sediment placed in the barge will be transported to an ocean disposal site (South Oahu Ocean Dredged Material Disposal Site [ODMDS]) and/or an upland site that is accessible by water. Upland sites considered include the Honolulu International Airport Reef Runway, a State-owned parcel of park land at Sand Island, and the Waipahu Ash Landfill (a City-owned incinerator ash landfill on the Waipio Peninsula, also referred to in this document as the Waipio site), with the Reef Runway being the only suitable upland option. Additional land used will be shore-side of the Ala Wai Canal, and at Magic Island, for equipment staging purposes. The overall duration of the project is expected to be approximately one year. This is based upon a five-day work week, 10-hour day, with eight hours of dredging. If the dredging contractor worked longer days, or longer weeks, the project duration would decrease. If the work week were six days, the project duration would decrease by approximately three months. If work occurred during holidays, the project duration would decrease by approximately two weeks. The final schedule for and duration of dredging will need to be balanced against potential impacts, including issues of park use, noise, and safety.

Socioeconomic Characteristics

Estimated project costs range from an average of $7 million to an average of $12 million, depending on the project component options chosen. The State Legislature, during its 1997 session,

[20] In Edward K. Noda and Associates (1994), the *makai* bank top elevation appears to have been selected as the limiting factor affecting maximum water surface elevation. Selection of the *makai* bank was interpreted to be due to the high concentration of densely developed and populated property all along this side of the canal. Areas immediately adjacent to the *mauka* side of the canal are primarily parks and golf course areas.

appropriated $10.35 million for construction (dredging). These funds must be committed by June 30, 2000, or they will lapse.

Recreational uses of the canal will be subject to short-term negative impacts during construction, but will subsequently benefit from substantial long-term positive impacts. Specifically, short-term impacts are associated with temporary inconveniences from the presence and movement of dredging and transportation equipment in the canal and with associated uses of park lands adjacent to the Ala Wai Canal for supporting activities. Portions of the canal will be temporarily inaccessible due to the presence of the equipment, but no recreational uses will be eliminated during dredging. Once dredging is complete, water use activities in the canal will be enhanced by the removal of shoal areas. The temporary use of park lands will be minimized by careful layout configuration and minimization of the sites to be used.

Residents in the vicinity of the canal will have a potential exposure on a temporary basis to construction noise, change in views of the canal, and possibly odors. Students at nearby schools, users of Ala Wai Community Garden, golfers at the Ala Wai Golf Course, convention attendees at the Hawaii Convention Center, and tourists at hotels in or visiting the Waikiki area will also be subject to these short-term exposures. None of these impacts are expected to be substantial.

Environmental Characteristics

No substantial environmental impacts are anticipated from the proposed action. Short-term effects from dredging activities during construction include: resuspension of bottom sediment; removal of the benthic communities in dredged areas; inconvenience to recreational users of canal waters and certain park land parcels; increase in ocean traffic; use of parking stalls in staging areas; and increased air emissions from fuel combustion for powering equipment. Long-term impacts will be positive, including improved drainage capacity, and improved navigation for recreation in the canal.

Impacts associated with noise, aesthetics, and odor will be transient and sporadic during construction. Apart from a possible need to relocate one private (Sheraton Hotels) water line, and allow for the presence of two electrical lines in a Hawaiian Electric Company easement, utilities will not be affected. Consistency with existing land uses and land use policies will be achieved.

Impacts associated with upland disposal of dredged sediments at the Reef Runway include potential for leaching of contaminants into groundwater, increase in barge traffic, and temporary disruption to recreation adjacent to the Reef Runway. The latter impacts would be short-term and temporary. The issue of contamination to groundwater would be addressed through sediment processing, and long-term monitoring of the site would be conducted consistent with state solid waste regulations.

The Ala Wai Canal is listed in the National and State registers of historic places. DLNR, State Historic Preservation Division concurs that there will be no effect on the historic character of the Ala Wai Canal or associated historic resources (see Appendix G).

Outrigger canoeing, a traditional Hawaiian water sport and mode of transportation, takes place in the Ala Wai Canal. This cultural practice may be temporarily affected by the presence of construction equipment temporarily obstructing passage on a portion of the canal, or launching from shore. The long-term effect will be positive for outrigger canoeing since removal of shallow areas will make more of the Ala Wai Canal passable for canoes.

Environmental justice concerns relate to fishing in the Ala Wai Canal. The majority of these fishermen are from minority and/or low-income populations, and some consume their catch. Fish contamination in the Ala Wai Canal is an existing condition, and potential health effects could result from consuming contaminated fish. The public should be advised of this, and signs should be posted along all portions of the canal where fishing occurs. Over the long-term, the proposed action will help to address the contamination potential.

3. ALTERNATIVES

As presented in Chapter 1, the proposed action, to dredge the Ala Wai Canal and the Manoa-Palolo Drainage Canal (MPDC), is divided into six components: (1) where to dredge, i.e., dredge limits; (2) how to dredge, i.e., dredge method (3) transporting sediment for disposal or reuse, (4) using areas of water and shore-side lands for supporting operations (staging and material transfer), (5) processing sediments, and (6) disposal or reuse of the dredged sediment. From an engineering standpoint, multiple options exist for each of these components, but not all options identified were found to be feasible given project-specific limitations and consideration of compatibility among other components.

Project alternatives are composed of at least one option for each component. In other words, various combinations of options for these six components comprise the project alternatives. The component options evaluated in this environmental assessment (EA) have passed two screening evaluations, those for engineering feasibility and for conceptual design. Engineering feasibility screening involved: attainment of the project objectives of flood abatement, restoration of sediment holding capacity, and recreational enhancement; the consideration of accessibility to the canal of certain equipment; rates of productivity; land area requirements for processing; and capacity of sites for the anticipated amount of material. Conceptual design, the second level of screening, included three generic considerations: whether the option meets regulatory compliance for water quality, solid waste, navigational safety, and recreational and historic sites protection; what the effect of the option is on the duration of construction; and what the cost of the option is. The third level of screening, environmental impacts, is the focus of this EA. Reports documenting these evaluations are provided in Appendix A. The analysis of environmental and social impacts are found in Chapter 4. The types of criteria applied at each level of evaluation are listed in Table 3-1.

TABLE 3-1: EVALUATION CRITERIA

Planning Activity	Criteria Applied
Engineering Feasibility Study	Project Objectives Met Technical Feasibility
Conceptual Design	Regulatory Compliance Project Duration Cost
Environmental Assessment	Significance of Environmental and Social Impacts

This EA initially evaluates the direct impacts of individual component options, rather than specific combinations of options, for environmental and social impacts. The feasible sets of options, which are the project alternatives, are then considered together for analysis of indirect and cumulative effects. In selecting alternatives for consideration, only those options that individually and collectively (with other feasible and compatible components) have no substantial impacts will be allowed. This approach is intended to allow maximum flexibility for bidding to allow innovative approaches, while preventing substantial environmental impacts.

3.1 ALTERNATIVES EVALUATED

The options evaluated in this EA are presented in Table 3-2 by component and discussed in more detail below. Options that are more favorable than others from a conceptual design standpoint are so noted. Options that remain as suitable upon evaluation of environmental and social impacts are discussed in Section 3.4.

TABLE 3-2. SUMMARY OF OPTIONS EVALUATED IN THIS EA

Component	Description of Options
1 – Dredge Limits	Area 1: -12 feet MSL maximum dredge depth
	Area 2: -10 feet MSL maximum dredge depth
	Area 3: -6 feet MSL maximum dredge depth, plus two additional variants: - Deeper dredging may be possible to improve water quality – may require additional testing and will require regulatory approvals. - Filling deep areas to improve water quality may be possible – may require additional regulatory approvals.
	Area 4: -10 feet MSL maximum dredge depth
2 – Dredge Method	Mechanical dredging (compatible with scow transport only)
	Hydraulic dredging (compatible with pipeline transport only)
3 – Sediment Transport	Scow transport to barge mooring site (compatible with mechanical dredging only)
	Pipeline transport to barge mooring site (compatible with hydraulic dredging only)
	Barge transport to processing/disposal site
4 – Use of Shore-side Areas	Upper Canal Laydown: Ala Wai Neighborhood Park A (most favorable) Kapahulu Avenue end site
	Lower Canal Laydown: Magic Island (most favorable) Vacant lot on Kalakaua Avenue
	Barge Mooring: Magic Island
5 – Sediment Processing	Offsite dewatering basins
	Hybrid mechanical dewatering systems
	Dewatering on barges (minimum of two barges would be required)
6 – Sediment Placement	South Oahu Ocean Dredged Material Disposal Site (ODMDS; ocean disposal)
	Reef Runway site as fill
	Sand Island as fill
	City and County Waipahu Ash Landfill at Waipio site as cover material

The principal options evaluated and discarded include deeper dredging limits because of structural concerns, truck transportation of sediments because of cost and traffic impacts, mechanical dewatering in the Ala Wai Canal because of cost and regulatory concerns, and reuse/disposal sites in the Barbers Point-Waianae area because of transportation costs.

3.1.1 Detailed Description of Components

The six components of the proposed action are described below. A comparison of feasible sets of options is in Section 3.2. The details such as dredge limit setback from the canal edge, side slopes, structural stability of the existing walls and bridges, dredge volumes, project duration, and cost are subject to refinement during the final design phase when additional studies such as geotechnical surveys and additional sediment testing may occur. The project details and evaluation of impacts in this EA cover the range of possible impacts.

Component 1, the limits and extent of dredging, are limited by geophysical considerations, obstructions by installed infrastructure, and regulatory considerations. The potential dredge areas and maximum depths depicted in Figure 1-2 are based on the maintenance dredging of the Ala Wai Canal, and consideration of the recommendations in a previous study by Edward K. Noda and Associates (see Section 2.2.3). In Area 1, dredging to –12 feet MSL corresponds to a dredge volume of approximately 8,500 cubic yards (CY). In Area 2, dredging to –10 feet MSL would result in a dredge volume of approximately 123, 500 CY. In Area 3, dredging to a maximum depth of –6 feet MSL would result in only 500 feet at the upstream (Kapahulu Avenue) end of Area 3 being dredged, for a volume of approximately 3,500 CY. Dredging 1,100 feet of the downstream end of Area 3 to –10 feet MSL (for an additional volume of about 11,000 CY) would open up existing depressions in Area 3, possibly resulting in an improvement in circulation and water quality. Filling these depressions with dredged sediment from the Ala Wai Canal and/or MPDC is another possibility.[21] Therefore, these variants are also considered in this EA. In Area 4, sediment to be dredged to a depth of –eight feet MSL has been approved for ocean disposal (see following discussion of Component 6), for a dredge volume of approximately 26,500 CY. Dredging to –10 feet MSL in Area 4 would result in an additional dredge volume of 5,500 CY. Because this incremental volume does not warrant the additional testing that will be required for characterization, a maximum dredge depth of –eight feet MSL in Area 4 is considered in the evaluation of potential impacts.

As initially planned, Areas 2, 3, and 4 would be dredged to the depths shown in Figure 1-2. This was based on the review of the previous study recommendations by Edward K. Noda and Associates (see Section 2.2.3). Subsequently, in February 1997, at the first meeting of the Agency Working Group (AWG) for this project, the Convention Center Authority expressed a desire to include Area 1 as part of the project. Thus, this EA considers dredging in Areas 1, 2, 3, and 4.

Component 2, dredging methodology, has two essential options. One option is hydraulic dredging, which uses hydraulic suction to remove the sediment and pumps them away in a pipeline slurry. The second option is mechanical excavation using a crane bucket or backhoe. There are many variants that revolve around these two basic methods. Because hydraulic dredging produces a slurry with high water content (as high as 80 percent), it needs to be pumped away through a pipeline. Mechanical dredging spoils are approximately 50 percent water content, and therefore too solid to be pumped.

Component 3 consists of transporting the sediment. The methods of transportation need to take into account the conditions of the sediment following dredging, especially with regard to water content. The two principal options are pumping the sediments as a slurry through a pipeline for hydraulic

[21] Filling to –11 feet MSL would require a total volume of approximately 2,000 CY; to –10 feet MSL, 7,500 CY; to –9 feet MSL, 16,500 CY; to –8 feet MSL, 29,000 CY; to –7 feet MSL, 44,500 CY; and to –6 feet MSL, 63,500 CY.

dredging, or carrying the sediments in scows appropriately sized (up to approximately 30 feet by 15 feet) to the waterway for mechanical dredging.

Component 4 is the set of shore-side support areas needed for the project. Use of shore support areas will substantially speed up completion of the project. About one quarter of an acre is needed of a site that is central to the dredging activity and is truck accessible. Two such areas are needed, one above and one below the McCully Street Bridge. Activities in this area would include movement of people and material from shore to water during mobilization and operation, truck turnaround, storage, bulky item storage and removal, and equipment maintenance. Additional dredging support area on the water will be provided by the dredging barge.

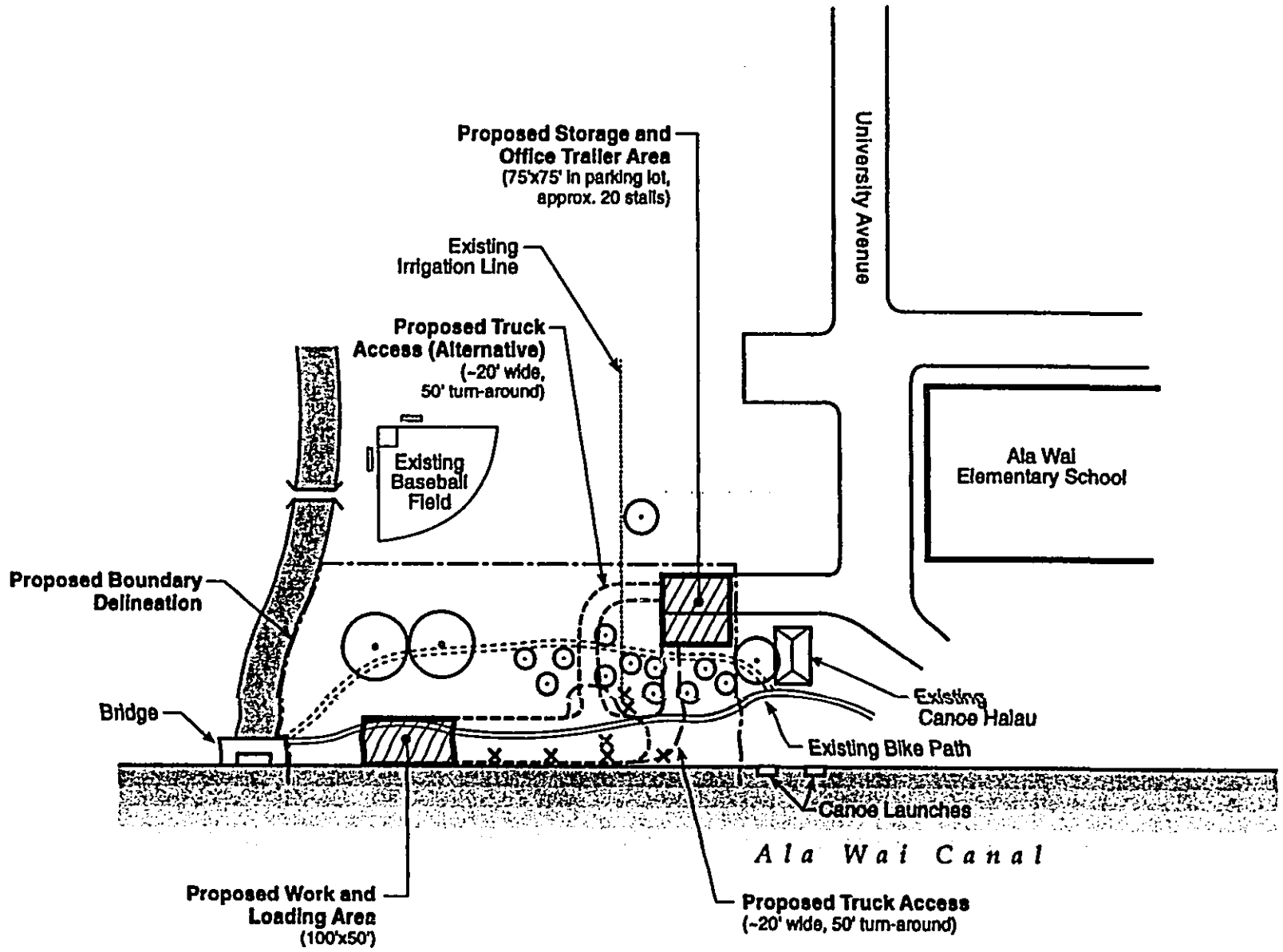
Publicly-owned sites above the McCully Street Bridge that are operationally feasible are a site adjacent to the Ala Wai Golf Course at the Kapahulu end of the Ala Wai Canal and the Ala Wai Neighborhood Park A. The Kapahulu end site is adjacent to a canoe launch area and is not in close proximity to where the majority of dredging would occur. The Neighborhood Park A is the most favorable option. It is located at the base of University Avenue and has a softball field, canoe *halau*, canoe launch, bike path, children's play area, and parking. Protection of an irrigation main underlying the park, protection of water valve and electrical control boxes, temporary re-routing of the bike path, and minimizing tree removal to a few coconut palms will be incorporated into the use plan for this site. The site will be returned to original preconstruction condition after dredging activity is completed. A possible schematic layout for the park is shown in Figure 3-1, and includes an approximate boundary delineation.

Sites below the McCully Street Bridge that are operationally feasible are the privately-owned vacant lot on Kalakaua Avenue across from the Hawaii Convention Center, and a portion of the Magic Island parking lot, a publicly-owned park. In addition, an area in the waterway below the Ala Moana Boulevard Bridge is needed to provide a location to transfer sediments to an ocean-going barge. The Magic Island site is most favorable for work support. None of the trees located in the Magic Island parking lot will be removed. The barge would be moored off Magic Island within the Ala Wai Harbor turning basin. The site, including area over which the barge is moved, will be restored to previous condition after dredging activity is completed. The site will be returned to original preconstruction condition upon completion of work. A schematic layout is shown in Figure 3-2, and includes an approximate boundary delineation.[22]

Component 5 is dewatering and processing. Given the condition of the sediments following dredging, and depending on the final disposal or reuse location, some processing may be necessary. Processing will typically include dewatering and/or mixing with some additive material prior to placement. Options include use of gravity dewatering basins, mechanical dewatering, use of additives during placement, and evaporation. The mechanical dewatering option is not considered feasible if it would require disposal of effluent into nearshore waters.

Processing of sediments will need to address the potential that high concentrations of sulfides in the dredged sediments may react with air and result in acidic conditions. Acidic conditions (low pH) can result in leaching of heavy metals from the sediment, and increase potential for contaminants to

[22] DOBOR, which has jurisdiction over mooring in the basin, has indicated that the only feasible location for a large barge is the corner of the basin adjacent to Magic Island. The barge location shown in the schematic attempts to maximize to the extent possible the barge's distance from this corner, to allow for recreational uses.



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LEGEND

:::::: Proposed temporary bike route

⊙ Tree

× Water valve and electrical control boxes

NORTH

0 50 100 200 400

SCALE IN FEET

Figure 3-1
STAGING AREA SCHEMATIC LAYOUT—
ALA WAI NEIGHBORHOOD PARK A
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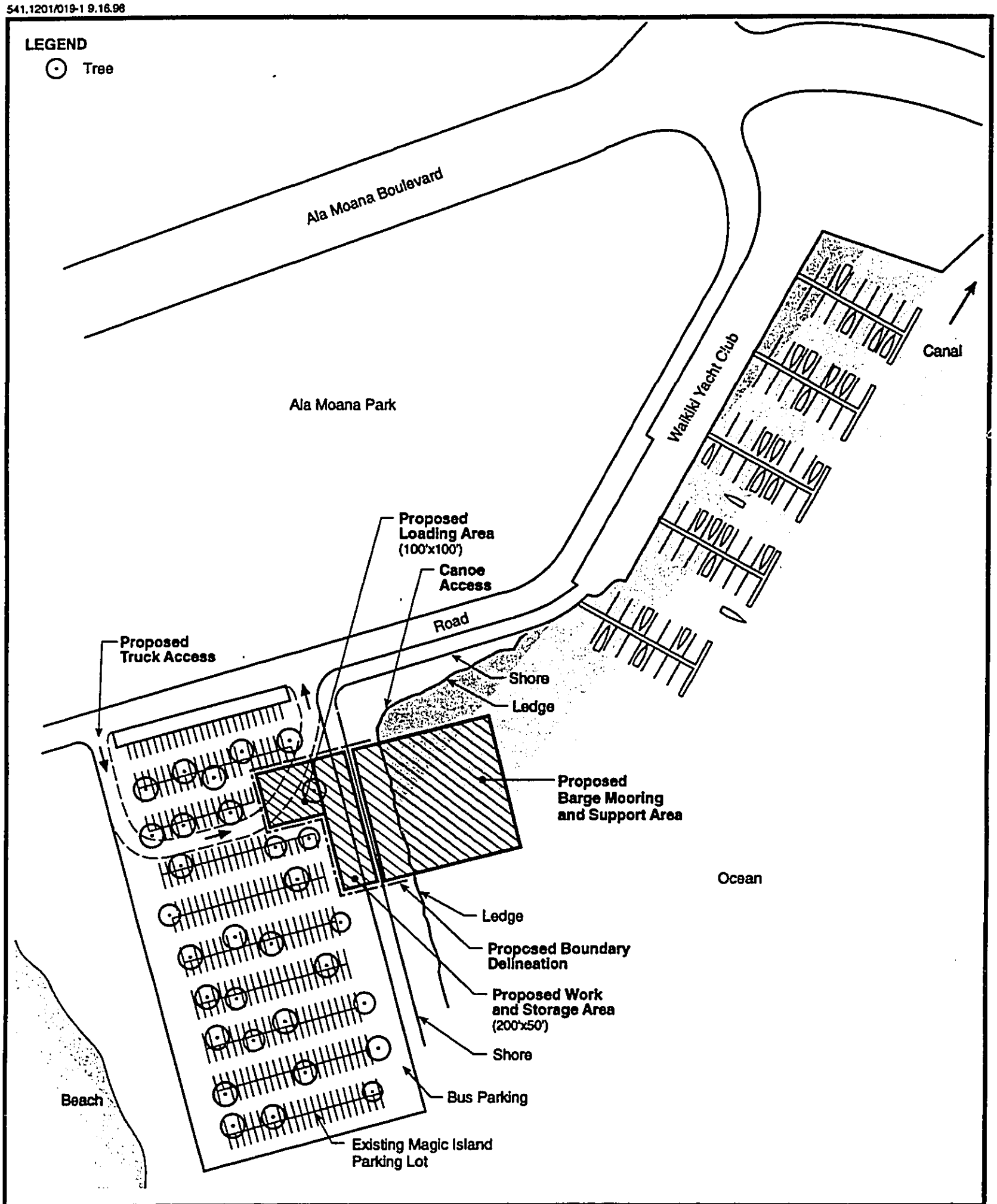

Figure 3-2
STAGING AREA SCHEMATIC LAYOUT—MAGIC ISLAND

NORTH

0 100 200
SCALE IN FEET

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migrate. Therefore, processing of sediments may include increasing the pH of the material, possibly by adding calcium carbonate compounds (i.e., lime), to decrease the potential for contaminants to migrate from the sediments into ground or surface waters. If during the final design phase, migration of contaminates appears likely, liners will be incorporated into design of the dewatering and processing area. Processing will also need to result in a material suitable for fill (see Component 6, below).

Component 6 is sediment placement for disposal or reuse, in the ocean and at an upland site. Figure 3-3 shows possible placement locations. The South Oahu ODMDS[23], located 3.25 nautical miles south of the Honolulu International Airport, is the designated ocean disposal location closest to the Ala Wai Canal. Depths at the site range from 400 to 475 meters, and the site is two kilometers (km) wide and 2.6 km long. Placement at this site requires approval by the U.S. Army Corps of Engineers (ACOE) and U.S. Environmental Protection Agency (EPA) (see Section 5.2.5).

There are several upland locations for potential beneficial reuse, all of which are accessible by barge. These include the Reef Runway site for use as fill (Figure 3-4), the Sand Island site for reuse as nonstructural fill (Figure 3-5), and the Waipio site for use as landfill cover (Figure 3-6). The Honolulu International Airport Soil Management Facility (SMF), or "Reef Runway," is under the jurisdiction of the State Department of Transportation (DOT) Airports Division. The area has the capacity to receive over 200,000 cubic yards of sediment for structural fill. The area available for dewatering, processing, and placement is approximately 120 acres. The Reef Runway is the preferred site for upland disposal. Processing sediments to meet requirements for fill at the Reef Runway could involve mixing with cement or other binding agents to stabilize material and improve its structural strength. This process would both reduce the potential for contaminant migration and also for airborne dust from the drying material. If during final design, migration of contaminants appears likely, lining of final placement site will be incorporated into the site design.

Property on Sand Island under consideration for dewatering, processing, and placement is under the jurisdiction of the Department of Land and Natural Resources (DLNR) State Parks and Land Divisions, and includes the Sand Island State Recreation Area. The area available for dewatering is approximately 32 acres; the land available for beneficial use as fill and/or top soil is approximately 140 acres. After dewatering and processing at the inland site, sediments would be transferred by truck to the placement site in the undeveloped portion of the park. A City and County of Honolulu operated ash landfill on the Waipio site, Waipahu Ash Landfill, which is no longer in use, is under consideration for a dewatering, processing and landfill cover site. About one-fourth of the site shown in Figure 3-6 is owned by the City and three-fourths is owned by the Navy. Dredged material must meet the following soil specifications to be accepted as final cover material on the Waipahu Ash Landfill: (a) maximum aggregate size of two inches or less, (b) well-graded material, with less than five percent passing the No. 200 sieve, (c) organic composition of less than 10 percent by weight, (d) dewatered and passes the paint filter test for free liquids, (e) non-hazardous concentrations of heavy metals (comment letter from City Department of Public Works dated June 5, 1998 [see Appendix H]). The property extends to the coastline at Middle Loch of Pearl Harbor. The land use area is 35 acres. There is a marsh adjacent to the property, and national wildlife refuges in the vicinity (see discussion in Section 4.1). If this site is to be considered further, consultation with the Navy will take place.

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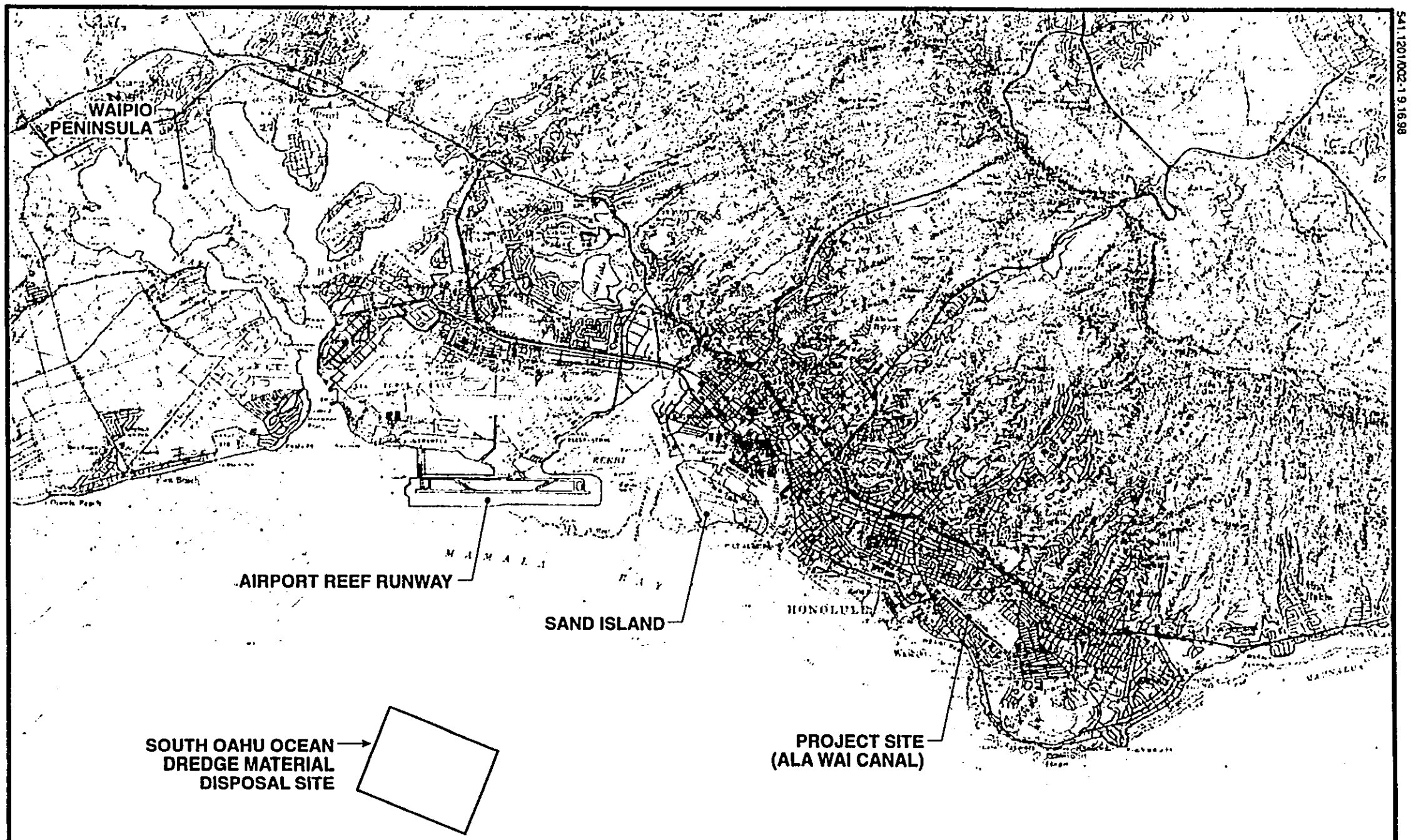
[23] The site has been in existence since 1980 when the Final EIS for the site was published by the EPA.



NORTH

0 1 2 4

SCALE IN MILES

Figure 3-3
POTENTIAL DISPOSAL AND REUSE LOCATIONS

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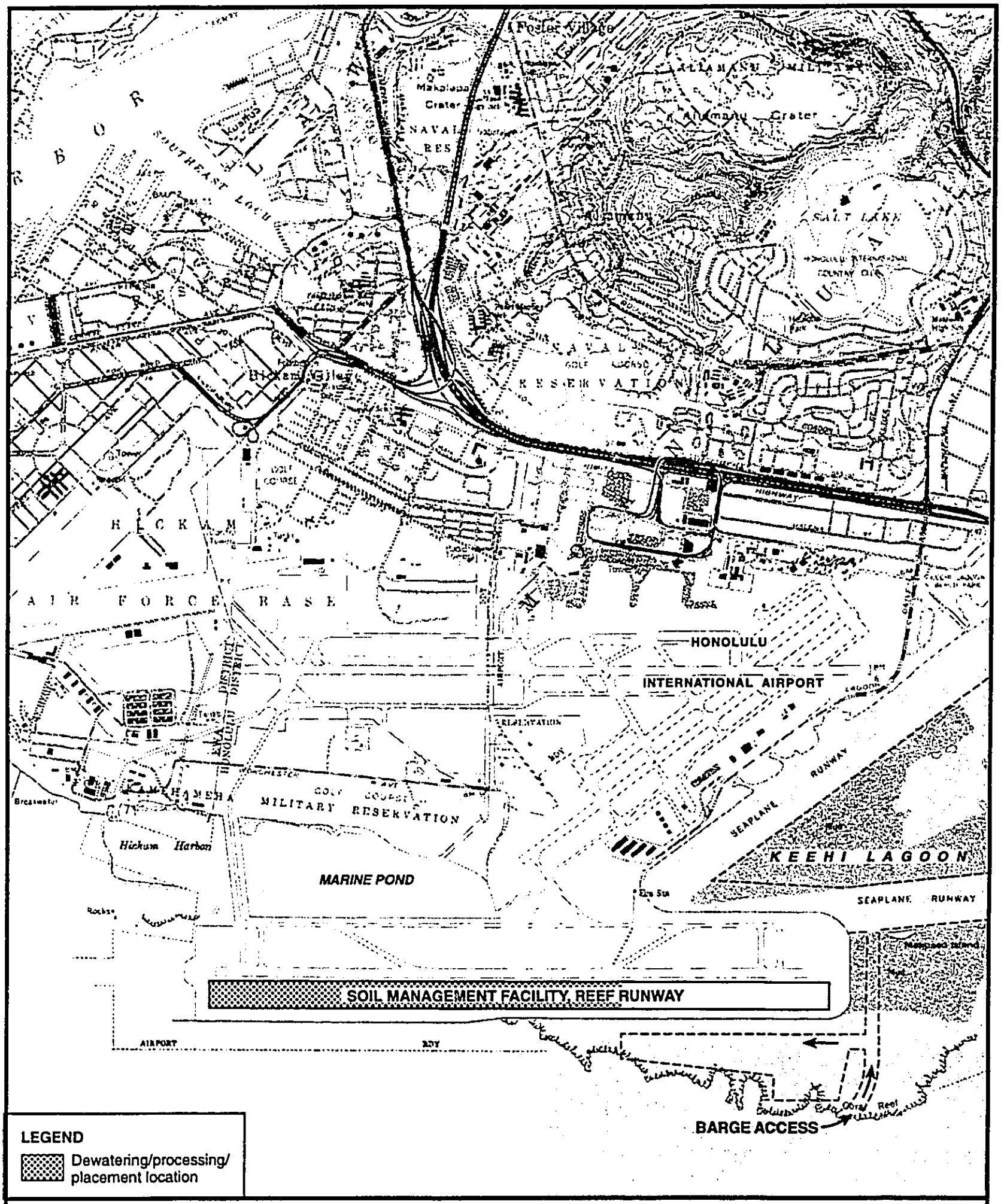

Figure 3-4
POTENTIAL PROCESSING AND PLACEMENT LOCATION AT THE REEF RUNWAY SITE

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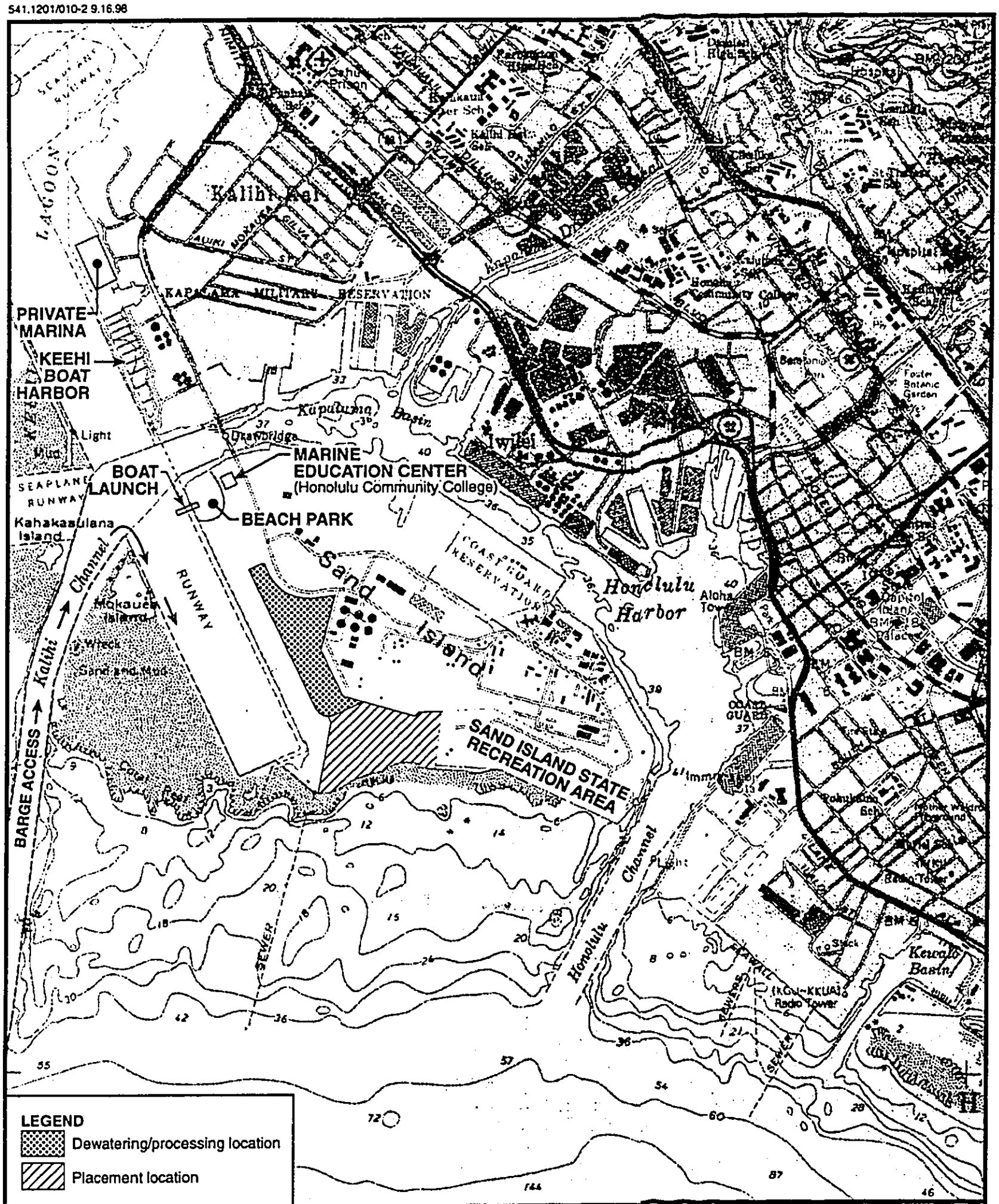

Figure 3-5
POTENTIAL PROCESSING AND PLACEMENT LOCATIONS AT THE SAND ISLAND SITE

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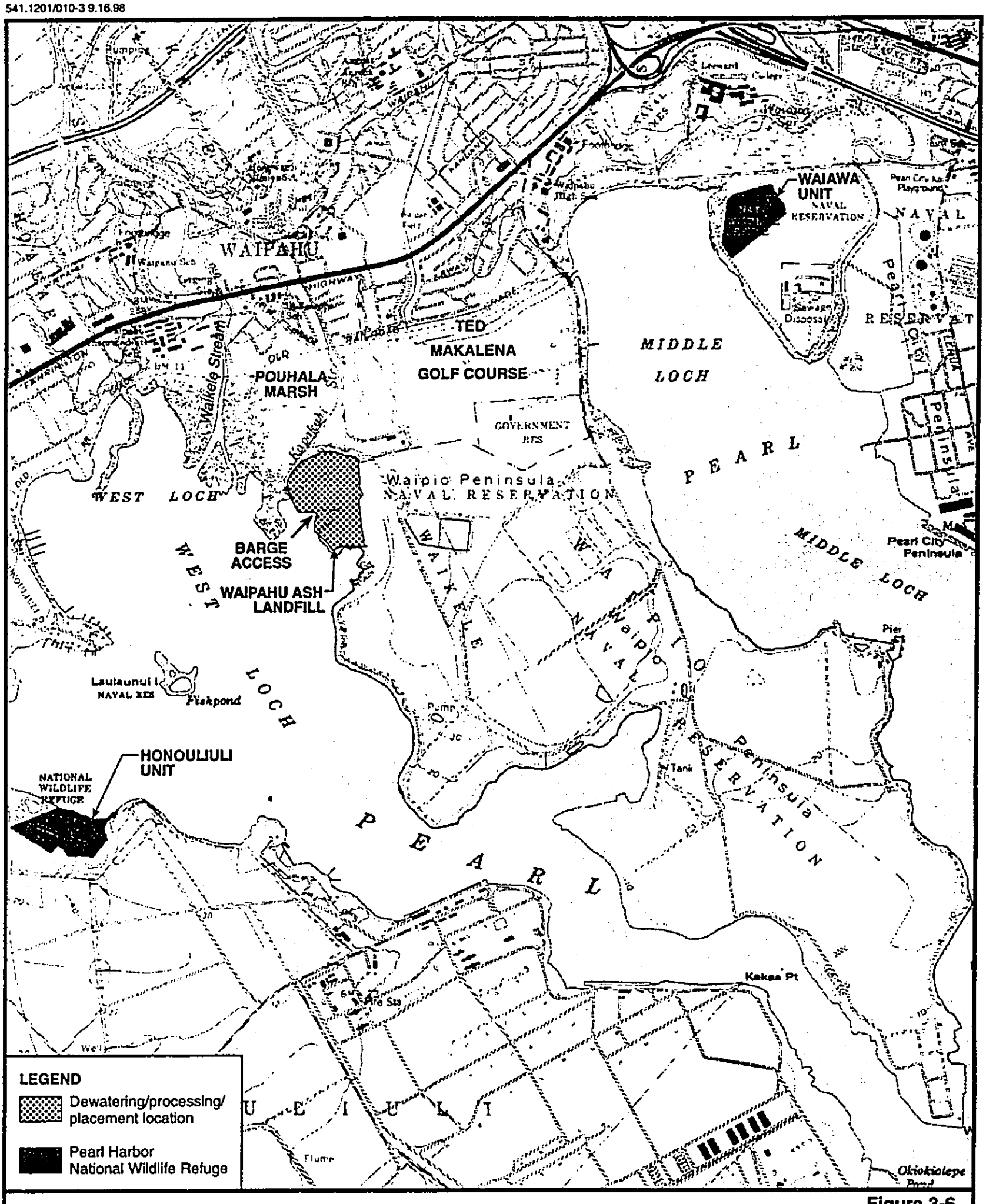

Figure 3-6
POTENTIAL PROCESSING AND PLACEMENT LOCATION AT WAIPIO PENINSULA SITE

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NORTH

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SCALE IN MILES

Placement of sediment at upland locations is regulated in the State of Hawaii by the State Department of Health (DOH), Solid and Hazardous Waste Branch. Sediment must be tested for hazardous characteristics using the Toxicity Characteristic Leaching Procedure (TCLP). If TCLP results exceed regulatory limits, the material is regulated as a hazardous waste, and therefore must be disposed of at a hazardous waste facility, which does not exist in Hawaii. If TCLP results do not exceed regulatory limits, the material may be regulated as a solid waste, with concurrence from DOH, and can be placed at an upland site.

The material targeted for dredging was tested for sediment chemistry, for the purpose of determining suitability for ocean disposal (i.e., for ACOE and EPA approval of placement at the South Oahu ODMDS). The sampling and analysis plans and results reports were reviewed by the ACOE and EPA. Copies of these reports are available for public review at Belt Collins Hawaii. Documentation of the regulatory determination on ocean suitability is included in Appendix A.

Because sediment chemistry testing involves several months of planning and approvals by the ACOE and EPA, the effort to test Areas 2, 3, and 4 was underway prior to the inclusion of Area 1 in the project scope. The ACOE and EPA's evaluation of the results from Areas 2, 3, and 4 as sampled in April 1997 found that sediment from some areas are suitable for ocean disposal without further testing. These are the Ala Wai Canal from the downstream side of the McCully Street Bridge to 900 feet upstream to a depth of –10 feet MSL, and the MPDC from the Ala Wai Canal to the Date Street Bridge to a depth shallower than the maximum targeted dredge depth (see Appendix A, Comments from EPA/ACOE on Sediment Chemistry Results - Summary for June 10, 1997). The remaining sediment would need to undergo bioassay and bioaccumulation (Tier III) testing to determine suitability for ocean disposal. The ACOE and EPA also indicated that in reviewing the levels of heavy metals and pesticides, based on past experience, it would be surprising if Tier III testing showed all of the remaining material as suitable for ocean disposal, especially at the Kapahulu end of the canal. It was recommended that more effort be placed on considering alternative options (e.g., upland reuse or disposal), and conducting the appropriate testing as part of the EA process.

In consideration of the recommendations made by the ACOE and EPA, the desire to add Area 1 into the scope of the EA, and the timing of funding availability and scope modifications, a change in project strategy was made for sediment disposal planning. This change was in consonance with EPA/ACOE policy that dredged sediments be considered as a resource when beneficial uses are available, and that such reuse should be incorporated into project plans and goals at the project's inception to the maximum extent possible.[24] The change in direction acknowledged the potential beneficial reuse by further investigating potential reuse sites and technologies, and added Sediment Chemistry testing for Area 1. This decision was made with the knowledge that some reduction in upland reuse volumes may be achieved by performing Tier III sediment testing during the final design phase, if sufficient beneficial reuse sites were not available.

Sediment chemistry testing for Area 1 was conducted in November 1997. At the same time, additional samples were collected from Areas 2 and 4 to refine the limits of the portions determined to be suitable for ocean disposal. Based on the testing results, EPA determined that: the sediment in Area 1 would need to undergo Tier III testing to determine suitability for ocean disposal; the portion in the Ala Wai Canal in Area 2 found suitable for ocean disposal could not be

[24] U. S. EPA and ACOE (1992) *Evaluating Environmental Effects of Dredged Material Management Alternatives - A Technical Framework.*

extended further upstream; and the maximum dredge depth in Area 4 for ocean disposal is –8 feet MSL, except in the transition zone in Area 4, where the dredge depth changes from –10 feet MSL in Area 2 to –eight feet MSL in Area 4.

In summary, based on sediment chemistry results, a portion of the material (approximately 45,500 CY) has been found suitable for ocean disposal and the remainder (approximately 127,500 CY) would require further testing to determine suitability. The volume of sediment to be placed is determined by estimating the volume of *in situ* sediment to be dredged, and accounting for bulking during dredging and handling. The volumes provided in this document are *in situ* quantities. To account for bulking, multiplier range of 1.1 to 2.5 can be assumed for Ala Wai Canal sediment and applied to the *in situ* volumes. (Bulking factors are 1.2 to 1.8 for silt and 1.5 to 3.0 for clay.[25] Ala Wai Canal sediments are made up on average of 49 percent silt and 31 percent clay. A bulking factor of 1.2 is assumed for the 20 percent not characterized as silt or clay.)

Tier III testing to determine suitability of the dredged sediment for ocean disposal is possible during the final design phase for dredging, which will take place after completion of the EA process. The decision on whether to conduct Tier III testing will be made by DLNR. Therefore, in addressing potential impacts at placement sites, this EA evaluates potential impacts for the most demanding scenario in terms of volume of material to be disposed (173,000 CY of material).

TCLP testing of sediment that may be placed at an upland location has been completed, with input from the DOH Solid and Hazardous Waste Branch on the sampling approach. Evaluation shows that results do not exceed regulatory limits, indicating that the material would be regulated as an inert solid waste, rather than as a hazardous waste. The final report documenting the testing results has been submitted to DOH. Based on its review of this document, DOH is regulating the sediment out of its Office of Solid Waste Management.

3.1.2 No Action Alternative

The No Action alternative is not to dredge the Ala Wai Canal and not to dredge the MPDC. None of the six components of dredging would be implemented, and the project objectives of restoring sediment holding and floodway capacities would not be realized. In addition, recreational benefits, including improved water quality and increased depth to accommodate canoes and kayaks, would not occur.

3.2 COMPARISON OF SETS OF FEASIBLE OPTIONS

A schematic of feasible sets of options of the six components is shown in Figure 3-7. The two main project alternatives are hydraulic dredging with pipeline transport, or mechanical dredging with scow transport. Both of these alternatives have a choice of four options of shore-side support areas, both would need a barge at Magic Island, both could use ocean disposal for a portion of the sediment disposal, both have a choice of gravity or mechanical dewatering (but with no effluent discharge to surface waters) and/or use of additives for sediment processing, and both have a choice of one of the three upland placement sites. Mechanical dredging has an advantage for

[25] Hartman Consulting Group (c. 1996) *How to Develop and Manage Successful Dredging Projects*. Training document from Hartman Consulting Group, Seattle, WA.

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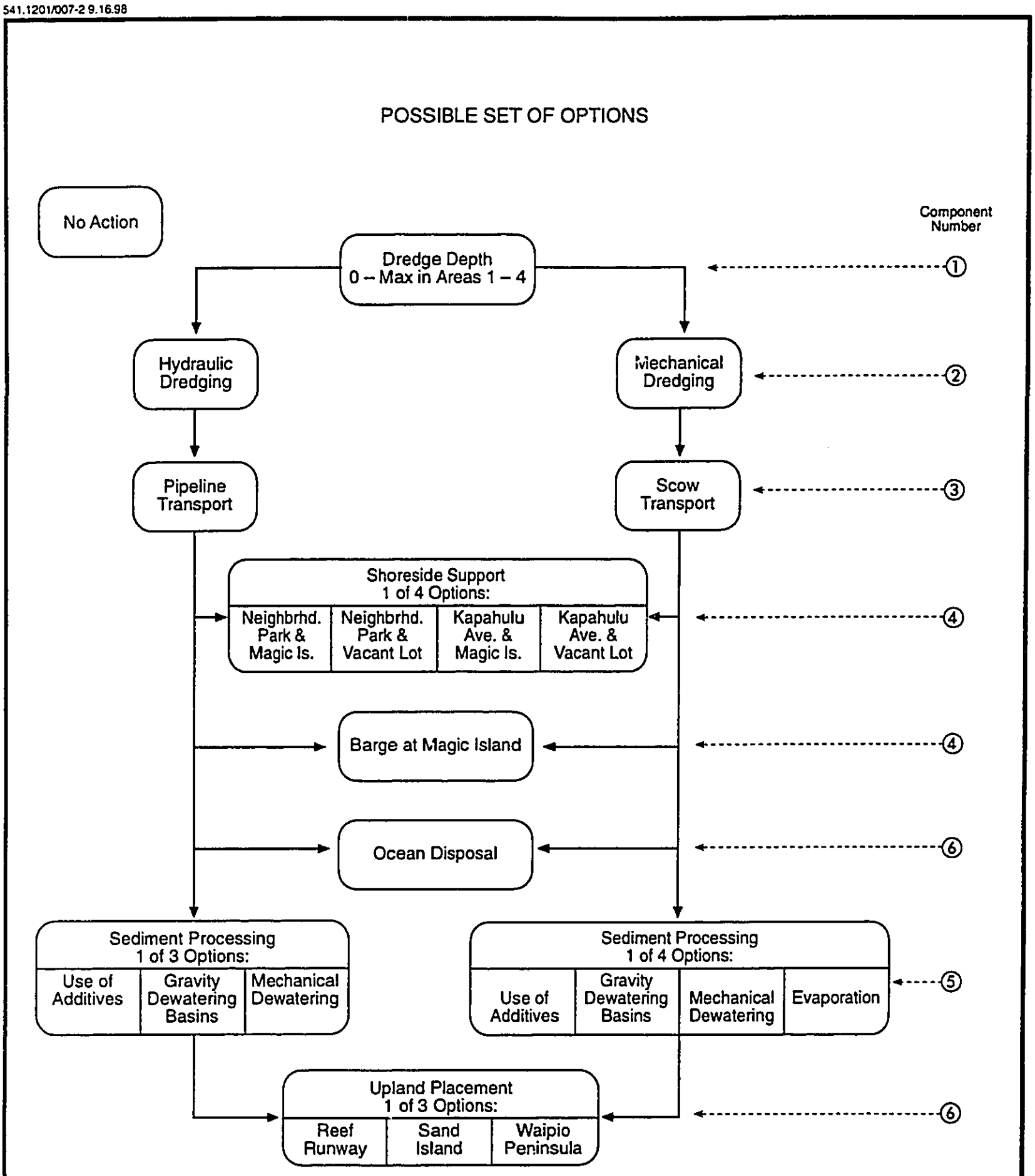

Figure 3-7
SCHEMATIC OF FEASIBLE SETS OF OPTIONS

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dewatering in having a substantially lower proportion of water in the dredged sediment than hydraulic dredging.

As is discussed in more detail in Chapter 4, none of the components of these sets of project alternatives have substantial environmental or social impacts. Since nonsubstantial effects of the various components are not additive, it is also the case that neither set collectively has substantial cumulative or indirect effects on the human and natural environment. The preferred options are discussed in Section 3.4. A final selection will be made following review of bids submitted in response to solicitation documents.

The difference in project duration between the two options is approximately 49 to 55 weeks for mechanical dredging, and 44 to 58 weeks for hydraulic dredging, assuming the work is performed on a five days per week basis, with eight hours of dredging during a 10 hour work day. It is also anticipated that the production rate and therefore project duration is controlled by the dredge method component.

The estimated costs for the mechanical and hydraulic options for dredging and handling at Magic Island, and for the various upland disposal or reuse locations are summarized in Table 3-3. The estimated costs are for the scenario where 45,500 CY will be disposed of at the South Oahu ODMDS, and 127,500 CY will be placed at an upland site. These volumes are derived from the EPA's determination of ocean disposal suitability based on sediment chemistry results.[26] In addition, if during the design phase it appears that there is a potential for contaminant migration at the upland disposal site, an additional cost for lining would be included in the project cost. Based on upland disposal of 127,500 CY, and an estimate of $9/CY for liner, this could result in an additional cost of approximately $1.2 million.

These volumes and associated costs may change during final design, and as discussed in Section 3.1.1, DLNR will decide whether to conduct Tier III testing during final design. Tier III testing results may lead the EPA and ACOE to determine that additional volume may be suitable for ocean disposal. Cost estimates associated with hypothetical ocean disposal suitability determinations by EPA and ACOE are shown in Table 3-4. These cost estimates are for a total dredge volume of 173,000 CY, with upland placement occurring at the Reef Runway site. In all cases, the costs fall within the $10.35 million appropriated for the dredging activity.

3.3 OPERATING CONSTRAINTS

As stated previously, only those options that individually and collectively (with other feasible and compatible component options) have no substantial impacts will be considered. In some cases, for an option to remain feasible, operating constraints are imposed. These are discussed in Chapter 4 as they relate to environmental and social impacts. Overall operating constraints are as follows.

[26] See Appendix A, EPA's memorandum for the record, for sampling station locations and results summary. Polygons represented by sampling stations are used to estimate sediment volumes. Conceptually, the polygons are three-dimensional, with the sampling station at about its center.

TABLE 3-3: COST ESTIMATES FOR MECHANICAL AND HYDRAULIC DREDGING

Activity	Dredge Method	
	Mechanical	Hydraulic
Dredge and Handle at Magic Island	$ 3,675,552 [$ 21.25 per CY]	$ 2,902,895 [$ 16.78 per CY]
Ocean Disposal	$ 357,878 [$ 7.87 per CY]	$ 353,668 [$ 7.77 per CY]
Upland Disposal at Sand Island	$ 3,267,719 [$ 25.63 per CY]	$ 3,234,356 [$ 25.37 per CY]
Upland Disposal at Reef Runway	$ 4,053,469 [$ 31.80 per CY]	$ 4,186,170 [$ 32.83 per CY]
Upland Disposal at Waipio site	$ 3,812,923 [$ 29.91 per CY]	$ 3,965,356 [$ 31.10 per CY]

CY = cubic yard

TABLE 3-4: COST ESTIMATES FOR HYPOTHETICAL OCEAN DISPOSAL SUITABILITY DETERMINATIONS BY EPA/ACOE

Hypothetical EPA/ACOE Approval Scenario	Dredge Method	
	Mechanical	Hydraulic
100% Upland, 0% Ocean	$ 9,176,231 [$ 53.04 per CY]	$ 8,582,953 [$ 49.61 per CY]
75% Upland, 25% Ocean	$ 8,141,242 [$ 47.06 per CY]	$ 7,499,117 [$ 43.35 per CY]
50% Upland, 50% Ocean	$ 7,106,253 [$ 41.08 per CY]	$ 6,415,281 [$ 37.08 per CY]
25% Upland, 75% Ocean	$ 6,071,264 [$ 35.09 per CY]	$ 5,331,445 [$ 30.82 per CY]
0% Upland, 100% Ocean	$ 5,036,275 [$ 29.11 per CY]	$ 4,247,609 [$ 24.55 per CY]

CY = cubic yard
Notes:
1. Total dredge volume = 173,000 CY
2. Upland placement at Reef Runway
3. Cost estimates for 74% (127,500 CY) upland, 26% (45,500 CY) ocean are: $8,087,399 [$46.75 per CY] for mechanical dredging and $7,442,733 [$43.02 per CY] for hydraulic dredging.

Hours of operation: The impacts on recreational use of the canal and transportation, as well as noise effects, will differ depending on the operating hours for dredging activities. A shorter work day and work week (for example, eight hours of dredging during a 10-hour day, five days a week) will extend the overall project duration, whereas a longer work day and work week (for example, two eight-hour shifts per day for six days a week), would enable a more rapid project completion. Nighttime operations will be avoided due to noise constraints. In accordance with DPR requirements, work will occur on weekdays only, exclusive of holidays (see Appendix G).

Litter and debris management: The EPA and ACOE have noted that a debris management plan may be necessary to address incidental trash and garbage for sediment approved for disposal at the South Oahu ODMDS. In addition, the DLNR maintains a debris basin at the mouth of the Ala Wai Canal. This basin captures and holds floating debris, and must be cleaned out on a routine basis.

The DLNR has indicated that dredging operations should contain and manage any debris and litter generated at the dredge site such that the debris basin is not unduly burdened.

Canal use: Shore-side and water areas used for recreation along the length of the Ala Wai Canal and at Magic Island will be avoided where possible in the placement of the dredging equipment and barge, and location of associated support activities. Access to canoe launching areas and other popular access points will be maintained as much as possible. The DLNR will be the liaison between the dredging contractor and canal users to enhance communication and coordinate activities where possible. Coordination with community, recreational, and other groups should address issues such as: hours of operation; procedures for reporting and taking appropriate actions in response to complaints about odors, noise, etc.; deciding the sequence and timetable for dredging Areas 1, 2, 3, and 4; and providing adequate notice to nearby residents, including boards of directors of condominiums near the Ala Wai Canal regarding these issues.

Dredging: Dredging activities will be located so as to allow canoe passage on one side of the dredging barge. Mooring of on-water equipment will not block popular access points or canoe launch sites unless required. Any blockage would be temporary to address dredging in a specific location within the canal.

Work support areas: In the work support area at Ala Wai Neighborhood Park A, protection of Ala Wai Canal walls, which are historic resources, will involve a 5 foot offset from the walls by dredge barge and equipment. Tree removal will be minimized at Neighborhood Park A, and no trees will be removed from Magic Island. In addition, both sites will be restored to original preconstruction condition upon completion of work.

Regulatory requirements: Permits required to be obtained prior to commencement of dredging activities are discussed in Chapter 5. Examples of issues addressed by these permits are dredging operations in the water and upland placement of the dredged sediment. The permits are issued by regulatory agencies, and will include permit conditions that must be adhered to. Therefore, these permit conditions are operating constraints. As discussed in Chapter 5, most permits will be processed during the final design phase, and thus the specific conditions imposed will be finalized after completion of the EA process. Permit conditions could require implementation of best management practices (such as silt curtains), place limitations on the levels of pollutants contained in any leachate or surface water runoff, and/or stipulate that routine monitoring of the receiving environment be performed.

As discussed above, in some cases, for a component option to remain viable as having no substantial impacts, operating constraints (identified in Chapter 4) will be imposed. It is anticipated that these constraints, as applicable, will be similar to those imposed by permit conditions. The cost estimates included in this EA do not directly account for compliance with operating constraints associated with regulatory requirements, which are expected to be approximately five percent or less of the total cost.

To ensure that operating constraints are addressed by the Ala Wai Canal Dredging project, these constraints and those listed in Table 4-7 will be included in the construction bid specifications that will be developed during final design and incorporated into the final contract. This will enable DLNR to suspend the contractor's operations if operating constraints are not followed.

3.4 SELECTED ALTERNATIVE

As presented in Table 3-1, the evaluation of component options consisted of three levels: (1) engineering feasibility, (2) conceptual design, and (3) environmental assessment. This EA documents the third-level analysis, which has resulted in identification of options that comprise the selected alternative. As a result of this analysis, which is presented in Chapter 4, some options have been eliminated. The set of selected component options is shown on Table 3-5.

Only the dredge and sediment transport method components have more than one suitable option: 1) mechanical dredging with transport by small scow to ocean going barge, or 2) hydraulic dredging with transport by hydraulic line to ocean going barge. The major contrasts in the potential impacts associated with these two sets of options are as follows. Mechanical dredging that involves an open rather than closed bucket may result in greater turbidity at the dredge site. The mechanical/scow option would result in higher potential for odor because of the degree of

TABLE 3-5: SELECTED ALTERNATIVE

Component	Selected Options
Limits of Dredging	Maximum dredge depths vary between -6 and -12 feet MSL (see Figure 1-2)
Dredge Method	Either mechanical or hydraulic
Sediment Transport Method	For mechanical, transport by small scow to ocean going barge For hydraulic, transport by hydraulic pipeline to ocean going barge
Work Support Areas	Ala Wai Neighborhood Park A (staging area only) Magic Island (staging area and barge mooring)
Sediment Processing and Disposal or Reuse	Ocean disposal (South Oahu ODMDS) Reuse at the Reef Runway

sediment exposure to the atmosphere. It would also have greater impact on movement of recreational vessels in the canal, since the scows would also be in motion. However, hydraulic dredging involves transport and processing of sediment with a higher moisture content. Because of the operating constraint that does not allow discharge or dewatering effluent to surface waters at the upland placement site (see Section 4.2), the need for processing of the sediment for acceptable water content at this site will be greater with hydraulically-dredged sediment. Finally, one comment letter states a preference between the two options; the Waikiki Yacht Club recommends that hydraulic pipeline rather than small scow be used to transport sediment from the canal to the barge at Magic Island.

The sites suitable for work support are the Ala Wai Neighborhood Park A and Magic Island. The Ala Wai Neighborhood Park A is central to dredging activity in the upper portion of the canal and accessible to the dredging barge. The Magic Island site was the only suitable site for barge moorage and transfer for disposal. Both sites will be returned to original preconstruction condition upon completion of the project. There may be temporary interference with recreational uses at both sites, however, access for recreational activities will be maintained during the project duration.

Regarding the sediment disposal or reuse component, ocean disposal and upland placement as fill are options. Ocean disposal is less expensive, per cubic yard, than upland placement. Ocean

disposal at the EPA-designated South Oahu ODMDS requires approval from the ACOE and EPA. As discussed in Section 3.1.1, a portion of the material has been found suitable for ocean disposal, and the remainder would require further testing to determine suitability. Upland placement of the remainder would be the only available option if it is not tested further or if further testing determines that some or all is not suitable for ocean disposal. The DLNR will consider further testing during the final design phase (after completion of the EA process).

The only suitable site for upland placement is the Reef Runway for use as fill material. This site presents a unique circumstance for reuse at a location that is relatively isolated and is permitted as a soil management facility. With the characteristics of this particular site, and with the imposition of operating constraints and permit conditions, no significant impacts are anticipated. Evaluation of potential impacts and operating constraints are provided in Chapter 4.

4. AFFECTED ENVIRONMENT

Chapter 4 is divided into 16 sections, one per topic area representing potential effects of the project related to the environment, infrastructure, and socioeconomic issues and a summary of operating constraints. In each of these sections, existing conditions are presented, and potential short- and long-term effects are analyzed. Short-term effects are from dredging activities, while long-term effects continue or occur after dredging has been completed. For the purpose of this analysis, the six components of the proposed action as discussed in Chapter 3 are configured into four parts, as follows:

- *Limits of Dredging:* These are the physical limits of dredging, i.e., depth of sediment dredged and work location in the canal. These limits, in turn, partially determine the duration of the dredging operation and the volume of the material to be disposed.

- Dredge Method and Sediment Transport: The two types of methods considered are hydraulic dredging using a pipeline to transport sediment to a barge moored at the mouth of the canal, or mechanical dredging using scows to transport sediment to the barge.

- Work Support Areas: These are the staging and material handling areas, of which two are required, one above and one below McCully Street.

- Sediment Processing and Placement: Sediment processing includes dewatering and placement refers to either disposal or reuse of sediments either at an upland site or an ocean disposal site.

The proposed action will have positive long-term effects on bathymetry, circulation, drainage, and water quality, and will increase the drainage capacity of the canal and benefit recreational users.

Negative short-term effects are anticipated from increased turbidity, vehicle and equipment operations, odors, noise, visual appearance of dredging equipment, and localized displacement of existing uses by the dredge, scows or pipeline, and barges. Fish and birds may be temporarily displaced from active work areas. No substantial effects are anticipated.

Under the No Action alternative, sediment would continue to accumulate in the Ala Wai Canal, leading to decreasing floodway drainage capacity, increasing visual and odor nuisances, continued and increasing eutrophication from circulation impairment, and increasing restrictions to navigation from shoaling.

4.1 BIOTA

For the purposes of this discussion, biota are divided into three types: terrestrial flora, terrestrial fauna, and marine biota. The proposed action is evaluated to determine whether or not it substantially affects a rare, threatened, or endangered species or its habitat. The Migratory Bird Treaty Act and Endangered Species Act provide regulatory requirements.

4.1.1 Existing Conditions

Terrestrial Flora

A botanical field survey was conducted on November 26, 1997 on the land areas adjacent to the Ala Wai Canal that would potentially serve as the material handling site and the staging area (this report does not cover upland processing and placement sites). This report is included as Appendix B. Figure 4-1 shows these surveyed areas, which are generally asphalt-covered or grassy, and are dominated by introduced or alien weeds, shrubs, and trees. Plants of Polynesian introduction are the coconut palm (*Cocos nucifera*) and kamani (*Calophyllum inophyllum*). Indigenous plants (plants native to the Hawaiian Islands and also elsewhere throughout the Pacific) found on these sites are milo (*Thespesia populnea*), 'akulikuli (*Sesuvium portulacastrum*), ricegrass (*Paspalum scrobiculatum*), *Pycreus polystachyos*, beach naupaka (*Scaevola sericea*), and water hyssop (*Bacopa monnieri*). For a complete list of plant species found on these sites, see Table 1 in Appendix B.

There are no listed, proposed, or candidate threatened or endangered species, nor is any plant a species of concern on the land areas that would potentially serve as the staging area or material handling site. Across the street (Ala Moana Park Drive) from the Magic Island staging area, there are banyan trees that are protected under the City and County of Honolulu's exceptional tree ordinance; this area will not be used.

The upland processing and placement sites are primarily in disturbed, industrial areas. The Reef Runway is paved, and the Soil Management Facility (SMF) in this area is coral fill. The Waipio site and portions of the Sand Island site that are not paved are characterized by secondary vegetation, dominated by introduced species such as kiawe (*Prosopis pallida*), koa haole (*Leucaena leucocephala*), and California grass (*Brachiaria mutica*). At the Waipio site, a thin line of American mangrove (*Rhizophora mangle*) grows along the shoreline. Portions of the shoreline contain wetland transition zones located between the bank and these shallow water mangrove stands.[27]

Terrestrial Fauna

The Ala Wai Canal and adjoining land areas considered for staging and equipment support were surveyed for birds and mammals during nine different days between February and September 1997 (upland processing and placement sites were not included in this survey). This report is included as Appendix C and survey locations are noted on Figure 4-2. Native, migratory, and introduced species were observed. The areas along the canal that are most utilized by native birds are portions of the Manoa-Palolo Drainage Canal (MPDC) on either side of the Date Street Bridge, the *mauka* bank of the Ala Wai Canal fronting the Ala Wai Golf Course, and a small area at the Kapahulu end of the Ala Wai Canal (Figure 4-3).

Only one endangered species, the common moorhen (*Gallinula chloropus sandvicensis*) which is endemic to Hawaii, was observed during the survey. One pair was observed foraging in the shoreline vegetation along the golf course side of the bank of the MPDC on either side of the Date

[27] Personal communication, Dave Smith, Wildlife Manager, DLNR Division of Forestry and Wildlife, with Cheryl Vann of Belt Collins Hawaii, April 23, 1998.

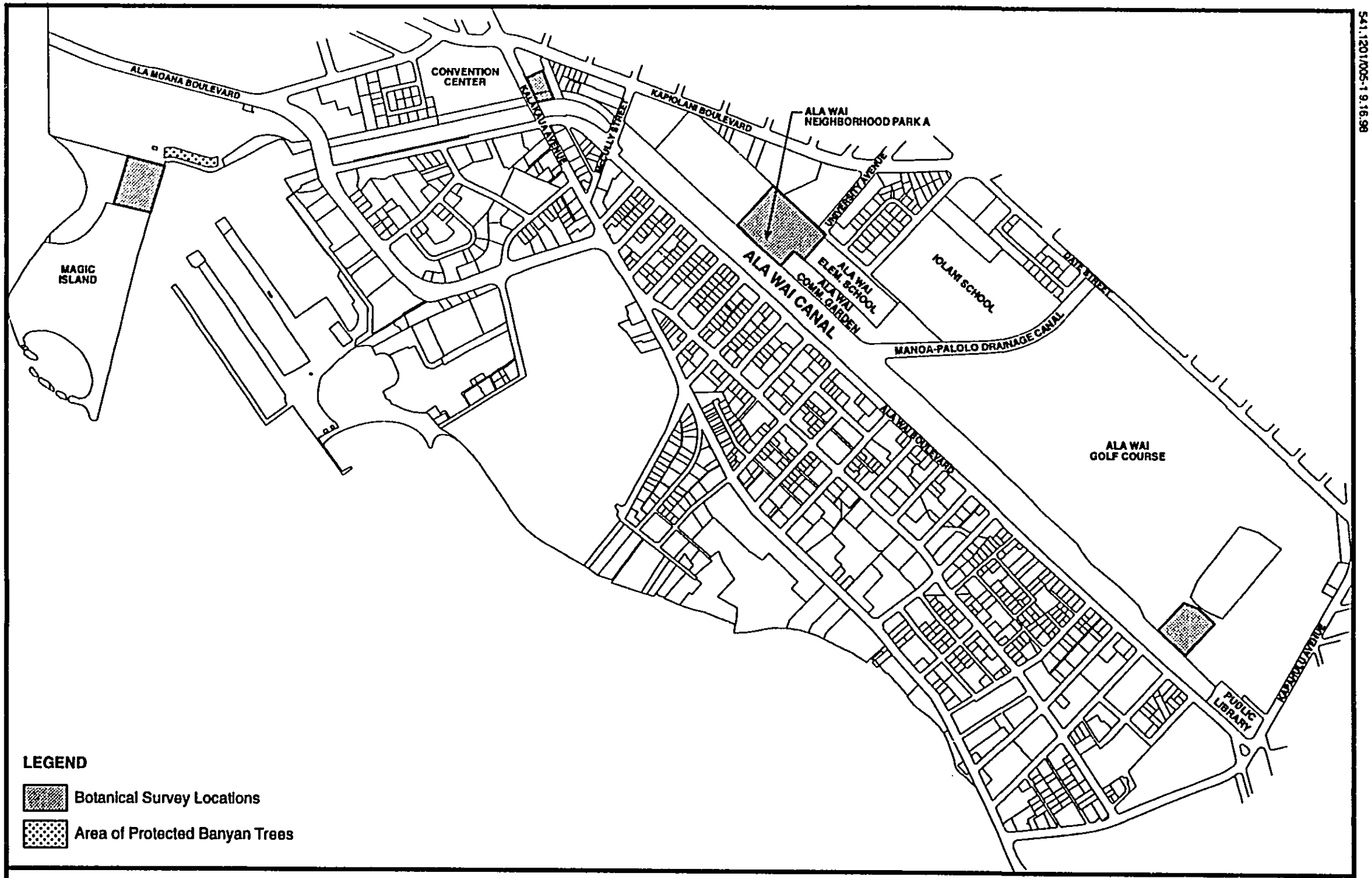

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Figure 4-1
BOTANICAL SURVEY LOCATIONS

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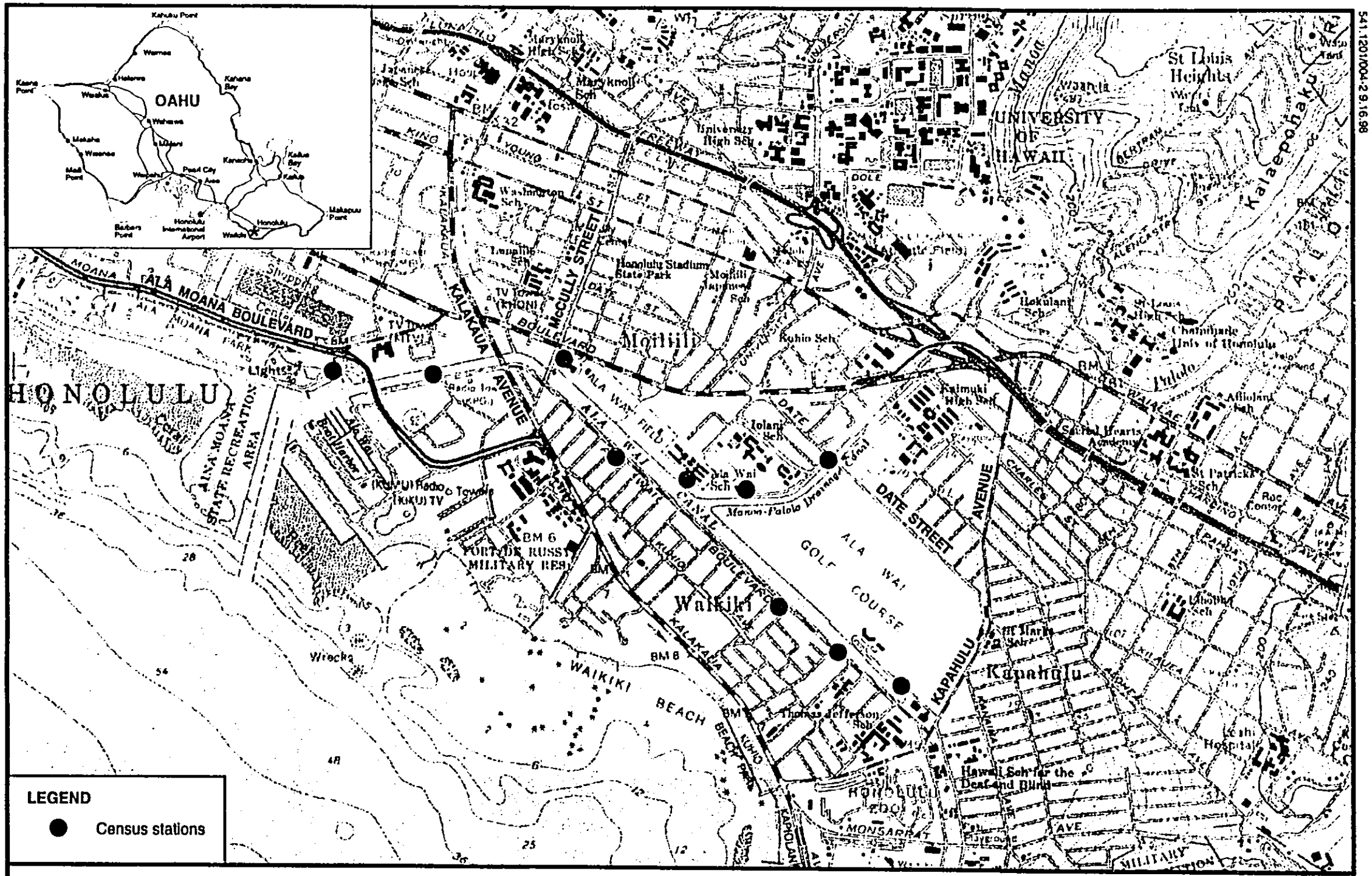
October 1998



541.1201/004-2.9.16.98

Figure 4-2
LOCATION OF THE FAUNAL SURVEY

Ala Wai Canal Dredging Environmental Assessment
Belt Collins Hawaii
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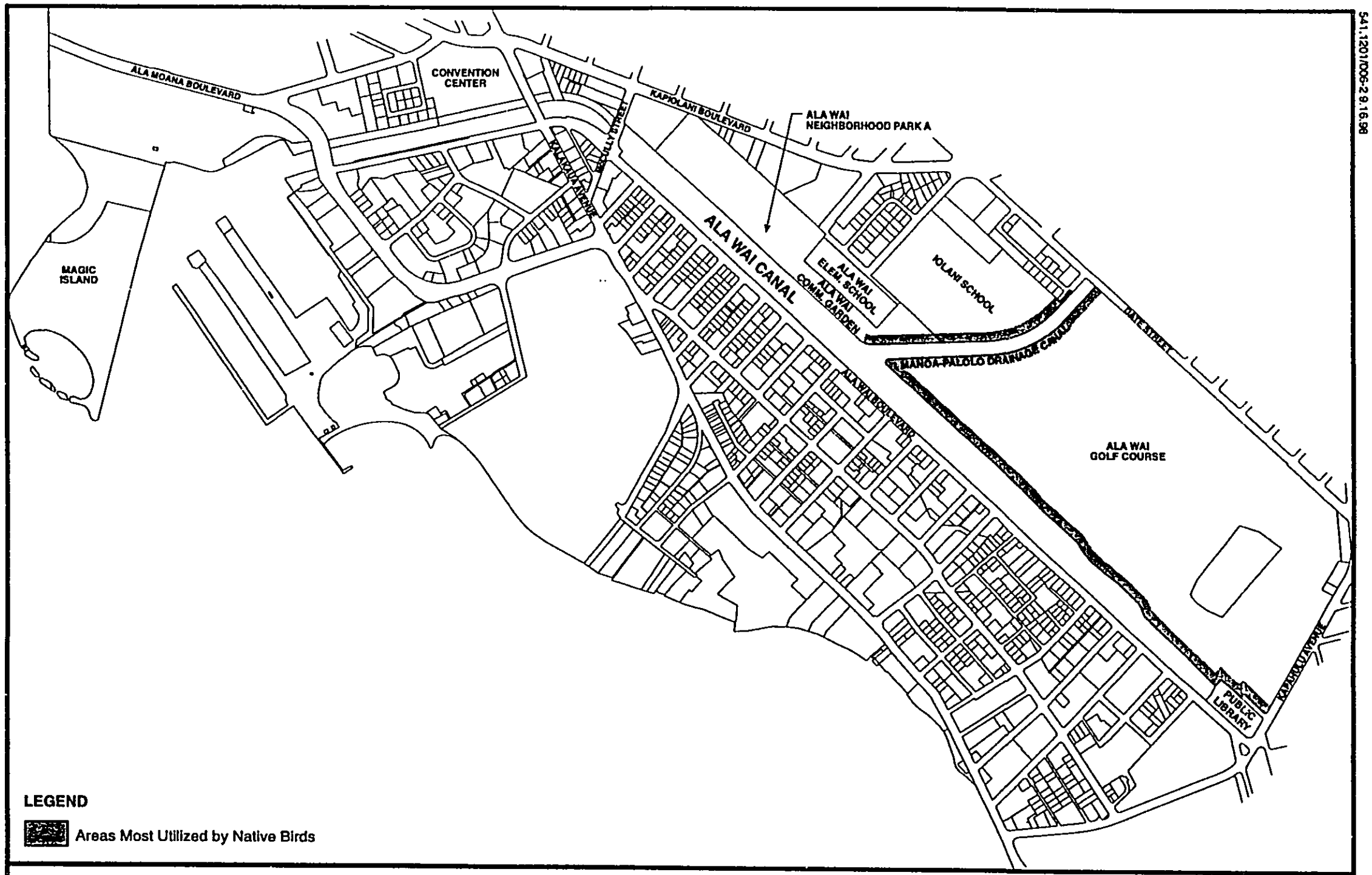

Figure 4-3
NATIVE BIRD SIGHTINGS

Ala Wai Canal Dredging Environmental Assessment
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Street Bridge during three of the nine survey days. No signs of common moorhen nesting were found.[28] A subsequent search of this area in February 1998 failed to find these birds. The majority of the area proposed for dredging is not typical common moorhen habitat; suitable habitat for the birds in this location is small and accessible to predators and human disturbance. This likely explains their absence in the 1998 survey.

Two endemic and endangered waterbirds that might on rare occasion occur in this area are the Hawaiian duck (*Anas wyvilliana*) and black-necked stilt (*Himantopus mexicanus*). The endangered Hawaiian black-necked stilt (*Himantopus mexicanus knudseni*) utilizes shallow areas *mauka* of the Date Street Bridge, and is therefore not expected to occur in the project area. None were observed during the survey.

Indigenous seabirds observed in the area were the great frigatebird (*Fregata minor*), white-tailed tropicbird (*Phaethon lepturus*), and white tern (*Gygis alba*). The only indigenous waterbird observed was the black-crowned night heron (*Nycticorax nycticorax*). The brown booby (*Sula leucogaster*) does not use the Ala Wai Canal for foraging, but occasionally can be seen near the shore at the mouth of the canal. None of these indigenous birds are listed as threatened or endangered at the state or federal level.

Migratory shorebirds such as the Pacific golden plover (*Pluvialis fulva*), wandering tattler (*Heteroscelus incanus*), and ruddy turnstone (*Arenaria interpres*) utilize the banks along the Ala Wai Canal and nearby sites from August to late April. Fourteen species of introduced birds were observed, all of which are commonly seen in urban Honolulu. Feral mammals on the site include mongoose, rats, mice, and feral cats.

Birds and feral mammals at the upland processing and placement sites are introduced and similar in species composition to those found along the Ala Wai Canal. Wetland birds may utilize the shoreline habitat adjacent to the landfill site on the Waipio Peninsula.

The Waipio site is adjacent to Pouhala Marsh, a wetland area bounded on the north by the old railroad, the south by West Loch, the east by Kapakahi Stream, and the west by Waikele Stream (see Figure 3-6). Pouhala Marsh provides habitat for three endangered species (the Hawaiian stilt, Hawaiian duck, and common moorhen). The shallow mudflats provide ideal habitat for the Hawaiian stilt; it is the most common of the endangered birds found in this area, numbering up to 60 to 120 birds daily.[29]

Marine Biota

Twenty-one fish species and five crab species were found to occur in the canal in the early 1970s, based on marine biology studies of the Ala Wai Canal conducted by the State Department of Land and Natural Resources (DLNR) State Fish and Game Division.[30] Of these species, six fish species and two crab species were in sufficient abundance to be of recreational importance. These are the

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28 Personal communication, Phil Bruner, Avifaunal Subconsultant, with Cheryl Vann of Belt Collins Hawaii, February 5, 1998.

29 Personal communication, David Smith, Wildlife Manager, DLNR, Division of Forestry and Wildlife, with Cheryl Vann of Belt Collins Hawaii, April 6, 1998.

30 Miller, Jacqueline N. (1975) *Ecological Studies of the Biota of the Ala Wai Canal.* HIMB Technical Report 32 and HIG Report 75-8.

awa (*Chanos chanos*), awa aua or lady fish (*Elops hawaiiensis*), ama'ama or mullet (*Mugil cephalus*), papio (*Caranx* sp.), kaku (*Sphyraena barracuda*), African cichlid (*Tilapia mozambiqua*), Hawaiian swimming crab (*Podophthalmus vigil*), and blue claw crab (*Thalamita crenata*). These species are indigenous with the exception of the introduced exotic *Tilapia*. None have protected status. Extensive measurements of salinity, temperature, and dissolved oxygen during these studies show that only one parameter, oxygen, affects the distribution of species; benthic fish and crab species were noticeably absent in areas of low oxygen concentrations.[31] (Possible uptake of pollutants by species in the canal is addressed in Section 4.2.)

Four species of endemic gobies and one indigenous goby, none of which are listed as threatened or endangered, occur in Hawaiian streams. The endemic 'o'opu alamo'o (*Lentipes concolor*) is considered a species of concern on both the state and federal levels, but occurs only in streams on the windward side of Oahu. Species commonly occurring in the lower reaches of Manoa-Palolo Stream near Kaimuki High School are the endemic 'o'opu naniha (*Stenogobius hawaiiensis*) and 'o'opu akupa (*Eleotris sandwicensis*). The indigenous 'o'opu nakea (*Awaous guamensis*) occurs in the middle reaches of Manoa Stream near Manoa Elementary School but is not found in abundant numbers. The endemic 'o'opu nopili (*Sicyopterus stimpsoni*) is mostly found in streams on the windward side of Oahu, but may on occasion occur in the middle reaches of Manoa Stream.[32]

Gobies need shallow, swiftly moving water for survival. They have a diadromous life cycle, meaning the eggs deposited in Manoa Stream are washed downstream to the brackish Ala Wai Canal waters or out through the canal to the ocean where the young develop for two or three months and then swim back upstream. Juvenile gobies do not necessarily return to the same stream from which they spawned.[33]

There is a designated Hawaiian Islands Humpback Whale National Marine Sanctuary that includes ocean waters along the south coast of Oahu from Magic Island to Makapuu Point.[34] Humpback whales, an endangered species, migrate to the Hawaiian Islands for reproduction, and the highest densities of whales occur between December and March. The marine sanctuary creates an area where coordination of conservation and management occurs to support existing education, enforcement, research, and monitoring efforts. The marine sanctuary does not create new regulations for the designated area, but encourages uses of the sanctuary compatible with existing protections.

The marine pond at the Reef Runway site contains fish species typically found in an estuary, such as mullet and crabs. The nearshore ocean waters adjacent to Sand Island and the Reef Runway contain reef fish and lobsters. Threatened green sea turtles may also frequent the area. Green sea turtles have also been noted at the mouth of the Ala Wai Canal and channel.

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31 Harris, Carol L. (March 1975) *Primary Productivity in the Ala Wai Canal, A Small Tropical Estuary*. MS Thesis in Oceanography, UH. Also HIG Report 75-7.

32 Personal communication, Mike Yamamoto, DLNR, Aquatic Resources Division, with Cheryl Vann of Belt Collins Hawaii, April 3 and 7, 1998.

33 Personal communication, Mike Yamamoto, DLNR, Aquatic Resources Division, with Cheryl Vann of Belt Collins Hawaii, January 29, 1998.

34 National Oceanic and Atmospheric Administration (NOAA) and State of Hawaii Department of Business, Economic Development and Tourism (DBEDT) (February 1997) *Hawaiian Islands Humpback Whale National Marine Sanctuary, Final Environmental Impact Statement/Management Plan*. Prepared by NOAA and DBEDT.

Marine communities in Pearl Harbor are relatively homogeneous. Predominant marine biota include sea cucumber, benthic algae, sponges, sabellid worms, tube worms, and various benthic shrimps and crabs.[35] No unique or rare assemblages of benthic in-fauna occur in Pearl Harbor, and no threatened or endangered marine life has been found in the proposed general project area within Pearl Harbor.

4.1.2 Potential Effects and Operating Constraints

Impacts of the six component options on biota are identified below. The potential effects on public health from consumption of marine biota are discussed in Section 4.3, Public Health.

Limits of Dredging

Terrestrial Flora: There are no rare, threatened, or endangered species, wetlands, or other sensitive habitat in the proposed areas. Therefore, no substantial effects will occur.

Terrestrial Fauna: Dredging activities will create a short-term noise nuisance for birds using the area, potentially resulting in waterbirds using alternate sites during hours of operation. The habitat along the canal is not considered unique, and other suitable habitat occurs nearby for use by displaced birds. Therefore, no substantial impacts are anticipated.

Only one endangered species, the common moorhen, was recorded during the survey. The shoreline habitat along the MPDC used by the common moorhen may be affected during dredging. This shoreline habitat is of low quality, and suitable alternate habitat is available in the vicinity. Therefore, no substantial impacts are anticipated.

Marine Biota: Short-term effects on marine biota will occur from removal of sediments and associated benthic communities of the canal bottom. Short-term effects would also occur if the depression in Area 3 is filled. Recolonization will occur after dredging or filling is completed, and none of the biota living in the canal are rare, threatened, or endangered. Therefore, no substantial effects are anticipated.

Effects of the proposed action on goby habitat will be minimal since dredging is limited to below the Date Street Bridge. Eggs from spawning gobies that are washed into the Ala Wai Canal may be affected by the dredging, as may juveniles attempting to swim upstream from the canal into Manoa Stream or other streams. The worst-case scenario would be loss of a recruitment class during the approximately 12 month dredging period. This is not anticipated to affect goby populations over the long-term; after the completion of dredging, recruitment of juveniles originally from Manoa Stream or from other streams will resume. Dredging will improve overall conditions in the canal, which could enhance future recruitment into the Ala Wai Canal and Manoa Stream.[36] No substantial adverse impacts are anticipated.

Long-term positive effects on marine biota are anticipated from the removal of accumulated organic material. This material is usually broken down by mircroorganisms, creating oxygen depletion in

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[35] Marine Research Consultants (1990) *Marine Environmental Assessment of Pearl Harbor in the Vicinity of Foxtrot 5 Pier.* Appendix F in *Final Environmental Impact Statement for Proposed Developments at Naval Base Pearl Harbor, Oahu, Hawaii.* Prepared by Department of the Navy, August 1990.

[36] Personal communication, Mike Yamamoto, DLNR, Aquatic Resources Division, with Cheryl Vann of Belt Collins Hawaii, January 29, 1998.

the water, which can lead to fish kills. Long-term positive effects on marine biota are also anticipated if the -10 to -12 foot MSL depression occurring at the Kapahulu end of the canal is filled in, or if areas immediately downstream of this depression are dredged to provide uniformity of the bottom topography, allowing better water exchange and improved water quality and dissolved oxygen levels.

There are potential cumulative positive effects of the proposed action in conjunction with other ongoing projects in the watershed to improve water quality. Potential negative cumulative effects will occur if storm events or construction dewatering discharges are concurrent with dredging events, leading to increased water turbidity. Fish or corals could potentially be negatively affected by the turbid conditions, although studies indicate that biota such as corals can survive in areas where turbid conditions occur on a regular basis.[37] However, the turbidity attributable to dredging will be small in comparison to that caused by natural storm events and will eventually dissipate. Biota in the canal are habituated to turbidity since it is such a regular occurrence.

Dredge Method/Sediment Transport

Terrestrial Biota: Terrestrial flora and fauna will not be affected by the dredge method.

Marine Biota: Either dredge method will create some short-term disruption to marine biota due to temporarily increased turbidity in the water column. These effects on marine biota are not considered to be substantial. Long-term benefits to aquatic life from improved water quality will occur upon project completion.

Work Support Areas

Terrestrial Flora: If the Ala Wai Neighborhood Park A site is used, some existing landscaping will be removed to allow for truck access to the bank of the canal, and for a truck turn around area. The layout has been configured to minimize the removal of trees. At Magic Island, no trees will be removed. None of this vegetation is considered rare, threatened, or endangered, nor does it represent sensitive habitat. The landscape in the affected areas would be restored upon completion of dredging. No substantial impacts to terrestrial flora are expected.

There are no rare, threatened, or endangered species or sensitive habitat at any of the other areas proposed for staging activities, so no substantial effects are anticipated.

Terrestrial Fauna: In general, the numbers of native and migratory birds within and nearby the project area are low, due to limited suitable habitat and considerable human disturbance. Migratory birds may experience temporary displacement due to project activities. This is not anticipated to be a substantial impact due to the short duration of effects, the availability of suitable habitat nearby, and no evidence of nesting in the work area sites.

Marine Biota: Marine biota may be affected by spillage from the barge at Magic Island. Suspended fine sediments from spillage could be transported by currents into areas with live coral at the mouth of the canal, in the vicinity of Magic Island, and at the reef areas beyond the boat harbor. While this

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[37] Marine Research Consultants (February 14, 1996) *Assessment of Water Quality and Marine Community Structure, Fort Kamehameha Ocean Outfall Extension Oceanographic Study*, Appendix VIII in the September 1997 *Draft Environmental Impact Statement, Outfall Replacement for Wastewater Treatment Plant at Fort Kamehameha, Navy Public Works Center, Pearl Harbor, Hawaii.* Prepared by Department of the Navy.

is not likely to have a detrimental effect, it will be avoided or minimized by the use of silt curtains and by avoiding over topping of the receiving barge.

Processing and Placement

Terrestrial Flora: No substantial effects on terrestrial flora are expected. No rare, threatened, or endangered species occur at the placement sites. No sensitive habitat occurs at any of the sites with the exception of the Waipio site. At this site, the wetland transition zones between the shoreline stands of mangrove and the bank will be avoided. Mangroves in areas lacking the wetland transition zone may need to be cut back for barge access, but this does not constitute an adverse impact since mangroves are considered pest species in Hawaii.[38] The mangroves will be cut flush with the water rather than pulled out by the roots, so that there will be no impact to the soil.

Terrestrial Fauna: No substantial effects on terrestrial fauna are expected to occur at any of the upland sites. With the exception of wetland habitat along the shoreline at the Waipio site, these upland sites lack suitable habitat for migratory or listed species. As stated above, the wetlands located along portions of the shoreline at the Waipio site will be avoided during barging and unloading operations.

Endangered birds using the Pouhala Marsh adjacent to the Waipio site may be affected by noise associated with unloading the barge and with processing and placement of the sediment. An alternate habitat, the 40-acre Pearl Harbor National Wildlife Refuge (NWR), is available in the vicinity. The refuge is divided into two units: the Honouliuli Unit is located west of the Waipio site on the opposite bank of West Loch, and the Waiawa Unit is located east of the Waipio site on the opposite bank of Middle Loch (see Figure 3-6). The Pearl Harbor NWR supports the four endangered bird species (the Hawaiian stilt, Hawaiian duck, Hawaiian coot [*Fulica alaī*], and common moorhen), though the quality of the Hawaiian stilt habitat at the Pearl Harbor NWR is not as good as that of the Pouhala Marsh. Therefore, use of the Waipio site could cause a temporary adverse impact on the endangered Hawaiian stilt.

Marine Biota: Effluent disposal from dewatering at the upland sites is not expected to negatively affect aquatic organisms, as dewatering discharge to surface waters will not be allowed. Dredged materials will be dewatered on land, and runoff will be contained.

Transportation of sediments for upland and ocean disposal would cross the Hawaiian Islands Humpback Whale National Marine Sanctuary at the end of Magic Island. The transit of a barge and towboat through the marine sanctuary would not be in conflict with any marine or endangered species regulations or management issues related to the sanctuary. Transport and transfer of sediments for upland placement at the Reef Runway would occur in the vicinity where green sea turtles have been seen. Barge transit, and transfer of sediment to the Reef Runway, will occur from one to two times a day during active dredging. It is unlikely that this would disrupt green sea turtles in the area.

No substantial effects to marine life are expected at the South Oahu Ocean Dredged Material Disposal Site (ODMDS), since only sediments that have been evaluated for the toxicity of their

[38] Personal communication, Dave Smith, Wildlife Manager, DLNR Division of Forestry and Wildlife, with Cheryl Vann of Belt Collins Hawaii, April 23, 1998.

contaminants and approved by the Environmental Protection Agency (EPA) and Army Corps of Engineers (ACOE) may be discharged there.[39]

As prescribed in 40 CFR Part 228, ODMDS designations by EPA are based on environmental studies of each site, studies of regions adjacent to the site, and historical knowledge of the impact of dredged material disposal on areas similar to such sites in physical, chemical, and biological characteristics. All studies for the evaluation and potential selection of dredged material disposal sites have been conducted in accordance with the appropriate requirements of 40 CFR Parts 228.5 and 228.6, which contain general and specific criteria for the selection of sites, respectively. The general criteria include: minimizing the interference of disposal activities with other activities in the marine environment, particularly avoiding areas of existing fisheries or shell fisheries, and regions of heavy commercial or recreational navigation; temporary perturbations in water quality or other environmental conditions during initial mixing caused by disposal operations anywhere within the site can be expected to be reduced to normal ambient seawater levels or to undetectable contaminant concentrations or effects before reaching any beach, shoreline, marine sanctuary, or known geographically limited fishery or shell fishery; and size limitations to localize for identification and control any immediate adverse impacts and permit the implementation of effective monitoring and surveillance programs to prevent adverse long-range impacts. The site-specific criteria include: geographical position, depth of water, bottom topography and distance from coast; location in relation to breeding, spawning, nursery, feeding, or passage areas of living resources in adult or juvenile phases; location in relation to beaches and other amenity areas; interference with shipping, fishing, recreation, mineral extraction, desalination, fish and shellfish culture, areas of special scientific importance and other legitimate uses of the ocean; the existing water quality and ecology of the site as determined by available data or by trend assessment or baseline surveys; potentiality for the development or recruitment of nuisance species at the disposal site; and existence at or in close proximity to the site of any significant natural or cultural features of historical importance.

Negative effects on nearshore waters could occur if a tsunami hit the Reef Runway during sediment processing, and contaminated sediment was washed from the site (see Section 4.12). This is further discussed under Cumulative Impacts (Section 4.15).

No Action

Under the No Action alternative, there would be no short-term disruptions of aquatic or bird life, but the accumulation of sediment would continue, worsening water quality by further reducing circulation and allowing resuspension of accumulated sediments.

4.2 POLLUTANTS IN THE ALA WAI CANAL

This section discusses pollutants in the Ala Wai Canal. The presence of pollutants in different parts of the canal—sediments, water, and biota—are inter-related, and could affect public health and recreational activities in the canal. Because of the complex nature of potential impacts, this section focuses on how the presence of pollutants in sediment, water, and biota will be affected by the proposed action. Potential effects of the proposed action on public health and recreational

[39] U.S. ACOE and U.S. EPA (no date) *Special Joint Public Notice Site Management Plan (SMP) for the Hawaii Ocean Dredged Material Disposal Sites.*

activities, including those due to the presence of pollutants, are discussed in Sections 4.3 and 4.4, respectively.

The determination of substantial effects of the proposed action on pollutants considers whether new pollutants are introduced to the environment (either directly from machinery emissions or spills, or from the transfer and placement of polluted sediments), and whether existing pollutants made more readily available to the environment (e.g., from resuspension of sediment during dredging, or from enhancement of anaerobic conditions or microbial activity in the area) will cause a deviation from existing conditions.

4.2.1 Existing Conditions

Several urban pollutants are known to be present in the sediments and water column in the Ala Wai Canal, including pesticides and heavy metals. Sources of these pollutants discharging into the canal include nearshore marine waters of the Ala Wai Boat Harbor (contributed through mixing and tidal exchange), stream flow inputs, overland flow, storm drain flow, atmospheric deposition and rainfall, uncontrolled dumping and spills,[40] discharge of new sediments, and resuspension of accumulated sediments.[41]

Pollutants from the sediment or water column have been found in the biota living in the canal. Bioaccumulation of these contaminants through the food chain has implications for human health since the canal is used by recreational fishermen, many of whom consume their catches.

Pollutants in the sediment, water column, and biota are discussed in separate sections below.

Sediment Quality

Urban pollutants known to be present in Ala Wai Canal sediment and MPDC sediment seaward of the Date Street Bridge include heavy metals (lead, copper, chromium, nickel, cadmium, zinc, and mercury), pesticides (chlordane, heptachlor, dieldrin, DDT, DDD, and DDE), PCBs (polychlorinated biphenyls), PAHs (polycyclic aromatic hydrocarbons), and phthalates. These compounds adsorb onto sediment particles and do not easily dissolve in water.

The most recent sediment testing was conducted on corings taken in 1997. Sediment chemistry analysis determined the concentrations of chemicals present, to screen for ocean disposal suitability.[42] Analysis by the toxicity characteristic leaching procedure (TCLP)[43] determined that the

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[40] Spills have been actively documented in the database maintained by the DOH Office of Hazard Evaluation and Emergency Response since the late 1980s. Since 1989, 27 minor spills into the Ala Wai Canal have been documented. No spills have been reported in the MPDC. Seven spills have been reported since 1989 in streams and storm drains in the upper Manoa and Palolo drainage basins.

[41] Edward K. Noda and Associates (April 1993) *Environmental Assessment and Negative Declaration: Ala Wai Canal Improvement, Honolulu, Oahu, Hawaii.* Job No. 31-OL-I.

[42] • Belt Collins Hawaii, MEC Analytical Systems, and Sea Engineering, Inc. (January 8, 1998) *Ala Wai Canal Conceptual Design and Environmental Assessment, Dredge Sediment Characterization, Tier II Sampling and Analysis Plan.* Prepared for City and County of Honolulu Department of Transportation Services.

• Belt Collins Hawaii, MEC Analytical Systems, and Sea Engineering, Inc. (January 8, 1998) *Ala Wai Canal Conceptual Design and Environmental Assessment, Dredge Sediment Characterization, Final Tier II Laboratory and Data Report.* Prepared for City and County of Honolulu Department of Transportation Services.

sediments will be regulated as a solid waste rather than a hazardous waste, pending concurrence by the Department of Health (DOH) prior to completion of the final EA. The results are summarized below by pollutant type. Results of previous studies are also discussed where appropriate.

Metals: Metals of primary concern for ocean disposal suitability identified during the sediment chemistry sampling were chromium, copper, lead, mercury, and nickel. The findings were generally consistent with those from previous, more detailed studies[44,45] of metals in the canal. These previous studies also evaluated the possible sources of pollutants, as follows. Lead concentrations corresponded to the phasing out of leaded fuels, beginning in 1975, as required by legislation. The concentrations of nickel were generally consistent with the dominant mineralogy of the sediments rather than representing anthropogenic (human-caused) contamination. The most probable source of zinc was found to be due to the wear of automobile tires, because zinc is widely used in the vulcanization of rubber. Copper, cadmium, and zinc showed increasing fluxes of concentrations attributable to anthropogenic inputs. Mercury levels were highest near the Ala Wai Yacht Harbor; anti-fouling paints, for which EPA suspended registration in 1972, are the probable source.

Organic tins: Tributyltin (TBT) and dibutyltin (DBT) were present in the Ala Wai Canal and MPDC sediments. The highest TBT level was measured at 50 µg/kg dry weight, which is below the recommended screening level of 73 µg/kg dry weight.[46] The source of organic tin is likely bottom paint from vessels being serviced during operations at the Ala Wai Marine boatyard.

Pesticides: Pesticides found in the sediment were chlordane, DDT, DDD, DDE, heptachlor, and dieldrin. Chlordane is the main pesticide of concern; it is insoluble in water and readily attaches to the organic-rich, fine-grained sediments of the Ala Wai Canal. In some samples, DDT, DDD and DDE were present, and heptachlor and dieldrin were detected at low levels. The apparent source of dieldrin and chlordane, which were widely used to control dryrot and subterranean termites, is the widespread use of termicides. Production of dieldrin was stopped in 1987 and registration of chlordane was canceled by the EPA in 1988.

PCBs: The data were inconclusive in the sediment chemistry testing. No specific sources of PCBs have been identified, although a likely source is power transformers where PCB was formerly used as a coolant.[47]

PAHs: High levels of PAHs were recorded in some samples. There were differences in PAH concentrations in samples taken from the top and bottom halves of the cores. Levels of PAHs in top samples were two to 19 times that in bottom samples. The likely source of PAHs is motor vehicle exhaust, as by-products of incomplete combustion.

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43 Belt Collins Hawaii, MEC Analytical Systems, and Sea Engineering, Inc. (January 16, 1998) *Ala Wai Canal Conceptual Design and Environmental Assessment, Upland Disposal Testing and Report.* Prepared for City and County of Honolulu Department of Transportation Services.

44 DeCarlo, Eric H. and Khalil J. Spencer (1995) *Records of lead and other heavy metal inputs to sediments of the Ala Wai Canal, Oahu, Hawaii.* Pacific Science 49(4):471-491.

45 Raine, L.M., Siegel, B.Z. and McMurtry, G.M. (1995) *Mercury accumulation of sediments of the Ala Wai Canal and in soils and stream sediments of the central Honolulu watershed.* Pacific Science 49(4):511-525.

46 In the absence of federal or state regulatory cleanup standards, the recommended cleanup screening level of 73 µg/kg dry weight, established for Puget Sound, Washington by an interagency group, is being used.

47 Edward K. Noda and Associates (1992c) *A Management Plan for the Ala Wai Canal Watershed. Report R-89c.* Prepared for the State of Hawaii, Department of Land and Natural Resources, Division of Water and Land Development. Job No. 31-OL-I.

Phthalates: Phthalates were present in sediment samples, especially bis (2-ethylhexyl) phthalate. Phthalates are common in plastics, and may occur due to the presence of plastic debris in the canal.

Organic material: Levels of total organic carbon (TOC) were high, as expected in the nutrient-rich estuary waters of the Ala Wai Canal. Organic material may bind chemicals to the sediment, possibly reducing the bioavailability of chemicals of concern.

Other chemicals: Sulfides and ammonia levels were high in the sediment. These are naturally-occurring compounds and are not long-lived pollutants. They are common in systems with low circulation and high levels of organic input. Salinity was low at the Kapahulu end of the canal, and pH levels were within normal ranges.

TCLP: The TCLP determines the potential of chemicals to leach from sediment. Under this procedure, a leachate fluid is generated and analyzed for chemicals present. The measured concentrations of chemicals are then compared to a regulatory TCLP limit, as listed in 40 CFR 261.24. None of the samples exceeded the regulatory limits for TCLP, which indicates that the sediment will be regulated as solid waste.

Water Quality

The Ala Wai Canal is listed as one of four water bodies in the state with severe water quality impairment.[48] It is classified as a Water Quality-Limited Segment (WQLS), which indicates that the subject water body is not expected to meet applicable water quality standards even if point sources of pollution are controlled. The waters of the Ala Wai Canal are Class Two inland waters, which are meant to be protected for recreational purposes, propagation of fish and aquatic life, agricultural and industrial water supplies, shipping, navigation, and propagation of shellfish.[49]

Studies conducted by the U.S. Geological Survey, State of Hawaii DOH, U.S. Fish and Wildlife Service (USFWS), and various researchers from the 1970s on have shown that Ala Wai Canal waters contain high levels of nutrients, fecal coliform bacteria, heavy metals (suspended), pesticides, sediment, and litter. Eutrophication and increased algal growth from high nutrient loads, long residence times, and incident sunlight result in the murky green appearance of the water and the unpleasant odor when the resulting organic matter decomposes. Stagnant conditions occur in areas where there is low circulation and anaerobic conditions due to microbial activity. Low levels of dissolved oxygen in the depths of the canal affect the distribution of marine and aquatic organisms, which need oxygen-rich waters for aerobic metabolism of food. During and after heavy rains, the canal turns a distinct brown color due to suspended sediment in surface runoff and possibly re-suspended bottom sediments.[50] Further details on pollutants in the Ala Wai Canal water column are discussed below by parameter.

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48 DOH (January 1997) *Hawaii's Water Quality-Limited Waters: The 1996 Assessment.* Draft for Public Review. State of Hawaii, Department of Health, Environmental Planning Office.

49 Hawaii Administrative Rules, Title 11, Department of Health, Chapter 54, Water Quality Standards. State of Hawaii, Department of Health, October 1992.

50 Edward K. Noda and Associates (April 1993) *Environmental Assessment and Negative Declaration: Ala Wai Canal Improvement, Honolulu, Oahu, Hawaii.* Job No. 31-OL-I.

Water quality at the proposed upland processing and placement sites varies. The marine pond at the Reef Runway and adjacent ocean waters are Class A waters. Keehi Lagoon near the Sand Island site is also Class A waters. Pearl Harbor waters surrounding the Waipio site are estuary waters.

Nutrients: Concentrations of nutrients (chemicals that promote growth) in the Ala Wai Canal generally exceed water quality standards.[51] The canal has a non-limiting nutrient condition, meaning that the availability of light, rather than nutrients, is the limiting factor for phytoplankton growth.[52] Nutrients measured in the canal include nitrogen, phosphate, chlorophyll *a*, and nitrate-nitrite. The amount of nutrients from natural versus urban sources has not been studied, but both are likely contributors.[53] In the Ala Wai Canal, nutrient concentrations are higher near the MPDC and drain inputs,[54] and the concentration of nutrients has also been shown by OI Consultants to increase near stream outlets into the canal.[55] The highest nutrient concentration is at the storm drain at the Kapahulu end. The Kapahulu end of the canal serves as a trap for particulate materials, with microbial activity releasing regenerated nitrogen (as ammonium) and phosphate.[56] Bottom water nutrient concentrations are related to resolubilization from the sediment.[57] Both the phosphate and ammonium appear to be released from the sediment, likely due to the process of simple diffusion from the high concentration of interstitial water to the overlying canal water (rather than being released by turbulence). Chlorophyll *a* levels were also the highest at the Kapahulu end of the canal, with maximum values typically about 50 µg/L (which exceed the geometric mean standard of 2 µg/L).[58]

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[51] • Sunn, Low, Tom & Hara, Inc. (1977) *Negative Declaration and Environmental Impact Assessment for the Proposed Ala Wai Dredging.* Prepared for the State of Hawaii, Department of Land and Natural Resources, Oahu, Hawaii.

• DOH (May, 1996) *1996 Hawaii Water Quality Assessment* [305(b) Report]. State of Hawaii, Department of Health, Clean Water Branch, Honolulu.

• Edward K. Noda and Associates (1992c) *A Management Plan for the Ala Wai Watershed. Report R-89c.* Prepared for the State of Hawaii, Department of Land and Natural Resources, Division of Water and Land Development. Job No. 31-OL-I.

[52] • Laws , E.A., *et al.* (1991) *Hypereutrophication of the Ala Wai Canal: Prospects for Cleanup. Research Report.* University of Hawaii at Manoa, Department of Oceanography. Unpublished.

• Harris, Carol L. (March 1975) *Primary Productivity in the Ala Wai Canal, A Small Tropical Estuary.* MS Thesis in Oceanography, UH. Also HIG Report 75-7.

[53] Edward K. Noda and Associates (1992c) *A Management Plan for the Ala Wai Watershed. Report R-89c.* Prepared for the State of Hawaii, Department of Land and Natural Resources, Division of Water and Land Development. Job No. 31-OL-I.

[54] Sunn, Low, Tom & Hara (1977) *Negative Declaration and Environmental Impact Assessment for the Proposed Ala Wai Dredging.* Prepared for the State of Hawaii, Department of Land and Natural Resources, Oahu, Hawaii.

[55] OI Consultants (August 1992) *Water Quality Studies for the Ala Wai Canal.* Prepared by Dr. David Ziemann. Appendix E in Edward K. Noda and Associates (1992b).

[56] Edward K. Noda and Associates (1992a) *Ala Wai Canal Improvement Project Executive Summary. Report R-89a.* Prepared for the State of Hawaii, Department of Land and Natural Resources, Division of Water and Land Development. Job No. 31-OL-I.

[57] Sunn, Low, Tom & Hara, Inc. (1977) *Negative Declaration and Environmental Impact Assessment for the Proposed Ala Wai Dredging.* Prepared for the State of Hawaii, Department of Land and Natural Resources, Oahu, Hawaii.

[58] Edward K. Noda and Associates (April 1993) *Environmental Assessment and Negative Declaration: Ala Wai Canal Improvement, Honolulu, Oahu, Hawaii.* Job No. 31-OL-I.

A large component of the nutrient load to the canal appears to be from groundwater contributions.[59] The steepest nitrate-nitrite to silicate gradient (as a measure of groundwater influence) was at the Kapahulu end of the canal where only 10 percent is fresh water. Groundwater is not the only source of this nitrate, nor are sediments, since the highest values occurred in the surface waters rather than the bottom waters. Another possible source is the percolation of nutrients applied to the Ala Wai Golf Course.[60]

Bacteria: Bacteria are primitive microbial organisms, some of which are responsible for human disease. Bacteria are also responsible for decomposition of available organic material. Concentrations of fecal coliform in the canal have frequently been in exceedance of water quality standards for the state.[61] High levels of bacteria are found primarily in the upper fresh-water layers.[62]

Enterococcus and fecal coliform are indicator species that originate in part by natural means, such as bird and small mammal droppings. Higher bacterial counts occurred in upstream locations in the watershed.[63] The likely source of naturally high levels of these bacteria found in the watershed is domestic pet and other animal waste, as opposed to human fecal contamination.

Heavy Metals: Heavy metal sampling of water in the Ala Wai Canal was conducted in two DOH studies, one in 1980 in an intensive urban storm-water runoff survey,[64] and one in 1990 as part of DOH's "Blue Waters" program.[65] Heavy metals are elements or compounds of certain metals that at certain concentrations can be toxic to ingesting organisms. Heavy metals identified in the Ala Wai Canal waters include arsenic, cadmium, chromium, copper, lead, mercury, nickel, selenium, silver, and zinc. Heavy metals can originate from both natural sources (such as volcanic deposits and soils) and human sources (such as paint, fertilizers, batteries, plastics, herbicides, and wear and tear of automobile parts). Levels of concern for each metal are different, and depend upon a number of factors, including molecular composition, adhesion to other particles, and solubility.

Pesticides: Pesticides are manufactured chemical compounds applied to the environment to kill insects. Their effects on humans vary, as does their persistence in the environment. Pesticides occurring in the water include dieldrin, chlordane, DDT, DDE, and DDD.

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59 OI Consultants (August 1992) *Water Quality Studies for the Ala Wai Canal.* Prepared by Dr. David Ziemann. Appendix E in Edward K. Noda and Associates (1992b). Their estimated groundwater influx rate from the (caprock) aquifer in the vicinity is about five million gallons per day per mile, based on salinity profiles and assuming relatively constant influx over the length of the Ala Wai Canal.

60 Edward K. Noda and Associates (April 1993) *Environmental Assessment and Negative Declaration: Ala Wai Canal Improvement, Honolulu, Oahu, Hawaii.* Job No. 31-OL-I.

61 • Sunn, Low, Tom & Hara, Inc. (1977) Negative Declaration and Environmental Impact Assessment for the Proposed Ala Wai Dredging. Prepared for the State of Hawaii, Department of Land and Natural Resources, Oahu, Hawaii.

• Edward K. Noda and Associates (1992b) Ala Wai Canal Improvement Project Feasibility Report. Report R-89b. Prepared for the State of Hawaii, Department of Land and Natural Resources, Division of Water and Land Development. Job No. 31-OL-I.

62 OI Consultants (August 1992) *Water Quality Studies for the Ala Wai Canal.* Prepared by Dr. David Ziemann. Appendix E in Edward K. Noda and Associates (1992b).

63 OI Consultants (August 1992) *Water Quality Studies for the Ala Wai Canal.* Prepared by Dr. David Ziemann. Appendix E in Edward K. Noda and Associates (1992b).

64 DOH (June 1980) *Storm Water Runoff and Urban Street Contaminants: Intensive Survey Report.* State of Hawaii, Department of Health, Pollution Investigation and Enforcement Branch, Environmental Protection and Health Services Division, Honolulu.

65 DOH (1991) *Biota Contamination Data from the Ala Wai Canal and Manoa Stream, 1975-91.* Unpublished.

Dissolved Oxygen: Dissolved oxygen concentrations in the Ala Wai Canal are highly variable.[66] Concentrations are high at the surface, but low to the point of oxygen depletion near the bottom of the canal, due to aerobic metabolism of organic material by microorganisms, which, by consuming oxygen, creates anaerobic conditions where circulation is impaired. More oxygenated waters cannot flow to the area, and "stagnant" conditions are more persistent.

Suspended Sediment and Turbidity: Sediment suspended in the water column is considered a water quality pollutant. A related parameter is turbidity, which is a measure of opaqueness of water. This is aesthetically and biologically important. Marine and aquatic plants require sunlight for photosynthesis, and where turbidity is high, sunlight cannot penetrate as far.

Sediments in the Ala Wai Canal are resuspended by natural processes, primarily increased bottom current flow. Both primary sediment load and entrained resuspended sediments are carried downstream by water flows for a distance inversely proportional to their rate of settling. Of the sediment samples tested, 50 percent by weight is of sufficient size to settle rapidly (between half a foot and five vertical feet per hour).[67] The smallest fractions, comprising about 16 percent of the sampled material, have much slower settling rates, ranging from 0.002 to 0.02 feet per hour. This indicates that mixing, dilution, and transport will occur with these smallest fractions prior to settling.

Turbidity levels barely met water quality standards in 1990 and 1995 and exceeded the standards in 1991 through 1994.[68] High turbidity occurs during storm runoff due to large amounts of suspended material washed into the canal. Even under typical conditions, the high levels of planktonic organisms and wind-induced resuspension of sediments lead to high turbidity.[69]

Litter/Garbage: Debris typically found in the canal includes aluminum cans, bottles, plastic cartons and cups, styrofoam, and golf balls. Roughly one-third of all debris in the canal is organic litter, such as leaves and branches.[70]

Litter originates from the stream inputs and drainage ways, as well as litter discarded from the banks of the Ala Wai Canal. Golf balls accumulate in the canal from the nearby Ala Wai Golf Course. The organic debris is a combination of naturally-shed substances such as leaves and waste dumped into stream-ways and drainage channels.

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66 Sunn, Low, Tom & Hara, Inc. (1977) *Negative Declaration and Environmental Impact Assessment for the Proposed Ala Wai Dredging.* Prepared for the State of Hawaii, Department of Land and Natural Resources, Oahu, Hawaii.

67 Belt Collins Hawaii and Sea Engineering, Inc. (December 1997) *Ala Wai Canal Dredging Conceptual Design and Environmental Assessment Feasibility Assessment (Deliverable No. 3.2.1).* Prepared for City and County of Honolulu Department of Transportation Services.

68 DOH (May 1996) *1996 Hawaii Water Quality Assessment [305(b) Report].* State of Hawaii, Department of Health, Clean Water Branch, Honolulu.

69 Sunn, Low, Tom & Hara, Inc. (1977) *Negative Declaration and Environmental Impact Assessment for the Proposed Ala Wai Dredging.* Prepared for the State of Hawaii, Department of Land and Natural Resources, Oahu, Hawaii.

70 Edward K. Noda and Associates (1992c) *A Management Plan for the Ala Wai Canal Watershed. Report R-89c.* Prepared for the State of Hawaii, Department of Land and Natural Resources, Division of Water and Land Development. Job No. 31-OL-I.

Pollutants in Biota

Testing has shown that pesticide residues are found in the canal's fish, and termicides and lead are found in its crabs. Sediment is theorized to be the source of the pesticides in the biota, since concentrations in water are only in the low parts per trillion as opposed to sediment concentrations of 10s to 100s of parts per billion.[71]

The USFWS National Contaminant Biomonitoring Program conducted biota studies on the canal in 1984 and found that of 112 stream stations throughout the United States, fish from Manoa Stream contained the highest concentrations of dieldrin, heptachlor epoxide, and all five chlordane related compounds[72] (although dieldrin concentrations appear to be decreasing in biota[73]). Similarly, DOH biota data for pesticide accumulation in tilapia and blue pincer crabs indicated higher amounts of pesticides coming from Manoa Stream than Palolo Stream.[74]

More recently, DOH conducted a study in September 1997 to assess the nature and extent of organochlorine pesticide and lead contamination in fish from the Ala Wai Canal.[75] This study was an update of an earlier (1991) DOH study that showed elevated levels of several organochlorine pesticides and lead in fish from the Ala Wai Canal. Three organochlorine pesticides (DDE, dieldrin, and endosulfan) and lead were detected in tilapia caught from the Kapahulu end of the Ala Wai Canal during this 1997 study. Levels of DDE and dieldrin found in the 1997 study were similar to levels measured in the 1991 study, but lead levels were higher in the 1997 study. Chlordane, which was detected in 1991, was not present in fish samples in the 1997 study.

Risk to human health (discussed in Section 4.3) from consumption of contaminated fish depends on the extent to which these chemicals are bioavailable to the fish and their food sources, and the degree to which toxins have bioaccumulated in these organisms.

Bioavailability: Bioavailability refers to the potential for pollutants to enter the biological food-chain. The degree to which pollutants in the sediment may be bioavailable has not been tested, but the 1997 sediment chemistry test results found contaminants in the canal that might have biological effects on marine organisms, particularly chromium, copper, and lead.[76] However, the sediment has a high TOC content, which usually indicates that a high proportion of chemical contaminants are

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71 Edward K. Noda and Associates (1992c) *A Management Plan for the Ala Wai Canal Watershed. Report R-89c.* Prepared for the State of Hawaii, Department of Land and Natural Resources, Division of Water and Land Development. Job No. 31-OL-I.

72 Dieldrin concentrations averaged 1,100 ppb, heptachlor epoxide averaged 200 ppb, and total chlordanes averaged 1,750 ppb. [Source: Schmitt, C.J., Zajicek, J.L., and Peterman, P.H. (1990) *National Contaminant Biomonitoring Program: Residues of Organochlorine Chemicals in U.S. Freshwater Fish, 197601984.* Archives of Environmental Contamination and Toxicology 14:225-60.]

73 Edward K. Noda and Associates (1992c) *A Management Plan for the Ala Wai Canal Watershed. Report R-89c.* Prepared for the State of Hawaii, Department of Land and Natural Resources, Division of Water and Land Development. Job No. 31-OL-I.

74 DOH (1991) *Biota Contamination Data from the Ala Wai Canal and Manoa Stream, 1975-91.* Unpublished.

75 Brooks, Barbara, Ph.D. (March 1998) *Summary of Health Risk Assessment for Consumption of Fish from the Ala Wai Canal.* Prepared by Hawaii Department of Health.

76 • Belt Collins Hawaii, MEC Analytical Systems, and Sea Engineering, Inc. (January 8, 1998) Ala Wai Canal Conceptual Design and Environmental Assessment, Dredge Sediment Characterization, Tier II Sampling and Analysis Plan . Prepared for City and County of Honolulu Department of Transportation Services.

• Belt Collins Hawaii, MEC Analytical Systems, and Sea Engineering, Inc. (January 8, 1998) Ala Wai Canal Conceptual Design and Environmental Assessment, Dredge Sediment Characterization, Final Tier II Laboratory and Data Report. Prepared for City and County of Honolulu Department of Transportation Services.

bound to the sediment, and are therefore not bioavailable. The availability of chlordane may be decreased by the TOC content and the particle size of the sediment.

Bioaccumulation: Bioaccumulation refers to the potential for certain chemicals, if bioavailable, to accumulate within the tissues of ingesting organisms. Sediment chemistry testing conducted in 1997 identified PCBs as a possible concern for bioaccumulation in the foodweb.[77]

4.2.2 Potential Effects and Operating Constraints

Limits of Dredging

No new pollutants will be introduced into the Ala Wai Canal from dredging and dredging is not anticipated to combine with natural factors to noticeably increase levels of bioaccumulation in canal biota. Dredging will expose and resuspend older sediments buried in previous years, which, based on the quality of the sediment tested, is not substantially different from more recent sediments. These older sediments will subsequently be covered by new sediments. Because of recent legislation banning leaded gasoline, certain ground treatment insecticides, and PCBs, sediments accumulating after dredging are likely to reflect lower levels of certain contaminants over time.

No new pollutants will be introduced into the Ala Wai Canal if the depression in Area 3 is filled to an elevation between -12 feet MSL and -6 feet MSL. This is because the fill material will be sediment dredged from one or more of the other areas of the canal. The relocation of sediment from one part of the canal to another may, depending on the method used, expose the sediment to air. It may also expose to the water column sediment that had been previously buried. Thus, if pollutants are bound to the sediment, they may become unbound and dispersed to the water in the canal. Dispersion and circulation in the canal are not likely to substantially affect pollutant levels in the canal or ocean. To minimize potential effects to water quality and bioaccumulation levels in biota, dredged sediment with the lowest levels of pollutants, if any, will be targeted for use as the fill material.

Short-term negative effects on water quality are expected from the temporary resuspension of sediment at the specific area where dredging takes place. Suspended sediment will be contained with silt curtains during the period it takes for localized suspended sediments to settle.

Groundwater influx from the caprock aquifer may increase as a result of the dredging of sediment from the canal. The removal of such low permeability material or the gravitational pressure caused by these sediments could cause a potential increase in influx volume, but the associated increase in nutrients is not anticipated to cause substantial impacts.

Long-term water clarity and quality improvements to the Ala Wai Canal waters are expected as a result of the proposed action. The removal of sediment from the canal would benefit water quality in the canal and in the adjoining harbor waters since these sediments contain pollutants and are

[77] • Belt Collins Hawaii, MEC Analytical Systems, and Sea Engineering, Inc. (January 8, 1998) Ala Wai Canal Conceptual Design and Environmental Assessment, Dredge Sediment Characterization, Tier II Sampling and Analysis Plan. Prepared for City and County of Honolulu Department of Transportation Services.

• Belt Collins Hawaii, MEC Analytical Systems, and Sea Engineering, Inc. (January 8, 1998) Ala Wai Canal Conceptual Design and Environmental Assessment, Dredge Sediment Characterization, Final Tier II Laboratory and Data Report. Prepared for City and County of Honolulu Department of Transportation Services.

resuspended and transported in the water column. Removal of shoal areas will improve water exchange and reduce bacterial concentrations. With greater water depths in the canal, flow velocity will decrease, reducing the total sediment load reaching the ocean. Thus, improvements to water quality in the canal may also improve water quality in the adjacent nearshore areas.

Negative cumulative effects on water quality could occur if large storm events or construction dewatering effluent discharge occur during dredging, leading to an increase in water turbidity. The contribution from dredging would be a non-substantial amount during a large storm event, and the turbidity would dissipate. Therefore, these cumulative effects will not be substantial.

Dredge Method/Sediment Transport

The type of dredge method used may affect water quality at the dredging location, and also has implications for the management of dewatering effluent at the transfer and disposal sites. Neither method will introduce substantial amounts of additional pollutants to the environment, and sediment quality will not be affected.

Both the mechanical and hydraulic methods are expected to resuspend a certain amount of sediment into the water column at the dredging location, causing short-term increases in turbidity. The hydraulic method uses a cutting mechanism to loosen sediment in front of the pipeline, while the mechanical "clamshell" dredge (whether using the open or closed bucket option) requires lifting loose bucketfuls of sediment through the water column. This results in some amount of spillage, which will vary depending on whether an open or covered bucket is used. The mechanical dredge causes more turbidity than the hydraulic dredge, but the use of "specialty" clamshell dredges, which have a more closed bucket design, results in even less turbidity than a hydraulic dredge. Because the hydraulic dredge resuspends sediments near the bottom, while a bucket resuspends sediments throughout the water column, the sediment suspended by mechanical dredging is more apparent and takes longer to settle.

Silt curtains will be required to limit and contain the bulk of resuspended sediments in the work area, but it is likely that some fine material may escape and be transported out of the canal. Because of the limited scope of the work area at any given time, these fine sediment concentrations will be diluted in surrounding waters. Conditions in the outer canal similar to those experienced during storm runoff periods may occur from time to time during dredging if suspended fine materials escape silt curtains and are transported out of the canal. Marine biota in the canal entrance are habituated to naturally recurring events of high turbidity, and no substantial impacts are anticipated.

Work Support Areas

The transfer of sediment from a pipeline or scow to an ocean-going barge at Magic Island has the potential for spills and over topping, introducing pollutants into near-shore waters. In the case of hydraulic dredging, this will be avoided by requiring effective communication between the dredge and receiving barges, and by prohibiting over topping of the barge. In the case of mechanical dredging, some spillage may occur during transfer by bucket from scow to barge. This will be avoided by tight mooring of the scow and receiving barge, and use of silt curtains to contain any spillage that occurs. In both cases, adequate free board in the transport barge will be maintained.

Processing and Placement

Potential impacts from placement at the South Oahu ODMDS will not be substantial. This site is an EPA-designated site and only sediment found suitable by the EPA and ACOE will be placed there. By definition, EPA and ACOE approve only material found to cause no substantial effects in the water column or the benthic environment at the ODMDS.

The extent to which dewatering activities are necessary will be affected by the type of dredge method used. Hydraulic dredging will result in a water content of as high as 80 percent of the dredged material, and will therefore require more extensive dewatering prior to placement at an upland site than would be necessary for the mechanical dredging process, which has approximately 50 percent water content. Dewatering to surface waters at the reuse site will not be allowed, so water quality will not be affected by this activity. At sites with limited space for constructing dewatering lagoons, mechanical dredging is favored, because water content in the sediments is relatively low, requiring less extensive dewatering.

Processing and placement activities may potentially affect water quality at the upland sites through surface runoff from precipitation during processing or once the sediment has been placed, and through potential leaching of contaminants from the placed fill material to groundwater or the ocean. The potential receptors for surface runoff or leaching are the adjacent ocean at the Reef Runway, Keehi Lagoon at the Sand Island site, and West Loch of the Pearl Harbor estuary at the Waipio site.

Surface runoff during processing for upland placement will be controlled through the use of containment. Processing of sediments will involve mixing with lime or other substance to increase pH and reduce potential for contaminant leaching into surface waters. Other binding agents may also be mixed with sediments to meet fill requirements at the Reef Runway. Once in place as fill material, standard construction practices, such as berms, would be used to prevent storm water runoff from reaching adjacent waters. Prevention of leaching of chemical contaminants from sediments into groundwater, or dispersal as fugitive dust, will also be addressed during dewatering and processing. Measures described above to increase pH and bind material, and additional measures, such as liners or covers, will be employed during dewatering and processing to prevent contaminant migration.

Leaching of contaminants is more likely to occur under acidic conditions than under neutral or alkaline conditions. Treatment of sediments during processing and placement, with lime and other binding agents, will help to raise the pH of the inherently acidic material. TCLP tests on the Ala Wai Canal sediment showed that chemicals did not leach into the test solution under mildly acidic conditions, which are meant to mimic possible landfill conditions. For potential upland placement sites, where less acidic rain water would be the primary leaching agent, this result indicates that contamination from chemical leaching would not be expected.

Negative cumulative effects could occur if a tsunami hit the Reef Runway during processing of sediments (see Section 4.12), or if the Reef Runway site near capacity due to disposal of contaminated sediment from other dredging projects. This is further discussed under cumulative impacts (Section 4.15).

No Action

Under the No Action alternative, sediment quality and bioavailability of pollutants will remain unchanged. Water quality in the canal will continue to deteriorate from reduced circulation, increased eutrophication, and re-suspension of shallow sediments.

4.3 PUBLIC HEALTH

Potential impacts to public health risk due to the proposed action are associated with the presence of bacteria, pesticides, and heavy metals in the canal. Worker safety issues will be addressed in the contractor's Health and Safety Plan, and by implementation of appropriate measures. Impacts are considered substantial if a new exposure is created or if existing risks will increase over the long term.

4.3.1 Existing Conditions

The Ala Wai Canal waters are characterized by high levels of fecal coliform bacteria, and various levels of pesticides and heavy metals. The two exposure pathways that are of concern are dermal contact or ingestion of canal water, and consumption of fish and crabs caught in the canal.

Bacteria is introduced into the water primarily by animal droppings and other runoff sources, where it propagates by decomposing organic material, and concentrates because of stagnant conditions. Dermal exposure to or ingestion of canal water with high levels of bacteria can lead to skin irritations, infections, or illness. Anecdotal information suggests that paddlers and rowers are prone to more frequent cut infections because of exposure to canal waters. A survey[78] conducted in Summer 1997 over an eight-week period of three canoe clubs based at the Ala Wai Canal and one at Kailua Beach Park found that 78 (approximately 32 percent) of the Ala Wai Canal paddlers surveyed said they had an infection during the survey period. The proportion of club members surveyed who reported the occurrence of an external rash was higher for the three Ala Wai Canal-based clubs (18 out of 48, 15 out of 33, and seven out of 24) than that for the Kailua club (four out of 48).

Pesticides and heavy metals, if biologically available, have the potential to accumulate within the tissues of the ingesting organisms, posing a risk to persons who consume fish or crabs caught in the canal. About 36 percent of Ala Wai Canal fishermen recently surveyed stated that they routinely consume the fish that they catch.[79] In order to provide a preliminary evaluation of human health implications from Ala Wai Canal waters, DOH prepared a cancer risk characterization for three pesticides (dieldrin, heptachlor epoxide, and chlordane) found in fish species taken from the Ala Wai Canal.[80] Given several assumptions about dietary intake, contaminated dietary fraction, exposure duration, body weight, and daily intake, a conservative cancer risk of 3.79×10^{-6} (3.79

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78 Cummins, Kerri (February 1998) *Welfare of Paddlers at the Ala Wai Canal.* Prepared by Environmental Planning Services.

79 Chau, Lisa (August 1997) *Fishing Practices of the Ala Wai Canal.* Prepared for Ala Wai Watershed Coordinating Committee and Environmental Center, University of Hawaii at Manoa.

80 DLNR (October 1992) Appendix B "Preliminary Cancer Risk Calculations for Three Pesticides in Fish from the Ala Wai Canal and Manoa Stream (for Chlordane, Dieldrin, and Heptachlor Epoxide only) " in *A Management Plan for the Ala Wai Canal Watershed, Honolulu, Oahu, Hawaii. Report R-89c.* Prepared by Edward K. Noda and Associates, Inc.

occurrences per million persons exposed to the calculated dose) and less-conservative cancer risk of 1.97×10^{-3} (1.97 per thousand persons exposed) were calculated. The study found that given the EPA's 1.0×10^{-6} (one-in-a-million) cancer risk as the criteria action level, the levels in fish sampled from the Ala Wai Canal pose an existing health risk when consumed under the conditions assumed in the study.

The consumption risk from contaminated fish in the Ala Wai Canal tested again in a 1997 study.[81] In this study, three pesticides (DDE, dieldrin and endosulfan) and lead were detected in fish tissue (tilapia). When compared to the 1991 study, DDE and dieldrin were found at similar levels, chlordane was not detected, and lead levels were dramatically increased. Based on this new information, consumption for adults of more than half a meal per month of whole fish or two meals per month of fish fillets could present an unacceptable cancer risk due to pesticide content of fish. The risk is expected to be even higher for children due to their lower body weight. Concentrations of lead in whole fish were high enough to present a significant risk to children if any fish was consumed (lead is a heavy metal that can cause neurological development problems and poisoning, and is of particular concern for children). Fish fillets resulted in a much lower risk factor. The study recommends that a fish advisory warning of the potential health effects be issued to the public.

4.3.2 Potential Effects and Operating Constraints

Limits of Dredging

The proposed action is not anticipated to increase bacterial infection by dermal exposure. Bacterial levels in the canal waters may decline in the long-term, reducing infection potential, if the limits and profile of dredging improve circulation, resulting in higher levels of dissolved oxygen and better flushing.

Dredging and/or filling may increase resuspension of sediments in the water column in areas where sediments contain bioavailable contaminants. The amount of sediment in the water column, and its degree of contamination by chemicals of concern, may increase the potential for the contaminants to enter the food chain. While contamination of fish is an existing condition,[82] this risk may marginally increase as a short-term effect, and it will diminish as a long-term consequence. By use of silt curtains, the areas affected by sediment resuspended during dredging will be contained to a relatively small size, and sediments will disperse and settle again. In all cases, consumption of fish from the canal is not healthful and signs will be posted to indicate the potential health risk.

Long-term health benefits derived from removal of sediment include potentially less bacterial concentration in the water and, with deepening of the canal, somewhat lower resuspension potential by surface (wind, current) disturbance.

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81 Brooks, Barbara, Ph.D. (March 1998) *Summary of Health Risk Assessment for Consumption of Fish from the Ala Wai Canal.* Prepared by Hawaii Department of Health.

82 Brooks, Barbara, Ph.D. (March 1998) *Summary of Health Risk Assessment for Consumption of Fish from the Ala Wai Canal.* Prepared by Hawaii Department of Health.

Dredge Method/Sediment Transport

The dredge method and sediment transport method are not anticipated to have substantial effects on public health. Hydraulic dredging may marginally reduce sediment resuspension in the water column.

Work Support Areas

Use of the work support areas is not anticipated to affect the exposure pathways of the public to pollutants.

Processing and Placement

Once removed from the marine environment, sediments will be out of the potential food chain. Only sediments tested to pose acceptable risk in the marine food chain will be allowed by ACOE and EPA for ocean disposal.

Public exposure to dredged sediments at upland placement sites would be limited at the Reef Runway, where access is restricted since it is an active runway, and the Waipio site, a landfill area with limited access. Public exposure to sediments may occur at the Sand Island site due to the use of the shoreline and adjacent Sand Island State Recreation Area for recreation. Material identified for upland disposal has been tested for potential of contaminants to leach, and all tests were negative. Therefore, contaminants are expected to remain bound to sediments at the disposal or reuse site. No discharge of dewatering effluent will be allowed to marine waters. Therefore no substantial effects to public health from processing and placement are anticipated.

No Action

Under the No Action alternative there will be a continuation of dermal and ingestion health risks to users in contact with canal waters, and consumption health risks to persons ingesting contaminated biota from the canal.

4.4 RECREATION

A study of recreational uses in the Ala Wai Canal was conducted, as part of this EA, in December 1997. This study is included as Appendix D. The findings are discussed below.

The determination of whether or not recreation is substantially affected by the proposed action is based on the degree to which uses of recreational resources are eliminated or displaced, the length of time that recreational access is inhibited, the cumulative effects of temporary disruptions of recreational use, and the degree to which parking facilities for these areas are affected.

4.4.1 Existing Conditions

Existing recreational uses in the canal, neighborhood park, channel, and upland sites are discussed below by location. Existing parking facilities at the proposed work support areas are discussed last.

Ala Wai Canal: The Ala Wai Canal is the most heavily used inland waterway in the state for recreational activities. The majority of these activities involve paddling in six-person outrigger

canoes, one-person outrigger canoes, surf ski kayaks, flat water kayaks, recreational kayaks, and rowing sculls. Due to paddling activities alone, the canal is in constant use every day of the year. The most intense period of use occurs during the short course canoe racing season from May to August. The canal is one of the few suitable areas in the state for rowing sculls.

Several features of the canal make it attractive to paddlers and rowers. It is one of the longest and largest bodies of calm water in the Hawaiian islands, is free of currents and surf, and is relatively lighted at night. In addition, the canal is centrally located in Waikiki, has several launching and landing sites, and its dimensions provide an ideal point-to-point, no-turns race venue for a number of distances.

Fishing is another popular activity in the project area. Fishing activities include pole fishing, throw netting, lay netting, and crabbing. Boating and fishing occur throughout the canal, but are primarily concentrated in the upper half between the library and the McCully Street Bridge. Crab netting takes place most frequently in the MPDC and in the smaller drainage channel near the Ala Wai Golf Course Driving Range. In-water activities, such as swimming, rarely occur in the canal since the waters are among the most polluted in the state, characterized by turbidity, litter, debris, and high levels of bacteria.

In addition to the daily and seasonal uses of the canal, several annual special events are important cultural, social, or fund raising activities. These include the four-day Royal Hawaiian Rowing Challenge in January and a number of one-day events: the Ala Wai Challenge fund raiser in January, the Honolulu Waterfront Canoe Challenge and the Great Hawaiian Rubber Duckie Race in March, and the Honolulu Toro Nagashi annual floating lantern ceremony in August.

Neighborhood Park A: The Ala Wai Neighborhood Park A, adjacent to the canal, is one of several access sites for paddlers. The canoe clubs that use this area have constructed floating docks that provide a boat launching platform, and the Department of Parks and Recreation (DPR) has constructed a canoe *halau*, used primarily by outrigger canoe paddlers. The park also accommodates play apparatus used by children, and soccer and softball fields. The fields are in use throughout the year almost every afternoon, and all day on weekends. A bike path running along the *mauka* bank of the canal between the park and golf course is used at all times of the day, with the heaviest traffic occurring in the mornings and late afternoons.

Channel/Boat Harbor: Situated between the mouth of the canal and the open ocean is the Ala Wai Boat Harbor, the only boat harbor in Waikiki. It contains 663 berthing spaces, 39 mooring spaces, and a two-lane launch ramp.[83] Two private yacht clubs are situated within the harbor: the Hawaii Yacht Club, which has 25 berthing spaces, and the Waikiki Yacht Club, which has a small loading dock and 135 berths for recreational vessels.

Activities occurring in the Ala Wai Channel and Boat Harbor seaward of the canal are sailing, paddling, SCUBA diving, and surfing. This entire area is part of the Waikiki Ocean Waters Restricted Zones Ocean Recreation Management Area (ORMA), extending from Magic Island to Diamond Head. (ORMAs are also discussed in Section 4.6, as they affect transportation.) Boating activities in the channel include junior sailing programs, yacht club races every Friday, and annual international yacht racing competitions. The junior sailing programs on water safety and basic boating are held by both the Hawaii Yacht Club and Waikiki Yacht Club, and take place in the

[83] Clark, John (January 16, 1998) *Ala Wai Canal Recreational Activities Survey.*

harbor between the Hawaii Yacht Club and Magic Island. The international yacht racing competitions are the Kenwood Cup Hawaii International Offshore Series held on even-numbered years and the Trans Pacific Yacht Race held on odd-numbered years. Commercial introductory SCUBA diving tours occur on an intensive basis at the seaward end of Magic Island. At least six dive tour operators use this site. In addition, the fringing reef on the east side of the Ala Wai Channel, called Ala Moana Bowl, is one of the best surfing sites on Oahu's south shore, and is a popular competition site. This site is heavily used every day of the year, with peak use from May to August.

In addition to the above activities, canoe paddling and fishing occur in the harbor and adjacent to Magic Island. A canoe launch site is located at Magic Island, near Ala Moana Park Drive.

Keehi Lagoon/Sand Island: Ocean recreational activities occurring in the Sand Island area include waterskiing on the seaplane runway ewa of Sand Island, commercial jet ski use, marine training classes, boating activities based at the La Mariana Sailing Club, and canoeing based at the Keehi Lagoon canoe facility. The ORMA at Keehi Lagoon includes canoe racing and competitive water ski zones (Figure 4-4).

Reef Runway/Waipio sites: No recreation activities occur on these sites. The shoreline along the Reef Runway is accessible from the Keehi Lagoon side at the east end of the runway. Fishing from shore occasionally occurs here. Access onto the Reef Runway is prevented by a locked gate and fence. The Waipio site is a landfill area with limited access. Future plans call for development of a soccer facility on adjacent lands, possibly including the landfill area. There is recreational use in the waters of the Reef Runway in the thrill craft ORMA.

Parking Facilities: Parking at the proposed work support areas varies. At Magic Island there are 437 car stalls and 15 bus stalls. The Neighborhood Park A parking lot has a capacity of approximately 75 cars. There are no delineated parking areas at the Kapahulu site or the vacant lot at the Kalakaua site. There are no parking areas that could potentially be affected at any of the proposed processing and placement sites.

4.4.2 Potential Effects and Operating Constraints

Short-term effects of construction are expected to constrain recreational activities in the canal, at Neighborhood Park A, in the Ala Wai Boat Harbor, and in the Ala Wai Channel. These constraints will cause inconveniences but not elimination of particular uses, and are therefore not substantial.

Long-term effects on recreational activities occurring in the project area are anticipated to be positive; water use activities in the canal should be enhanced once the project is complete due to the removal of sediment and shoal areas, which is expected to improve water quality and allow navigation over the width and length of the canal.

Hours of construction will affect the extent to which recreational use is constrained on a daily basis versus a long-term basis. A shorter work day and work week (eight-hours of dredging during a 10-hour work day, five days a week) will extend the overall project duration, but would allow some use of the canal free of equipment noise and emissions either early or late in the day and all day on the weekends when equipment is not in operation. On the other hand, this equipment would still be stored in the canal, creating restricted access and visual impacts, even when not in use.

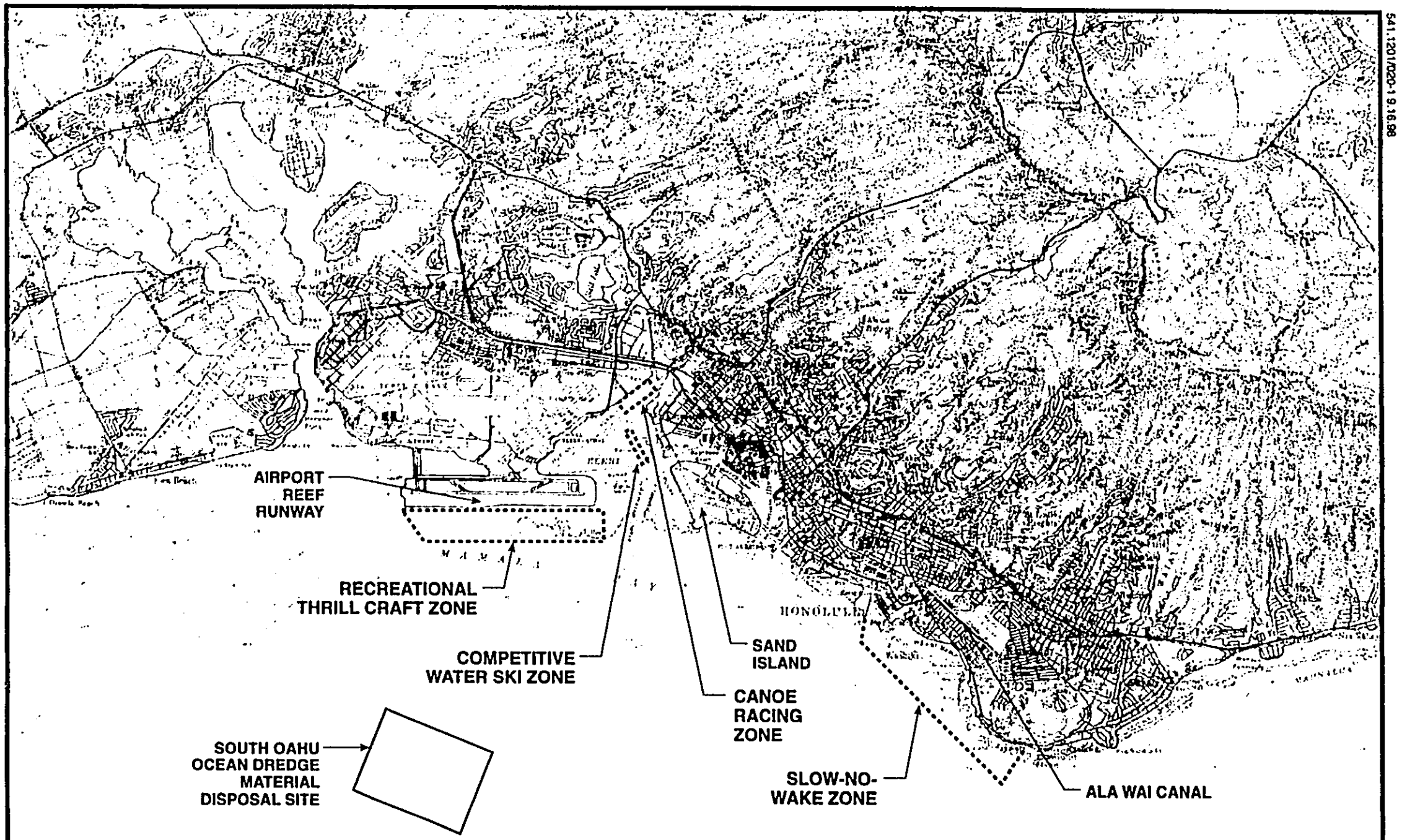

Figure 4-4
OCEAN RECREATION MANAGEMENT AREAS

Ala Wai Canal Dredging Environmental Assessment
Belt Collins Hawaii
October 1998

(Restricted access is described in more detail under Dredge Method and Sediment Transport below.) Longer daily hours of operation would enable a more rapid project completion. Either way, hours of operation are not anticipated to substantially affect recreational use of the canal.

Limits of Dredging

Some impacts to recreational users will occur regardless of the location of the dredged area since some paddlers and fishermen use the entire length of the canal. The primary area to be dredged is in the middle upper part of the canal. Various access points to the canal will be constrained for short periods of time when the dredge is operating in the vicinity. The exact extent of dredging will determine in part where these short-term effects occur, and for how long. Inconveniences to canal users can be minimized by ensuring there is clear passage of the dredging barge on one side of the canal, and by coordinating with affected clubs when dredging is occurring adjacent to their canoe launches. In order to assist with communication, DLNR will coordinate interaction between the canal users and the dredging contractor during the project.

To assess the impact of the dredging schedule on recreational uses of the Ala Wai Canal, an estimate of the duration of dredging in Areas 1, 2, 3, and 4 was developed to compare with recreational activities and events. Duration of dredging in the areas of the canal is shown in Table 4-1. Recreational activities and areas of the Ala Wai Canal most used are shown in Table 4-2.

TABLE 4-1: DURATION OF DREDGING IN AREAS OF THE ALA WAI CANAL

Area	Volume	Mechanical (weeks)	Hydraulic (weeks)
1	8,500 CY*	2.5	2.4
2	123,500 CY	36.3	35.3
3 (to –6 feet MSL)	3,500 CY	1.0	1.0
3 (to –10 feet MSL)**	11,000 CY	3.2	3.1
4	26,500 CY	7.8	7.6

* CY = cubic yards
** Dredging of 1,100 feet in Area 3 from upper edge of Area 2 (see Section).

Recreation in the Ala Wai Canal occurs throughout the year; there are no months during the year that are free of canoe, kayak, or rowing shell practices or races, or special events. Special events occur in January, March, July, August, and October. Area 1 will take less than one month to dredge, and dredging there should be avoided during the season of heaviest canoe practice and racing (May to August). Areas 2 and 3 are most heavily used for canoe and kayak practices, and events that occur within the canal. Because Area 2 will have the longest dredging period (approximately nine months), it will be difficult to avoid all special events that will occur in this area. The best months to avoid dredging in Area 2 would be May to August. The best time to avoid dredging Area 3, which will take about one month even with the alternative dredging plan, is between March and August. Area 4 will take approximately two months to dredge, and since it is most heavily used for launching canoes by high schools, the time to avoid dredging there is November to February. Based on these limitations, a notional schedule of dredging periods for each area was developed and is contained in Table 4-3. This is provided as a guideline; the actual schedule will be developed during final design of the dredging project or by the selected contractor.

TABLE 4-2: RECREATIONAL USE IN THE ALA WAI CANAL AND VICINITY WITH TIME AND AREA USED

Event	Time	Area Used
Special Events:		
Royal Hawaiian Rowing Challenge	December to January (ends with 4-day event)	Kapahulu-Waikiki Library to MPDC and Ala Wai Community Park 1
Annual Ala Wai Challenge (includes canoe race)	January	Along Ala Wai Community Parks 1 and 2
Great Hawaiian Rubber Duckie Race	3rd or 4th Saturday in March	McCully St. bridge to Hawaii Convention Center
Honolulu Waterfront Canoe Challenge	March (even numbered years)	McCully St. bridge to Ala Wai Neighborhood Park A
Molokai to Oahu Outrigger Canoe Race	2nd Sunday in October	Land in canal
Sailing:		
Regular Races	Fridays, 5:30 p.m.	Ala Wai Boat Harbor to Honolulu Harbor
Kenwood Cup Hawaii International Offshore Series	July and August (even numbered years)	Ala Wai Boat Harbor and yacht clubs
Trans Pacific Yacht Race	July (odd numbered years)	Ends at Oahu, mooring at yacht clubs in Ala Wai Boat Harbor
Outrigger Canoes:		
High school season	November to February	Kapahulu-Waikiki Library to McCully St. bridge
Pre season races	March to May	Kapahulu-Waikiki Library to McCully St. bridge
Practices	Weekdays, early a.m. and late afternoon, May to August (highest intensity)	Kapahulu-Waikiki Library to McCully St. bridge
Short course regatta season	April to August (ends with state championship in August)	Whole of canal for practices, race in ocean
Long course season	August to 2nd Sunday in October (ends with Molokai to Oahu race)	Launch and land in canal for open ocean practice
Kayaks:		
Ocean racing (surf ski) racing season	January to May	Open ocean (launch in canal) and canal for practice
Surf ski (ILH) training	Saturdays in October	Ala Wai Neighborhood Park A and length of canal
Hawaii Canoe Kayak Team (Olympic development team, flat water kayaks)	November to June	Ala Wai Neighborhood Park A and length of canal

TABLE 4-3: NOTIONAL SCHEDULE OF DREDGING ACTIVITY

Areas of the Ala Wai Canal	Ideal Dredging Schedule
Area 1	August
Area 2	September to May
Area 3	June
Area 4	July to August

The increase in depth of the Ala Wai Canal from dredging will benefit all boating users of the canal in the long-term, as it will enable use of the full width of the canal where currently shoals cause water depths too shallow to allow passage.

Dredge Method and Sediment Transport

Recreational water craft on the canal will be temporarily affected at the dredge site by the dredge, associated anchors and lines, and servicing barges. The dredge will be placed so as not to obstruct the entire canal width, and the obstruction will affect only a small reach of the canal at any time. Therefore, no substantial adverse effects are anticipated.

Mechanical dredging will take approximately 49 to 55 weeks, assuming the work is performed during a 10 hour day with eight hours of dredging on a five days per week basis. Should mechanical dredging be conducted, two to three small scows (approximately 15 feet by 30 feet) will transport sediments out of the canal to an ocean-going barge at Magic Island. Depending on size, approximately 10 scow trips per day could be required. Therefore, at least one scow will be continuously transiting the canal in one direction or another. While this traffic will be slow and easily avoided, maneuvering by other craft using the canal will be necessary.

These scows with prime movers (tow boats) will navigate according to rules for vessels under tow, and leave sufficient room for safe passage by other vessels. Caution will be required at narrow bridges, and the span used by scow traffic should be clearly marked and fendered. Scows will be anchored or berthed at night so as not to impede navigation or canoe launching areas in the canal.

Hydraulic dredging will last approximately 44 to 58 weeks (using the same hours of operation stated above). Use of a pipeline with hydraulic dredging could potentially interfere with navigation in portions of the canal seaward of the dredging area and with boat slips in the boat harbor. A hydraulic line to the ocean-going barge at Magic Island will have to be secured along the side of the canal so as not to obstruct canal traffic, and in a manner that does not prohibit launching of canoes and kayaks from the *mauka* side of the canal. Beyond Ala Moana Bridge, the line must be submerged to allow unimpeded navigation to boat slips along both sides of the canal, and to allow egress from the canoe-launching site in the northeast corner of Magic Island. The submerged pipeline will be clearly marked with markers, and buoys at its emergent points.

Either dredging method has the potential to cause turbidity plumes at the point of dredging, or from leakage in transport, which could create adverse short-term impacts in the boat harbor or outer channel area. Turbidity plumes could have a negative effect on water clarity in the outer channel areas where commercial SCUBA diving tours occur almost daily. In addition, turbid water may increase surfers' anxiety at the Ala Moana Bowl site since many surfers associate turbid water with possible shark attacks. However, these sites are a substantial distance from the closest dredging

area, and over a mile from the center of the dredging effort. Therefore, any sediment released during dredging would be substantially settled and diluted before reaching surfing or diving sites and no elimination or displacement of uses is anticipated. In order to reduce the potential for sediment plumes, sediment suspended by dredging will be contained with silt curtains before it reaches the channel. Sediment will likely not resettle in noticeable depths within the boat harbor. Spillage during transport or handling at Magic Island will be prevented by requiring no over topping and adequate freeboard in the scows and barge. No substantial effects are anticipated.

Work Support Areas

Out of the four proposed work support areas, only the use of the Kalakaua Avenue site, an empty, privately-owned lot, would have no effect on public recreation. It is, however, in close vicinity to the Hawaii Convention Center, where its use as a work support area would create minor visual or noise disturbances for convention center users (for details, see the discussion under Section 4.5, Socioeconomics).

Use of the ¼ to ½ acre at Ala Wai Neighborhood Park A for staging and material handling would cause a temporary inconvenience to some park users accessing the canoe *halau* or using the bike path. Approximately 10 to 20 parking stalls (about 13 to 25 percent of available stalls) located at the *ewa* end of the Neighborhood Park A parking lot that serves the canoe *halau* would be used for dredging support, along with a small portion of land fronting the canal. Coordination with the Department of Education for use of Ala Wai Elementary School parking on the weekends would help offset the reduction in number of stalls available at the Neighborhood Park A,[84] and additional street parking is available nearby.

The existing bike path will be temporarily rerouted around the affected shore-side area for use during the construction period. This path will be replaced to its original position and relandscaped upon completion of dredging. No playing fields will be displaced. At any one time, the proposed work and loading area at Ala Wai Neighborhood Park A will affect shoreline access for approximately 100 feet of the length of the canal. The site will be restored to original preconstruction condition and work will occur on weekdays only, exclusive of holidays, in accordance with DPR requirements (see Appendix G). No substantial effects on recreational use are anticipated.

The Kapahulu end site is adjacent to the Ala Wai Golf Course. Staging operations at this site are anticipated to create minor visual and noise disturbances, but will not directly affect normal use of the golf course. Portions of a canoe launching site located at the east end of the canal may be temporarily inaccessible during staging operations. The banks of the canal here are soil rather than concrete walls, making it the only site on the Ala Wai Canal where the boats are walked into the water. Portions of the site will remain accessible during staging for recreational users walking boats into the water. Therefore, no substantial effects are anticipated.

Staging operations at Magic Island would temporarily block about 43 out of 437 car parking stalls (10 percent of available stalls). Three or four of the 15 bus stalls (20 percent) would also be blocked. These effects are temporary for the period of construction and do not preclude use and

[84] The Ala Wai Elementary School parking lot can be reserved on weekends by making arrangements with the school. There is a rental fee for this use. It is difficult to anticipate whether the school lot would be available during the whole dredging period. (Personal communication, Keileen Isono, Vice Principal of Ala Wai Elementary School, with Jane Dewell, Belt Collins Hawaii, April 8, 1998.)

appreciation of the park and waterway. Although some inconvenience will be caused, the effects will not be substantial. A portion of about 150 feet of the shoreline usually used by fishermen will be obstructed by a barge. The area at the eastern corner of Magic Island, used as a launching site for canoes and kayaks, would be temporarily constricted but not blocked by dredging activities. The site will be restored to original preconstruction condition and work will occur on weekdays only, exclusive of holidays, in accordance with DPR requirements (see Appendix G). The effects are short-term, and will not prohibit recreational use of the surrounding areas.

The barge moored at Magic Island would be roughly 150 feet long by 40 feet wide and would affect local navigation in the immediate vicinity. The outer Ala Wai Channel is approximately 600 feet wide at this point. The transfer barge, associated anchors, lines, and equipment may take up to 200 feet, or one-third of this dimension. While the remaining 400 feet is sufficient for safe navigation, some events will be temporarily affected, such as sailing races and classes, where room for tacking and maneuvering could be reduced. However, these activities will not be displaced by the proposed action.

To minimize effects on recreational users of the canal, and to ensure safety, the barge will be moored in such a way as to allow continued access to the ocean for recreational users. The mooring cables and buoys will be clearly marked day and night to prevent hazards to navigation. Coordination of tug and barge movements will be made with the Ala Wai Harbor Master's office. In order to prevent impacts to water-quality-sensitive recreational users, spillage of dredged slurry or over topping of the barge will be minimized and contained by use of silt curtains.

Processing and Placement

Transportation of dredged sediment by barge from Magic Island to the ocean or any of the three potential upland sites would primarily traverse open waters. There could be effects on recreational boating and commercial recreation within constricted waters at some destinations. These are not anticipated to be substantial since only one to two barge trips per day are expected.

At the Sand Island site, ocean recreational activities occurring within the canoe racing and competitive water ski zone ORMAs will not be directly affected by the barge, which would keep to the south of these zones upon entering the channel near Sand Island. At the Reef Runway site, the barge would anchor at the southeast end of the thrill craft zone ORMA. Thrill craft, such as jet skis, would need to stay clear of the barge or maneuver around it, but use of the area would still be available. Access to the shoreline on Sand Island and at the Reef Runway will not be interfered with by the processing and placement of sediment. Security at the Reef Runway will be necessary if the fence is open to receive material from the barge.

A portion of the Waipio site is proposed to be developed as part of a soccer facility. If this site is selected for upland placement of sediment as landfill cover, with the concurrence of all property owners involved, the final grading, cover, and closure of the landfill would need to be designed to conform with the proposed recreational land use.

The ocean disposal site is located approximately six miles southwest of the Ala Wai Boat Harbor, remote from recreational activity (see Figure 3-3). Ocean disposal will not affect recreational craft once offshore, other than as a navigating vessel under tow. Therefore, no substantial effects are anticipated.

No Action

Under the No Action alternative, there would be no short-term interruptions of recreational activity in the Ala Wai Canal, the Boat Harbor, the channel, or along the shoreline. However, navigation within the Ala Wai Canal would continue to deteriorate from progressive shoaling due to sediment deposition. This would increasingly restrict recreational uses of the canal over the long term.

4.5 SOCIOECONOMICS

Effects of the proposed action on socioeconomics would be considered substantial if the action were to cause a change in property values, or affect the revenue earning potential of business activities. Cultural practices are considered separately in Section 4.14. Commercial recreation was analyzed in Section 4.4.

4.5.1 Existing Conditions

Activities and buildings in the project area that generate revenue for the state are tourism in Waikiki, the Ala Wai Golf Course, and the Hawaii Convention Center. The Ala Wai Canal is heavily used for recreational purposes which, at times, are revenue-generating events.

The socioeconomic region of influence for the Ala Wai Canal includes the neighborhoods of Waikiki, Ala Moana/Kakaako, McCully/Moiliili, and Diamond Head/Kapahulu/St. Louis Heights. These neighborhoods all share a boundary with the Ala Wai Canal, which provides unique open space with associated views and recreational uses. The populations in these neighborhoods, as recorded in the 1990 U.S. Census, were as shown in Table 4-4.[85]

TABLE 4-4: 1990 NEIGHBORHOOD POPULATIONS

Neighborhood	Population
Waikiki	19,575
Ala Moana/Kakaako	10,943
McCully/Moiliili	28,466
Diamond Head/Kapahulu/St. Louis Heights	20,860

Other characteristics of these neighborhoods are reported in Table 4-5. All of these neighborhoods are densely populated, with high rise apartments and hotels dominating Waikiki and parts of Ala Moana/Kakaako and McCully/Moiliili. Generally, the household size is below the Oahu average of 3.02 persons, and the percentage of the population with college or graduate level education is above the island average of 24.6 percent. Income falls below the island median of $40,581; but divided by household size, the income is above the island median.

The Waikiki neighborhood is a tourism center in Hawaii, with a hotel occupancy rate of 81.79 percent (higher than the state average of 76.63 percent).[86] The number of visitors to Waikiki

[85] DBEDT (1996a) Table 1.14; Characteristics of Oahu Neighborhoods: 1990 in Hawaii Data Book.

[86] DBEDT (1996b) Table 23.32; Hotel Room Occupancy and Room Rates, by Geographic Areas: 1995 in Hawaii Data Book.

was about 4.9 million in 1995, with daily visitor numbers of approximately 70,000.[87] In addition, Waikiki has the economic attributes as outlined in Table 4-5, and described as follows:

> *"...[Waikiki] has a direct work force for tourism of 38,800 persons. Waikiki generates 45 percent of all State visitor expenditures, nearly $4.9 billion annually. It generates 60 percent of all hotel room taxes, 16 percent of our State's gross excise tax and 14 percent of the City real property taxes. It comprises 18 percent of the gross state product."* [88]

TABLE 4-5: SELECTED CHARACTERISTICS OF OAHU NEIGHBORHOODS BORDERING THE ALA WAI CANAL[89]

Neighborhood Area	No. of Households	Avg. Household Size (persons)	Percent College Graduates *	Median Household Income **	Median Income per Person ***
Oahu Total	265,625	3.02	24.6	$40,581	$13,437
Waikiki	11,445	1.71	29.4	$26,980	$15,778
Ala Moana/Kakaako	6218	1.72	26	$25,162	$14,629
McCully/Moiliili	13,428	2.08	27.8	$31,974	$15,372
Diamond Head/Kapahulu/St. Louis Heights	8040	2.56	27.3	$39,357	$15,374

* Percent of persons 25 years and over with a bachelor's degree or higher
** Median 1989 income of households, in dollars
*** Calculated by dividing Median Household Income by Average Household Size (persons)

Source: City and County of Honolulu Planning Department (1990) Tabulations from 1990 U.S. Census.

The industries that benefit most directly from tourism in Waikiki are the hotels, restaurants, and retail shops. In 1995, there were 74 hotels, 52 condominium buildings, over 1,000 businesses (including restaurants), and 1,000 retail shops.[90] Statewide, in 1996, service jobs numbered 166,100 (31.4 percent of nonagriculture jobs), hotel jobs numbered 38,450 (7.3 percent of nonagriculture jobs), and retail jobs numbered 113,800 (21.5 percent of non-agriculture jobs).[91] In 1995, restaurant-related jobs numbered 46,527 (11.0 percent of jobs in major industry groups).[92] These categories comprise a large proportion of jobs in Hawaii, and Waikiki's tourism economy has an effect on these job numbers and related revenues and income.

87 City and County of Honolulu (February 1996) *Waikiki Planning and Program Guide*. Prepared by the Planning Department.

88 City and County of Honolulu (February 1996) *Waikiki Planning and Program Guide*. Prepared by the Planning Department.

89 DBEDT (1996a) Table 1.14, Characteristics of Oahu Neighborhoods: 1990 in Hawaii Data Book.

90 City and County of Honolulu (February 1996) *Waikiki Planning and Program Guide*. Prepared by the Planning Department.

91 DBEDT (1996c) Table 12.10; Jobcount, by Industry: Annual Averages, 1991 to 1996 in Hawaii Data Book.

92 DBEDT (1996d) Table 15.20; Characteristics of Business Establishments, by Major Industry Group: 1995 in Hawaii Data Book.

Other than residential properties, two major revenue-generating activities border the Ala Wai Canal: the Ala Wai Golf Course, run by the City and County of Honolulu Department of Auditoriums, and the Hawaii Convention Center, run by the State of Hawaii Convention Center Authority. The Golf Course covers over 137 acres and extends along the Ala Wai Canal from the MPDC to the Kapahulu end. During the county fiscal year of 1997, it generated $2,186,794 in revenues from 177,363 rounds of golf. An additional $504,938 was generated from concessions, including a driving range, pro shop, and restaurant.[93] The Hawaii Convention Center is adjacent to Ala Wai Canal *makai* of Kalakaua Avenue. The net impact, projected to the year 2008, of the Hawaii Convention Center on visitor numbers is an additional 8,000 to 8,900 visitors per day to Oahu, and an additional 13,200 to 16,300 visitors per day to the state. On average, convention visitors are expected to spend from $617 to $720 a day.[94]

Recreational uses of the Ala Wai Canal waterway and the Ala Wai Boat Harbor, as discussed in Section 4.4, include events and competitions which at present are small, primarily local, and do not generate substantial revenues. The two international yachting races are major international events and, in addition to the sailors who race the yachts, may attract additional visitors to Waikiki and nearby neighborhoods.

4.5.2 Potential Effects and Operating Constraints

Limits of Dredging

The limits of dredging will determine the length of time nearby residents and tourists using the area are affected by nuisances associated with dredging (noise, odors, and visual impacts). Property values are not expected to be affected as a direct or indirect result of dredging activities. Dredging will be conducted throughout the canal, so the dredge will be in front of any particular property for a relatively short period of time. It is not anticipated that dredging will cause a decrease in visitors to Waikiki, or will have impacts on business activity in the vicinity of the Ala Wai Canal. Few restaurants or shops are adjacent to the Ala Wai Canal that could be affected by shoppers avoiding the locations due to possible noise, odor, or other impacts related to the dredging project. Therefore, no substantial effects are anticipated. After dredging has been completed, it is anticipated that odor and water clarity will improve and will result in positive aesthetic benefits for both residents and visitors.

The group that will be most directly affected by the length of time dredging occurs is the recreational users who paddle, kayak, row, or fish in the canal. Impacts on recreational users are discussed in Section 4.4. The postponement or constraint of any racing events during the dredging period should not have broad-reaching effects on revenues because these events are small and primarily for local paddlers. These events will benefit in the long-term from removal of shoals in the canal as a consequence of a single year of inconvenience.

A positive cumulative impact from the Ala Wai Canal dredging project, considering the State's recent economic downturn, would result from the jobs and construction revenue associated with the project. Funds appropriated by the 1997 Legislature for the dredging construction work total

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93 Written communication (facsimile) from Clarence Nakatsukasa, City and County of Honolulu Department of Parks and Recreation, to Molly Kihara of Belt Collins, August 26, 1997.

94 Convention Center Authority (July 1995) *Hawaii Convention Center, Honolulu, Hawaii - Final Environmental Impact Statement.* Prepared for the State of Hawaii by Nordic/PCL and Wilson Okamoto & Associates, Inc.

$10.35 million. Jobs associated with this work will include approximately three supervisory and administrative staff and a five to nine person dredging crew, depending on the dredge method selected. In addition, the project could temporarily increase revenues for support services and suppliers associated with dredging activities.

Dredge Method/Sediment Transport

There will be no substantial effect on socioeconomics from the use of mechanical or hydraulic dredging.

Work Support Areas

Two of the proposed staging areas are in close proximity to revenue-generating activities. These are the Ala Wai Golf Course near the Kapahulu site and the Hawaii Convention Center near the Kalakaua site. Due to their unique status in the downtown Honolulu area, it is unlikely that use of the Hawaii Convention Center or the golf course would decrease due to the dredging activity.

The Magic Island site is in the vicinity of smaller-scale revenue-generating activities, such as sailing and SCUBA classes in the Ala Wai outer harbor area. These activities are not anticipated to be negatively impacted by the location of the staging area.

Processing and Placement

No substantial socioeconomic effects are anticipated at any of the upland sites or the ocean disposal site since there are no residential properties at the upland sites or revenue-generating businesses that could be affected by the processing and placement activities.

Transportation support on land and water will be required for moving dredged sediment from the Ala Wai Canal to processing and placement sites, and for construction and administration of these sites. Therefore, some additional jobs (approximately a year in length) will be generated.

No Action

Under the No Action alternative, water quality will continue to degrade in the Ala Wai Canal, causing visual impacts and unpleasant odors for nearby residents and tourists, potentially making the area less desirable for use. As the canal's drainage capacity diminishes from accumulation of sediments, the potential for damage to property and loss of revenues from interrupted business, due to flooding, would increase. No new jobs would be generated under the No Action alternative.

4.6 TRANSPORTATION

Land transportation impacts would be considered substantial, and require more detailed study, if "100 added vehicle trips in the peak direction (inbound or outbound) during the site's peak traffic hour" were added.[95] Also under consideration is the total additional traffic on local streets. Air and marine transportation effects would be substantial depending on the degree to which there is interference with airport clear zones and marine navigation, respectively.

[95] Institute of Transportation Engineers (1991) *Traffic Access and Impact Studies for Site Development, A Recommended Practice.*

4.6.1 Existing Conditions

Ground Transportation

Existing conditions along roadways in the vicinity of the canal include high volumes of vehicular and pedestrian traffic during most of the daylight and evening hours. Peak hours typically occur during weekday morning and afternoon commuting times and at various times on Saturdays and Sundays.

Major roadways in the area are Ala Moana Boulevard (a six-lane State highway), the H-1 Freeway (the primary highway for cross-town traffic), Piikoi Street (a major *mauka-makai* arterial roadway between Ala Moana Boulevard and the H-1 Freeway), University Avenue (a collector street serving *mauka-makai* traffic between lower Manoa and the lower Moiliili area which provides direct access to the canal shore vicinity of Ala Wai Neighborhood Park A), Kapiolani Boulevard (a six-lane arterial street serving *Ewa-Koko Head* traffic between downtown Honolulu and Moiliili), Ala Wai Boulevard (a four lane one-way street on the *makai* side of Ala Wai Canal), and Kapahulu Avenue (an undivided minor arterial street which provides a "back door" connection between Waikiki and the H-1 Freeway).

Ocean Transportation

Ocean transportation areas potentially affected by dredging and sediment transport include the Ala Wai Boat Harbor and Ala Wai Channel in Waikiki, the Hawaiian Islands Humpback Whale National Marine Sanctuary, the seaplane runway and Keehi Lagoon near Sand Island, the waters adjacent to Honolulu International Airport, and Pearl Harbor waters. Primary activities in Waikiki and Keehi Lagoon waters are commercial ocean recreation, anchorage, fishing, recreational boating, and naval ship traffic. The potential barge and tug boat routes from the Ala Wai Boat Harbor to the upland sites shown on Figure 4-5.

The waters described above contain ORMAs under the jurisdiction of DLNR Division of Boating and Ocean Recreation (DOBOR), as defined in HAR 13-250. The ORMA at Keehi Lagoon includes canoe racing and competitive water ski zones and there is a thrill craft zone directly south of the Reef Runway (see Figure 4-4). Constraints on vessels moving through ORMAs include exercising extreme caution and keeping speeds down to observe a "slow-no-wake" rule in some locations. Anchoring or mooring vessels is prohibited in the canoe racing and competitive water ski zones in Keehi Lagoon and adjacent to Sand Island.

In addition to ORMA restrictions, navigation or access is constrained at some locations. Navigation in Pearl Harbor is managed by Naval Station Pearl Harbor. Barge access to the Waipio site in West Loch would require permission from Naval Station for entry. Pearl Harbor, which is home port for 17 Navy surface ships and 24 submarines, experiences the heaviest traffic on Mondays (when ships usually depart for the week) and Fridays (when ships usually return) from 7:00 am to 6:00 p.m.[96] The average volume of traffic on these days is between 10 and 20 craft, restricting navigation in the harbor.

[96] Personal communication, Petty Officer Mitchell, Pearl Harbor Port Operations, with Cheryl Vann of Belt Collins Hawaii, January 23, 1998.

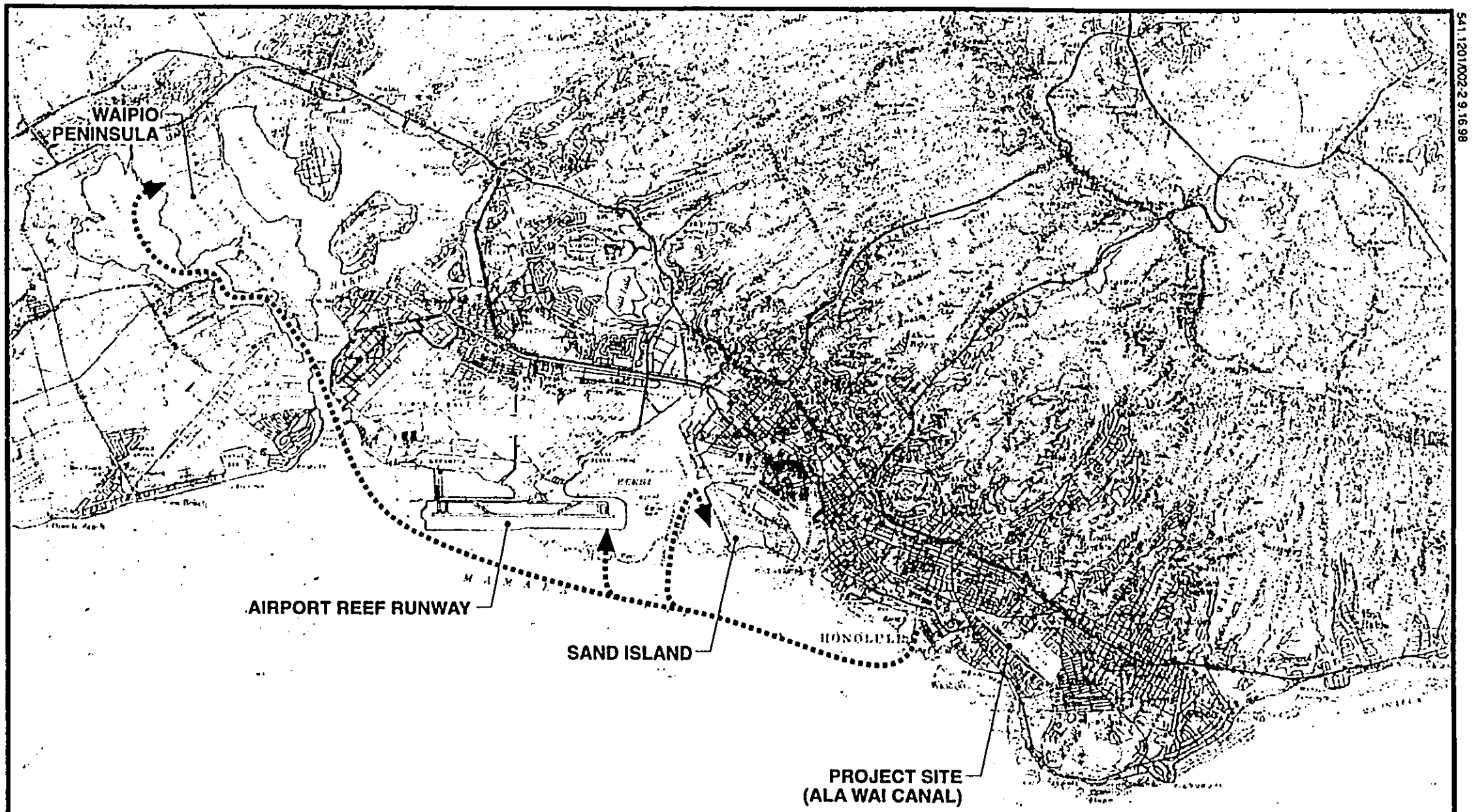

Figure 4-5
POTENTIAL BARGE ROUTES TO UPLAND SITES

Ala Wai Canal Dredging Environmental Assessment
Belt Collins Hawaii
October 1998

Boat traffic offshore of Honolulu includes interisland barges and container ships that arrive at Fort Armstrong from the northwest or the southwest, commercial tour boats (including parasailing, daytime and sunset cruises, and submarine tours), private sailboats and fishing boats. The South Shore Parasail Area is designated as an ORMA, and vessels are required to exercise extreme caution in that area. Traffic entering Kewalo Basin, Honolulu Harbor, and Pearl Harbor approaches through Mamala Bay, and vessels anchor in off-shore waters waiting to enter Honolulu.

Air Transportation

The Reef Runway, a potential upland processing and placement site, is a principal operating surface of the Honolulu International Airport. Lateral clear zone and transitional obstruction ceilings are

defined for the Reef Runway and will have to be observed by vessels and equipment employed in dredge material placement. The seaplane runways in the vicinity of the Reef Runway and Keehi Lagoon are infrequently used at present. Future plans defined in an updated Airport Layout Plan include increased use of seaplane lanes.[97] This would occur sometime after completion of the dredging project.

4.6.2 Potential Effects and Operating Constraints

The proposed action is expected to have limited, non-substantial short-term effects on transportation. There will be no long-term effect on vehicular or marine transportation systems. Impacts on recreational users at the Ala Wai Canal, Ala Wai Boat Harbor, Keehi Lagoon, and Sand Island are discussed in the recreation section (Section 4.4).

Hours of construction are not anticipated to substantially affect transportation. If the project operates only 10 hours a day with eight hours of dredging activity, for five days a week, then the project will occur over a longer time duration, and workers will commute to the site for a longer time period. If there are two eight-hour shifts per day for six days a week (the other extreme), then the number of workers commuting per day will increase, but for a shorter overall project duration. Neither of these impacts is anticipated to be substantial since the number of workers is relatively small.

The number of bulky item trips and barge trips will remain the same overall, regardless of working hours, but will either be concentrated into a shorter period of time or will be less intense over a longer time period. The number of barge trips for eight hours of dredging activity is expected to be one to two loads per day if 3,000 to 4,000 cubic yard barges are used, or three to four loads for a 16 hour day. Up to four barge loads per day will not constitute a substantial navigational hazard.

Limits of Dredging

The volume of sediment dredged will dictate the duration of dredging and will determine: 1) the length of time employees will be commuting to the work site, 2) the number of truck trips necessary to remove bulky items, and 3) the number of barge trips to the processing and placement site. The duration of dredging, as defined above, is anticipated to be about 12 months for the volume of sediment in the maximum limits option.

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97 Personal communication, Terry Kearney, DOT Airports, with Jane Dewell of Belt Collins Hawaii, April 9, 1998.

Dredge Method/Sediment Transport

The State Department of Transportation is planning construction of a pedestrian bridge adjacent to the downstream side of the Kalakaua Avenue Bridge. The design will generally match the existing bridge, with piers in line with the existing pier locations. Construction is planned to begin in Summer 1998 and is expected to be completed prior to any dredging activities. The additional piers and abutment for the new pedestrian bridge will be protected from damage with the installation of temporary fendering.

Assuming that each employee will arrive in a single vehicle, the added traffic due to employee arrivals or departures would be about eight vehicles per day for hydraulic dredging and 12 vehicles per day for mechanical dredging, based on anticipated size of the workforce at the dredge site. No trucks will be needed to haul dredged sediment since barges will be used to transport the dredged sediment to either the ocean or upland site. The land transportation impact is therefore not considered to be substantial.

Hydraulic dredging would require more barge trips to disposal or reuse sites than mechanical dredging, because the water content is higher using this method (as high as 80 percent versus about 50 percent for mechanical). A maximum of two ocean-going barge exchanges would be required daily, depending on the size of barge used. Transit time out of or into the Ala Wai channel is estimated to be approximately 20 minutes. Ocean-going barge traffic for mechanical dredging would be reduced from that needed to support hydraulic dredging, either in the size of the barge or frequency of trips out of the channel. A Notice to Mariners (NOTMAR) regarding routes and frequency of ocean transport activity will be coordinated with the U.S. Coast Guard. No substantial impacts on marine transportation are expected from either dredge method since a maximum of two trips daily is anticipated.

Work Support Areas

The proposed action will marginally increase traffic in the vicinity of the work sites due to the daily arrivals and departures of eight to 12 construction personnel. The proposed action will also generate truck traffic associated with mobilizing construction equipment and removal of bulky items. Available truck hauling routes are restricted, due to the turning radii of the larger trucks and existing traffic congestion limiting the desirable routes to wider streets. Preferred routes to each of the four potential staging areas are summarized in Table 4-6.

The total land transportation traffic impact from commuting workers, truck hauling activities, and visits by agency inspectors or other visitors is expected to average between 10 and 20 vehicle trips per day. This is not considered substantial given the capacities of local streets serving support areas.

Pedestrian and bike traffic along the Ala Wai Canal bike path will be rerouted during the construction period (see Figure 3-1). The bike path will be restored to original preconstruction condition upon completion of work.

Marine traffic arriving or departing the Ala Wai Boat Harbor will be temporarily inconvenienced by the sediment barge located at Magic Island, but will have sufficient space for safe maneuvering.

There are no substantial effects anticipated on navigation. Proper marking for vessels under tow will be required, and coordination will be required with the Ala Wai Harbor Master.

TABLE 4-6: TRAFFIC ROUTES TO AND FROM STAGING/MATERIAL HANDLING AREAS

Potential Work Support Areas	Approach Route	Departure Route
Magic Island site	Eastbound H-1, exiting at Kinau Street, right turn onto Pensacola Street, left onto Waimanu Street, right onto Piikoi Street, left onto Ala Moana Boulevard, and right into Ala Moana Park.	Left turn from park drive to Ala Moana Boulevard, right onto Piikoi Street, left onto Lunalilo Street, westbound on H-1.
Kalakaua site	Eastbound H-1, exiting at Kinau Street, right onto Pensacola Street, left onto Kapiolani Boulevard, right into site.	Right turn onto Kalakaua Avenue, left onto Kapiolani Boulevard, right onto Piikoi Street, left onto Lunalilo Street, to westbound H-1.
Neighborhood Park site	Eastbound H-1, exiting at Kinau Street, right turn onto Pensacola Street, left turn onto Kapiolani Boulevard, right turn onto University Avenue, and enter the site.	University Avenue to on-ramp, westbound H-1.
Kapahulu site	Eastbound H-1, exit at King Street, onto Harding Avenue, right onto Kapahulu Avenue, right into Ala Wai Golf Course.	Left onto Kapahulu Avenue, onto Old Waialae Road, westbound H-1.

Processing and Placement

No ground transportation effects will occur at the placement sites because only barge transportation is being considered for sediment transfer, and the number of workers involved will be small.

Barge traffic between Magic Island and the disposal site will be relatively infrequent, one to two loads per day if 3,000- to 4,000-cubic yard barges are used (assuming an eight hours of dredging activity per work day). No channels would be blocked or obstructed and normal navigational procedures for barge traffic would be applicable.

There will be no substantial effects on marine navigation as a result of the selected placement site. Barge trips to the ocean site, Reef Runway, or Sand Island constitute only normal navigational hazards. The barge operator, however, should be aware that the barge mooring location at the Reef Runway is within a recreational thrill craft zone ORMA (see Section 4.4).

If the Waipio site is chosen for processing and placement, the barge would be required to traverse a naval defensive area and an active explosive safe quantity distance area. Entry to Pearl Harbor would need to be granted by Naval Station Pearl Harbor Port Operations. Coordination of passage in the entrance channel would be required to prevent obstruction of naval traffic. Ammunition operations at Naval Magazine Piers could close West Loch to navigation by non-military craft, with detrimental effects on the project.

Air transportation impacts from use of the Reef Runway site are not anticipated. The barge and any temporary vertical structures, such as cranes and conveyors, will be within surfaces limiting vertical structures adjacent to aviation operating surfaces. Notices to Airmen (NOTAM) and Federal

Aviation Administration (FAA) "notice of construction activities affecting navigable air space" will be published.

Concurrent dredging of Pearl Harbor and possible use of the Reef Runway for upland disposal may pose cumulative constraints for sediment placement at the Reef Runway. To avoid time delays when maneuvering barges in the limited water space adjacent to the Reef Runway, and to facilitate efficient deposition of dredge material at the Reef Runway, coordination will be necessary with the Department of the Navy and the Department of Transportation (DOT) Airports Division. No substantial cumulative effects are anticipated from cooperative use of this disposal site.

No Action

There would be no impacts to ground or marine transportation under the No Action alternative. Navigation within the canal could ultimately be obstructed as sediment accumulates in the canal.

4.7 AIR QUALITY

National Ambient Air Quality Standards (NAAQS) have been established to protect human health and welfare and provide a common measure used to determine the level of pollution control needed for air basins. The State of Hawaii has also established a set of ambient air quality standards, which are more stringent than the NAAQS. All stationary sources are regulated by the DOH Clean Air Branch, through their operating permit program as presented in HAR 11-60.1. Major stationary sources are defined as sources emitting equal to or greater than 100 tons of emissions per year. The six pollutants for which there are air quality standards at the federal level are particulate matter, sulfur dioxide, nitrogen dioxide, carbon monoxide, ozone, and lead. At the state level there are standards for these six pollutants, as well as for hydrogen sulfide.

Odor is also considered to be an air quality pollutant. Odors are a function of the chemical concentration causing the odor and the individual's physio-psychological response to the chemical; odor perception can therefore vary widely among individuals. The elements of an odor are detectability, intensity, character (i.e., tarlike, sulfury, rubbery), and whether or not it is perceived as pleasant or unpleasant.[98] Duration is also a factor. Odor from Ala Wai Canal dredged sediments would be primarily due to the presence of anaerobic bacteria and the resulting hydrogen sulfide gas that may be released (off-gassed) when sediments are dredged from the canal and the material contacts air. Hydrogen sulfide gas is detectable at very low levels and emits a "rotten egg" odor. Concentrations that may be emitted by dredged sediment from the Ala Wai Canal would be below the level that could cause respiratory irritation, but the odor is detectable at very low concentrations. At very high levels (greater than 300 ppm),[99] hydrogen sulfide can cause poisoning and death. This kind of exposure would only occur in enclosed industrial settings, including farming and sewer work.

4.7.1 Existing Conditions

The DOH maintains a network of air quality monitoring stations located at various sites around Oahu, but not adjacent to the Ala Wai Canal. Based on data from these various other locations,

98 Godish, Thad (1991) *Air Quality*, Second Edition. Lewis Publishers, Inc.

99 National Institute for Occupational Safety and Health, Immediately Dangerous to Life or Health (IDLH) level for hydrogen sulfide.

national and state standards are generally being met throughout the state. Exceedances of the State standards are primarily associated with elevated carbon monoxide concentrations resulting from vehicular tailpipe emissions at problem intersections or roadways under certain weather conditions.

Air quality in the vicinity of the canal can be affected by vehicle emissions from the busy Waikiki area, and from odors sometimes emanating from the canal after heavy rains. Tradewinds from the northeast blow through the project area at approximately 12 to 24 miles per hour (mph) about 70 percent of the time.[100] Weaker "Kona" winds from the south occur about 15 percent of the time. The area therefore receives adequate ventilation, with stagnant conditions during calm periods generally occurring only five percent of the time.

4.7.2 Potential Effects and Operating Constraints

Emissions from the project will be primarily from a diesel dredge and booster pump for the hydraulic method, or a diesel dredge crane and a diesel transfer crane for the mechanical method. Small-scale emission sources associated with the mechanical method are the outboard motors for towing the scows, which will have dispersed emissions while in transit. Other smaller-scale emission sources for either method include a hydraulic crane used intermittently near the dredging site to remove materials from the canal, a welder for equipment repair, and sporadic truck use for mobilizing and bulky item removal. Emissions were calculated based on a 10 hour work day with eight hours of dredging, five days a week.

The cranes used for mechanical dredging and the dredge and booster pump for hydraulic dredging are expected to be classified as minor stationary sources by DOH. Their anticipated emissions, estimated for the two most pertinent air quality parameters for diesel engines (carbon monoxide and particulate matter), are compared and discussed below. The air quality effects associated with construction-related equipment are relatively short-term, are expected to be dispersed under prevailing meteorological conditions, and will not be located near odor-sensitive neighbors. Most of the equipment will be located in the middle of the canal. Fugitive dust is not expected to be generated by the proposed action.

Limits of Dredging

The limits of dredging will impact air emissions in regard to the length of time the dredging occurs, and by the location of the dredge emitting exhaust gases. This is discussed in the following subsection.

Dredge Method and Transport

Both the hydraulic and mechanical dredging methods have relatively stationary sources that on an hour by hour basis will be in relatively continuous use throughout the day. The only exception is the diesel booster pump for the hydraulic method, which will only be needed when the dredging occurs at the far end of the canal away from Magic Island. The primary emissions sources for each method will be separated by hundreds of meters, so emissions are calculated separately for these sources.

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[100] University of Hawaii Department of Geography (1983) *Atlas of Hawaii*, Second Edition. University of Hawaii Press, Honolulu.

The mechanical method is estimated to have lower emissions than the hydraulic method. Emissions from the dredge crane and transfer crane for the mechanical method are estimated for each to be 6.42 tons per year (tons/yr) for nitrogen oxide, 2.44 tons/yr for carbon monoxide, and 0.45 tons/yr for particulate matter.[101] If the hydraulic method is used, emissions for the dredge pump are estimated to be 15.41 tons/yr for nitrogen oxide, 3.32 tons/yr for carbon monoxide, and 1.08 tons/yr for particulate matter. Emissions from the booster pump, which will only be used during approximately half of the dredging operation, are estimated to be 7.71 tons/yr for nitrogen oxide, 1.66 tons/yr for carbon monoxide, and 0.54 tons/yr for particulate matter. These figures assume all equipment is diesel engine powered at the point of use. None of the emissions from either dredge method are major stationary sources. None of the estimated emissions are anticipated to have a substantial adverse effect on ambient air quality. The cranes and pumps will be regulated as non-covered sources by DOH Clean Air Branch and are required to comply with standard operating requirements.

Under hydraulic dredging conditions, odor would be minimized in the vicinity of active dredging and at the Magic Island barge site because of the high volume of water in the dredge slurry and transport of the slurry by pipeline to the barge at Magic Island. Under mechanical dredging conditions, odor would be slightly greater since dredged materials will be introduced to air when loaded onto scows for transport to the barge at Magic Island. The duration of the off-gassing exposure will be too short to allow reactions to occur. Therefore, no substantial odors are expected under either dredging method option.

Work Support Areas

Some combustion engine emissions from commuter vehicles and trucks (during mobilization and for bulky item disposal) will occur at any of the work support sites. Vehicle emissions will primarily consist of carbon monoxide. The additional increase of 10 to 20 vehicles per day is not expected to create substantial air quality effects. These emissions will be short-term and will be rapidly dispersed by favorable meteorological conditions.

If the mechanical dredge method is chosen, use of a transfer crane at the Magic Island site will be necessary. Emissions from this crane, discussed in the subsection above, are not anticipated to be substantial.

There may be some odor from items dredged from the canal at the material handling site. This debris will be removed daily or contained in a closed dumpster. Effects of these odors at each site will vary since perception of odor is site-dependent. These effects will be short-term, and odors will be dispersed from the site by prevailing tradewinds.

Processing and Placement

Potential emissions at the upland sites are from material handling machinery and vehicles. The number of vehicles will be equal to or less than expected for the work support areas. Emissions are similar to those from equipment at the work support areas and will be dispersed by tradewinds. These emissions are therefore not anticipated to be substantial.

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[101] Emissions estimated using emission factors from U.S. EPA (October 1996) *Compilation of Air Pollutant Emission Factors*, Fifth Edition. (Downloaded from http://www.epa.gov/ttn/chief/ap42c3.html).

There are no odor sensitive receptors at the Reef Runway or Waipio sites. Park users at Sand Island would be too distant from operations to detect odors. Therefore the only odor sensitive receptors will be the workers. Potential odors from the dredged sediment will be managed by mixing and covering the material to prevent anoxic decomposition. Some mechanical dewatering options have odor control filters that could reduce odor impacts; gravity dewatering would not have associated filters. The dewatered sediment will be mixed with other materials to raise its pH and stabilize microbial action, thereby further reducing odor and contaminant leaching potential.

Fugitive dust from drying sediment will be prevented through the processing of materials, with binders or other additives, or with covers on the dried piles prior to final placement. When sediment has been placed as fill, it will be bound into a hardened material to meet fill specifications, or will be covered with topsoil and vegetation. Either process will prevent fugitive dust.

No Action

Under the No Action alternative no emissions from machinery and vehicles related to the proposed project would occur in the area. However, odors from the decomposition of accumulated organic matter, which can be particularly strong after storms, may continue to emanate from the canal.

4.8 NOISE

Factors to be considered in determining acceptable noise levels are (1) the sound pressure level being generated (measured in decibels and usually based on an A-weighted scale [dBA]), (2) the distance of the listener from the source, (3) attenuating and propagating effects of the medium between the source and the listener, and (4) the period of exposure.

The day-night sound level (DNL) is commonly used for environmental noise in general and for relating the acceptability of the noise environment for various land uses. The DNL represents the 24-hour average sound level for an average day, with nighttime noise levels (10:00 p.m. to 7:00 a.m.) increased by 10 decibels prior to computing the 24-hour average.

Average exterior noise levels of 65 DNL or less are considered acceptable for projects receiving funding assistance from federal agencies. Sound levels no greater than 55 DNL represent a minimal exposure level that is considered unconditionally acceptable. State regulations (HAR 11-46) permit varying maximum sound levels dependent upon specific zoning districts. The project area has land uses within the Class A zoning district (i.e., public lands, schools, parks, libraries), for which the maximum permissible sound levels at the property line are 55 dBA during daytime hours and 45 dBA during nighttime hours.[102] Condominiums in the surrounding areas are within the Class B zoning district, for which maximum permissible noise levels at the property line are 60 dBA for daytime and 50 dBA for nighttime.

For the discussion below, the source of noise for the dredging activity is at the mid-width of the Ala Wai Canal; this is considered the primary dredging area. The distance between source and listener is measured to the property line where the listener would be located. Distances specified below are between the source (whether primary dredging area or work support area) and the park and public land areas that have the lowest levels of noise allowed. The distance between primary dredge area

[102] Daytime hours referred to here are 7:00 a.m. to 10:00 p.m. Nighttime hours are 10:00 p.m. to 7:00 a.m.

and listeners is approximately 150 feet. The distance between work support areas and the listener is approximately 50 feet.

4.8.1 Existing Conditions

The existing noise environment along the Ala Wai Canal is typical of an urban setting. The *makai* side of the canal is adjacent to Waikiki where there are many high-rise buildings and heavy traffic on Ala Wai Boulevard directly adjacent to the canal. The *mauka* side of the canal has a somewhat quieter environment due to separation from roadways by buildings, walkways, and park lands. Buildings on the *mauka* side include high-rises, such as the Marco Polo and the Ala Wai Plaza (located at 500 University Avenue). Noise-sensitive land uses adjacent to the canal include Ala Wai Elementary School and Iolani School on the *mauka* side, and residential high rise buildings on both sides.

4.8.2 Potential Effects and Operating Constraints

Noise sources during dredging will vary in location, intensity, and persistence. Persistent noises will include diesel machinery operating on the dredge (either a pump for hydraulic, or a clamshell crane or backhoe for mechanical), and sediment transporting machinery (either a booster pump for hydraulic, or scows for mechanical). The duration of these activities will be relatively constant during hours of work.

The nearest sensitive noise receptors, the City parks on the *mauka* side of the Ala Wai Canal, are approximately 150 feet from the primary dredging area (see Section 4.8). Ala Wai Elementary School is approximately 300 feet from the primary dredging area. Iolani School is approximately 200 feet from the MPDC, where some dredging will occur. The nearest condominiums are on the *makai* side of the Ala Wai Canal approximately 200 feet from the primary dredging area. Condominiums are also located on the *mauka* side of the Ala Wai Canal. Due to the greater distance from the canal, noise levels encountered at these locations would be below that achieved for the park areas adjacent to the Ala Wai Canal.

Noise effects from ground vehicles for commuting workers, mobilization of equipment, and hauling of bulky items can be expected. These are short-term and are commensurate with existing noise levels in the urban setting, so they will not be discernable. Therefore, no substantial effects are anticipated.

Dredge Limits

Limits of dredging will have little effect on noise generation. The total volume to be dredged will affect project duration and therefore the period over which noises from the project will be experienced.

Dredge Method/Sediment Transport

Noise estimates for hydraulic dredging are based on use of a generator during active dredging. Associated noise levels of 63 to 74 dBA could occur at 150 feet (distance between park areas and primary dredging area). Noise estimates for mechanical dredging are based on use of a crane during active dredging. Associated noise levels of 66 to 80 dBA could occur at 150 feet. These levels are above the 55 dBA regulatory level for daytime, and above the 45 dBA for nighttime, required for a

Class A zoning district (i.e., parks, schools). Dredging noise levels would need to be attenuated to meet levels required for the Class A zoning district, or if not possible, a community noise permit would be required from the DOH Noise and Radiation Branch (NRB). Permit coverage is for the hours of 7:00 a.m. to 6:00 p.m. during weekdays (for Saturday, coverage is between 9:00 a.m. and 6:00 p.m.; no excess noise is permitted on Sundays and holidays). If activities extend past 6:00 p.m., a variance is required. Application for a variance requires public notice, and the process can take from two to four months if a public hearing is necessary to address community concerns (see Section 5.2.13). Because of the noise limitation and requirement of a variance after 6:00 p.m., nighttime work will be avoided in the dredge area.

Noise levels could be attenuated by using equipment that have lower associated noise levels, or by incorporating effective mufflers or other noise-attenuating equipment on the machinery. The contractor will be required to attenuate noise levels to 55 dBA or below during daytime work at 150 feet from the source, or obtain a community noise permit. The noise attenuation required would be to a maximum of 64 dBA in the primary dredging area (measured as within 50 feet of the source).

Work Support Areas

Some noise will be generated at the support areas by material handling equipment, heavy vehicles, and possibly generators. This will be fairly continuous during mobilization and demobilization, and relatively infrequent and sporadic otherwise. Impulsive noises are not anticipated, with the exception that a few temporary piles may need to be driven to provide a suitable access point from the shore.

The closest sensitive noise receptors for work support areas would be the users of Ala Wai Neighborhood Park A. Park users could be approximately 50 feet away from the noise source. Based on noise from trucks (the highest potential noise source among the equipment listed above), levels would be below 82 dBA at 50 feet. (Noise levels between 82 and 95 dBA are associated with truck travel at high speed and related exhaust and tire noise. This would not occur in the project area.) Truck and other work support operations noise would be intermittent and short-term. Trucks entering the area would be traveling slowly and be required to have complete and effective mufflers, and will be subject to limitations on hours of operation. Noise associated with the work support area would need to meet the requirements for attenuation, or if necessary, a community noise permit would be required as described above.

Processing and Placement

Noise associated with barge unloading, and processing and placement of sediment, may affect endangered birds using the Pouhala Marsh adjacent to the proposed Waipio site. Potential impacts are discussed in Section 4.1.2. There are no sensitive noise receptors near any of the other proposed reuse or disposal areas, so no substantial adverse effects are anticipated.

No Action

Under the No Action alternative there would be no short-term dredging-related noise impacts along the Ala Wai Canal or at the work support areas.

4.9 AESTHETICS

The determination of effects to scenic vistas and viewplanes is based on the existing visual qualities of the area, and the degree and duration of disturbance. Public views, as defined in the City and County of Honolulu's Development Plan (DP) Common Provisions, include "views along streets and highways, *mauka-makai* view corridors, panoramic and significant landmark views from public places, views of natural features, heritage resources, and other landmarks, and view corridors between significant landmarks."[103] Important views to be protected on Oahu, as identified in the Special Provisions for the Primary Urban Center DP, are "panoramic, *mauka* and *makai* and continuous views of the Koolau and Waianae mountain ranges, ridges, valleys, and coastline and the sea," and "views of natural landmarks, such as Diamond Head, Punchbowl, Pearl Harbor, and major streams and forest areas."[104]

4.9.1 Existing Conditions

The proposed action will occur primarily along the Ala Wai Canal and in the Ala Wai Boat Harbor. The Ala Wai Canal and surrounding park areas provide a major open space resource, from which one can view Diamond Head and the Koolau range, including Tantalus, Manoa Valley, St. Louis Heights, and Palolo Valley. Ala Moana Beach Park is one of the shoreline areas that provides vivid pedestrian views; in particular, Magic Island provides an important stationary view of the Waikiki skyline.[105] Views from the Kapahulu site, Neighborhood Park A, and Kalakaua site are across the Ala Wai Canal towards the high-rise buildings of Waikiki.

4.9.2 Potential Effects and Operating Constraints

No long-term visual impacts will occur because the project does not involve construction of permanent structures that could potentially block important views. Visual impacts along the Ala Wai Canal due to dredging will be limited to views of the canal itself, and will not impact views of the Koolau or of Diamond Head. These temporary impacts, lasting during the dredging period of approximately 12 months, are not anticipated to be substantial.

Limits of Dredging

Regardless of the amount of dredging that occurs or the exact location where it occurs, there will be short-term visual effects because of the presence of construction equipment and activities in and along the canal. These will be temporary, local, and will not obstruct larger viewsheds.

Dredge Method/Sediment Transport

The hydraulic/pipeline method would present a lower profile than the mechanical dredge with scows, because a crane boom in the canal would not be used. In addition, the hydraulic method only affects views in the location of operation, while the mechanical method using scows would cause visual impacts along the length of the canal traveled by the scows. However, the scows and

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[103] §24-1.4, Revised Ordinances of Honolulu.

[104] §24-2.2(2)(A) and (B), Revised Ordinances of Honolulu.

[105] City and County of Honolulu, Department of Land Utilization (1987) *Coastal View Study.*

tow boats will be of low profile and consistent in general aspect with typical working vessel traffic, so a substantial change to the visual aspect of the canal is not anticipated.

Work Support Areas

Some visual effects will occur, primarily for motorists on Ala Wai Boulevard, boaters on the canal, some park users, and some residents, regardless of which staging location is chosen, but these impacts will be temporary and are not substantial. At the Kapahulu site there would be visual impacts to users of the library and golf course. At the Neighborhood Park A site, there would be impacts to park users and users of the canoe *halau*. Some apartment dwellers may also have affected view, but the site is partially screened by trees. The Kalakaua site is in a heavily urbanized area that receives heavy traffic daily. The staging operation at this location would be visible from the adjacent Hard Rock Cafe and the Hawaii Convention Center across the street, but most of the activity at these places occurs indoors. Park users at the Magic Island staging site would be able to see the parking lot site, as will hotel visitors across the Ala Wai Channel and boaters in the channel. The use of Magic Island as a transfer point for sediment will be visible from a number of vantage points, but will not comprise a substantial vertical intrusion or obstruction in the overall viewshed, or obstruct views of notable scenes.

Processing and Placement

There are no substantial public viewsheds at the potential placement sites. No effects are anticipated.

No Action

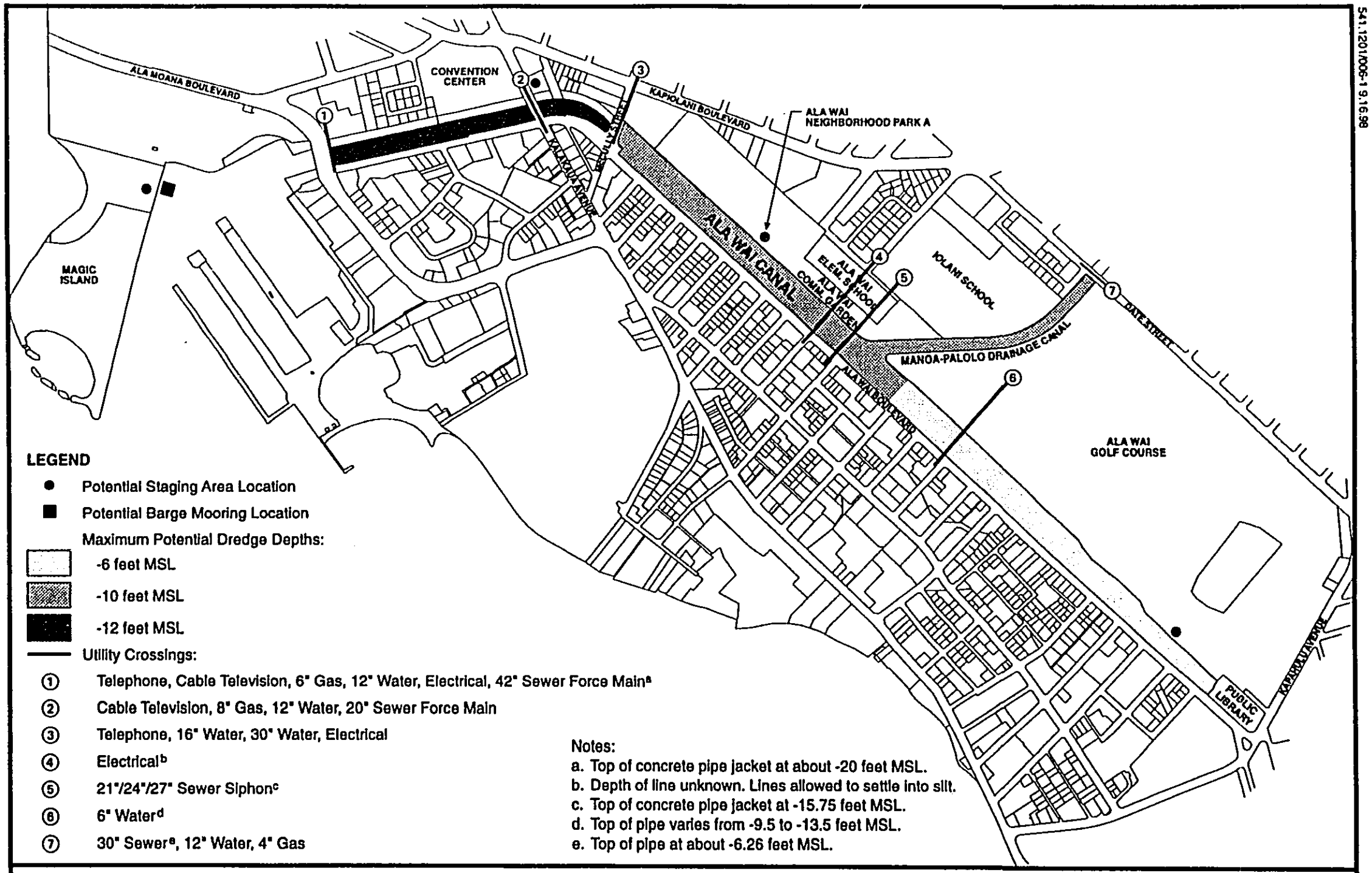
There would be no negative short-term visual impacts under the No Action alternative. In the long term, turbidity in the canal and unsightly sediment shoals emerging at low tide would continue to create negative visual effects.

4.10 UTILITIES

The determination of effects on utilities includes the degree to which normal use is interrupted and whether the proposed action will cause damage to the storm drain system or to any of the existing water, sewer, gas, electrical, cable TV, or telephone lines.

4.10.1 Existing Conditions

The Ala Wai Canal, a portion of the MPDC south of Date Street, and areas immediately adjacent to the Ala Wai Canal were assessed to identify potential dredging effects on installed utility infrastructure. Water, sewer, electrical, telephone, cable television, and gas lines identified as crossing the Ala Wai Canal and relevant portion of the MPDC are discussed in detail below and are shown in Figure 4-6. Water and sewer line information was obtained from City records. Cable



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LEGEND

- ● Potential Staging Area Location
- ■ Potential Barge Mooring Location

Maximum Potential Dredge Depths:

- -6 feet MSL
- -10 feet MSL
- -12 feet MSL

Utility Crossings:

① Telephone, Cable Television, 6" Gas, 12" Water, Electrical, 42" Sewer Force Main[a]
② Cable Television, 8" Gas, 12" Water, 20" Sewer Force Main
③ Telephone, 16" Water, 30" Water, Electrical
④ Electrical[b]
⑤ 21"/24"/27" Sewer Siphon[c]
⑥ 6" Water[d]
⑦ 30" Sewer[e], 12" Water, 4" Gas

Notes:
a. Top of concrete pipe jacket at about -20 feet MSL.
b. Depth of line unknown. Lines allowed to settle into silt.
c. Top of concrete pipe jacket at -15.75 feet MSL.
d. Top of pipe varies from -9.5 to -13.5 feet MSL.
e. Top of pipe at about -6.26 feet MSL.

NORTH

0 600 1200 2400
SCALE IN FEET

Figure 4-6
UTILITY CROSSING LOCATIONS

Ala Wai Canal Dredging Environmental Assessment
Belt Collins Hawaii
October 1998

television, electrical, and gas lines were identified through correspondence with Oceanic Cable Inc., Hawaiian Electric Company, and Gasco, Inc., respectively. In addition, a private water line crossing owned by the Princess Kaiulani Hotel was identified and included in the utilities assessment. Easement information is from Tax Maps.

Water

Four City waterlines were identified as crossing the Ala Wai Canal and one was identified as crossing the MPDC. The four lines crossing the Ala Wai Canal are located as follows: two lines, a 16-inch line and a 30-inch line within the structure of the McCully Street Bridge; one 12-inch line in the structure of the Kalakaua Avenue Bridge; and one 12-inch line in the structure of the Ala Moana Boulevard Bridge. The single water line crossing of the MPDC is a 12-inch line hung under the Date Street Bridge.

One private potable water line crossing the Ala Wai Canal was identified. This six-inch diameter PVC line is owned by Sheraton Hotels. The line provides potable water service to the Princess Kaiulani Hotel. The six-inch line was installed (laid on the bottom surface of the canal) in 1986 as an emergency replacement for the original eight-inch water line, which has since been abandoned.[106] The invert across the Ala Wai Canal varies from about –10 feet to –14 feet MSL.

Sewer

City sewer lines cross the Ala Wai Canal in three locations and the MPDC in one location: a concrete jacketed 42-inch force main crosses the Ala Wai Canal just upstream of the Ala Moana Boulevard Bridge; a 20-inch force main crosses the canal in the Kalakaua Avenue Bridge; and an existing concrete jacketed three-pipe siphon crosses the canal within a sewer easement downstream of the MPDC. A single 30-inch line crosses the MPDC. The 42-inch force main was constructed in the early 1960s. The pipe invert is at approximately -24.50 feet MSL and the top of the force main is therefore estimated at about -21 feet MSL (Department of Public Works (DPW) Plans, Beach Walk Sewage Pump Station Force Main, 1962). The top of the concrete jacket is at about –20 feet MSL. This force main crossing was outside of the 1978 dredging limits and therefore was unaffected by the dredging activities.

The 20-inch force main crossing the Ala Wai Canal at Kalakaua Avenue is constructed inside of the bridge and is therefore located outside of the waterway.

The three-pipe siphon crosses the canal from near Ala Wai Elementary School (on the mauka side of the canal) to near the intersection of Lewers Street and Ala Wai Boulevard (on the makai side of the canal). The siphon is made up of 21-inch, 24-inch, and 27-inch lines. By design, all three gravity lines connect to the same upstream and downstream manholes. The tops of the 21-inch, 24-inch, and 27-inch pipes (near Ala Wai Elementary School) are at about -17.1, -16.8, and -16.6 feet MSL, respectively. The top of the concrete jacket encasing the siphon pipes is at about –15.75 feet

[106] Per input from the hotel's consulting engineer, the State of Hawaii, Department of Transportation, Harbors Division has required that this private water line be permanently relocated, in accordance with the following stipulations: 1) the line is to be below grade so as not to be exposed within the waters of the canal, 2) the line is to be buried with a minimum of 3 feet covered below finished dredge line and 3) grouted rip-rap side slope protection is to be provided over the pipe. The Hotel's engineer has requested that they be kept informed of any proposed dredging activities to ensure that relocation work for the water line can be scheduled and coordinated. This will mitigate disruption of water service to the hotel.

MSL. Inverts of all three lines are at about -19 feet MSL. The three-pipe siphon was unaffected by the 1978 dredging activities.

The 30-inch gravity wastewater line crosses the MPDC at the Date Street Bridge. The crossing is located in the canal, just upstream of Area 4. The invert of the 30-inch line is -8.76 feet MSL. Therefore, the top of pipe should be about -6.26 feet MSL.

Storm Drain System

The storm drain system is owned and maintained by the City and serves the urbanized areas in the watershed. Outlets from the storm drain system occur at numerous locations along the MPDC and the Ala Wai Canal, concentrated on the Waikiki side of the canal. No drain lines cross either canal.

Gas

Gas utility lines cross the Ala Wai Canal in two locations and the MPDC in one location. An eight-inch gas line crosses in the Kalakaua Avenue Bridge, and a six-inch line crosses in the Ala Moana Boulevard Bridge. One four-inch gas utility line crosses the MPDC in the Date Street Bridge. All three lines are constructed in bridges and are therefore outside the waterway.

Electrical

Three electrical line crossings of the Ala Wai Canal have been identified. One crossing is located in the Ala Moana Boulevard Bridge and one in the McCully Street Bridge. The lines cross through conduits encased in the structures of the bridges.

The third electrical line crossing is located in a 200-foot wide easement within the Ala Wai Canal. Two electrical lines are located within this easement. The two onshore electrical manholes servicing these lines are located on Kaiolu Street at the intersection with Ala Wai Boulevard and on the opposite *(mauka)* bank of the canal, approximately 30 feet from the canal wall in the vicinity of the Ala Wai Community Gardens. The *mauka* manhole is covered by a removable concrete slab (the slabs are not designed to withstand vehicular traffic).

These lines, installed in 1989, are located within the HECO easement and replace the original pair of lines (in place at the time of the last canal dredging project). At the time of installation, an attempt was made to install these lines to a depth of –16 feet MSL; however, due to embedded obstacles, the lines were allowed to settle in the silt. Exact depth of installation is not known.[107] The original pair of lines was cut and abandoned in-place.

There are no electrical line crossings in the MPDC between the Ala Wai Canal and the Date Street Bridge.

Cable Television

Cable television lines cross the Ala Wai Canal through conduits constructed in the Kalakaua Avenue and Ala Moana Boulevard Bridges.

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[107] Comment letter from Hawaiian Electric Company, Inc., dated June 5, 1998 (see Appendix H).

There are no cable television line crossings in the MPDC between the Ala Wai Canal and the Date Street Bridge.

Telephone

Telephone lines that cross the Ala Wai Canal are constructed in the McCully Street and Ala Moana Boulevard Bridges.

There are no telephone line crossings in the MPDC between the Ala Wai Canal and the Date Street Bridge.

4.10.2 Potential Effects and Operating Constraints

No interruption of normal use or damage to the storm drain system or to water, sewer, gas, electrical, cable TV, or telephone lines are anticipated due to the proposed action. Therefore no substantial impacts are expected.

Limits of Dredging

Water: None of the City-owned water lines crossing the Ala Wai Canal are anticipated to be impacted by the dredging activities since all crossings occur in bridges. In the MPDC, dredging activities will be limited to the area below the Date Street Bridge. Dredging activities will therefore not impact the line hung from under the bridge.

Dredging in the area of the Princess Kaiulani Hotel's six-inch PVC line is planned to a depth of approximately -six feet MSL. However, the recent bathymetric survey of the area indicates that the channel bottom is already at -10 feet MSL. Therefore, this area will not be dredged, unless the area immediately downstream of the -11 to -12 feet MSL depression is dredged to allow a smoother transition of the floor of the canal. If dredging activities occur in the area, the owner is aware that the line will have to be relocated. Sheraton Hotels will be kept informed of dredging work scheduling so that they may allocate funds for relocating their water line should this area be considered for inclusion in the dredging area.

Sewer: No impacts on the 42-inch force main are anticipated. The proposed dredging will lower the canal bottom to approximately -12 feet MSL, but even at this bottom elevation there will be about eight feet of cover remaining over the concrete jacketed force main. The contractor should exercise caution when working in this area.

Because the 20-inch force main crossing the Ala Wai Canal at Kalakaua Avenue is constructed within the bridge, dredging will not affect this line.

The three pipe siphon is not anticipated to be negatively effected by the dredging since the area will only be dredged to the same depth as the 1978 dredging (approximately -10 feet MSL). The contractor should exercise caution when working in this area.

No effect on the 30-inch line under the Date Street Bridge is anticipated since dredging will be limited to downstream of the Date Street Bridge. The dredging contractor should, however, be aware of the 30-inch line location prior to commencement of dredging activities in the area.

In the event of a sewage spill during dredging, the contractor shall notify the State Department of Health and send a copy of the notification to the City Department of Wastewater Management.

Gas: None of the gas line crossings are anticipated to be affected by the proposed dredging since they are constructed in bridges.

Electrical: The electrical lines located within the structures of the Ala Moana Boulevard and McCully Street Bridges will not be impacted by dredging activities. At the third crossing, the easement conditions for HECO privileges and protection of its facilities must be adhered to. The depth of electrical lines in this easement will be verified during the design phase. The dredging contractor will coordinate work with HECO and provide the necessary measures to ensure HECO's continued operation of the electrical lines.

Cable TV: Neither of the cable TV line crossings of the Ala Wai Canal are anticipated to be impacted by the dredging activities since they cross in bridges. Because there are no underground cable TV lines in the MPDC, no dredging-related effects on cable TV service are anticipated.

Telephone: The telephone line crossings are constructed in the McCully Street and Ala Moana Boulevard Bridges and therefore no negative effects are anticipated.

Dredge Method/Sediment Transport

Neither dredge method is anticipated to interrupt normal use or damage utility lines.

Work Support Areas

Work support areas are planned for paved or grassy areas and the proposed action will not include any subsurface digging in these areas. Use of these areas will therefore not affect utilities. If the Neighborhood Park A site is used, existing water valve and electrical control boxes will be protected and kept accessible. The site shall be restored to original preconstruction condition upon completion of dredging activity.

Processing and Placement

There are no utilities in any of the proposed areas for sediment processing and placement. Therefore no substantial impacts are anticipated.

No Action

There will be no impacts to existing utilities from the No Action alternative.

4.11 CULTURAL RESOURCES

The National Register of Historic Places (NRHP), as defined in the National Historic Preservation Act and implementing regulations, and the Hawaii Register, as defined in HRS, Chapter 6E-10, have criteria for determining whether or not a resource has cultural significance.

An effect on an eligible or listed historic property would be considered substantial if it alters those characteristics that qualify the historic property for inclusion in the National Register or Hawaii Register. Impacts may include the following:

- Physical destruction, damage, or alteration of all or part of the property;
- Alteration of the character of the property's surrounding environment that contributes to the property's qualification for the National Register;
- Introduction of visual or atmospheric elements that are out of character with the property or alter its setting; or
- Neglect of a property resulting in its deterioration or destruction.

4.11.1 Existing Conditions

Historic architectural resources and archaeological resources are evaluated separately below.

Historic Architectural Resources

A survey and evaluation of the existing built environment was conducted for this assessment in December 1997 to determine impacts of the proposed dredging project on historic architectural resources. This report is included as Appendix E.[108] Existing resources in the project area include the Ala Wai Canal, certain adjacent buildings and structures, and the three bridges spanning the canal.

The Ala Wai Canal (constructed between 1921 and 1928) and the Kalakaua Avenue Bridge (constructed in 1929) were declared eligible for the National Register of Historic Places on October 28, 1985. The Ala Wai Canal is significant for its pivotal role in the development of Waikiki and its contribution to the development of the State's tourism-based economy. With construction of the Ala Wai Canal, 625 acres of wetland were drained and filled and runoff was diverted away from Waikiki beaches.

The canal is primarily defined by the stone walls that line it. On the Waikiki side, the stone walls are about four feet above the water level, and are topped with a similarly well-fitted lava rock wall railing with regularly-spaced small arched openings and a concrete cap. On the *mauka* side, the two parallel walls have been covered with cement plaster. They terminate about 18 inches above the ground with flat plastered tops that are roughly at seat height. The ground level at the outer of the two walls is about two feet higher than the ground level immediately adjacent to the canal.

The Ala Wai Park Clubhouse and Ala Moana Beach Park were listed on the Hawaii Register as part of the "City and County of Honolulu Art Deco Parks and Playgrounds" thematic grouping on June 9, 1988. The 1937 Ala Wai Park Clubhouse is significant for its Art Deco styling and its associations with the development of City and County of Honolulu parks in the 1930s. The clubhouse is strongly associated with paddling sports in the Ala Wai Canal and remains a focal

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[108] Spencer Mason Architects (January 1998) *Survey and Evaluation of the Existing Built Environment and Assessment of Impacts of the Proposed Ala Wai Canal Dredging Project on Historic Architectural Resources.* Prepared for Belt Collins Hawaii.

point for this sport. Ala Moana Beach Park, according to the National Register nomination form, stands as "the crowning achievement of the golden-age of Honolulu park design during the 1930s."

The 1929 Art Deco style Kalakaua Avenue Bridge is significant for its contribution to engineering style and transportation in Hawaii. The Date Street Bridge was identified as a potential National Register-eligible resource in the 1996 *State of Hawaii, Historic Bridge Inventory and Evaluation.*[109] The 1937 *Art Moderne* style Date Street Bridge is significant for its contribution to engineering style and transportation in Hawaii.

Other than these historic resources, no other properties that could be affected by the proposed action appear to meet the National Register of Historic Places criteria.

Archaeological Resources

The Ala Wai Canal and the MPDC (south of the Date Street Bridge) were dredged as part of the original construction and have been previously maintenance dredged, so subsurface archaeological resources are unlikely to be present in the affected area. There are no archaeological resources in the alternative sites being considered for dredging support or for upland processing and placement.

4.11.2 Potential Effects and Operating Constraints

Limits of Dredging

In general, dredging will help restore the canal to its original configuration. Dredging equipment will temporarily alter the visual setting of the canal locally, but will not alter its historical importance.

Based on prior dredging experience, dredge design will incorporate a setback of at least five feet from the canal edge in the Ala Wai Canal, to protect shoreline walls and foundations and will incorporate a stable cut-slope grade. Therefore, no impact on shoreline walls of the canal is anticipated.

Dredge Method/Sediment Transport

No substantial effects will occur from the specific method chosen. Should mechanical dredging be selected, the contractor will be required to install temporary fendering on bridge abutments to prevent accidental damage should a scow or workboat accidentally strike the structure.

Work Support Areas

There will be no archaeological impacts at the work areas; no resources occur at any of these sites and no ground disturbance is planned. The shoreline support areas at Kalakaua Avenue, Ala Wai Neighborhood Park A, and at the Kapahulu end of the Ala Wai Canal are bordered at the canal by historically significant walls. These walls will be covered to prevent damage during transfer of material from the bank to the barge in the canal. The contractor will be prohibited from dredging within a five-foot setback of these walls.

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[109] Spencer Mason Architects (1996) *Draft-State of Hawai'i, Historic Bridge Inventory and Evaluation.* Prepared for the State of Hawaii, Department of Transportation Highways Division in cooperation with the U.S. Department of Transportation Federal Highway Administration, Honolulu.

There are no historic structures at Magic Island, therefore no precautions related to cultural resources are needed at that site.

Processing and Placement

None of the potential upland sites contain historic architectural resources.[110] The Reef Runway site is permitted by DOH as a soil disposal site. It consists of fill land and is unlikely to contain archaeological resources. DLNR lands on Sand Island, including the Sand Island State Recreation Area, consist of fill. No substantial effects are anticipated at the Waipio site, since the existing landfill area would be used.

No Action

There will be no impact to cultural resources under the No Action alternative. However, no action would allow the continued infilling of the canal, contributing to its neglect and deterioration, which would constitute, over time, a substantial negative impact.

4.12 LAND USE COMPATIBILITY

The General Plan for the City and County of Honolulu establishes long-term objectives and policies that represents its commitment to a desirable and attainable future for Oahu. In addition, Oahu is divided into eight DP areas; the Ala Wai Canal falls within the Primary Urban Center (PUC). The DPs are intended to provide a system of land-use controls designed to implement the objectives and policies of the General Plan and to guide more specific zoning and density regulations.

In addition, Waikiki has additional land use requirements, as defined in the Waikiki Master Plan[111] and City and County of Honolulu Land Use Ordinance (LUO).[112] The Waikiki Master Plan applies to activities along and within the Ala Wai Canal, and is intended to guide the physical development of Waikiki during the next 20 years. Under the LUO, Waikiki has additional development and redevelopment guidelines to protect and enhance the area and maintain it as a community and scenic resource. Waikiki is bounded by the ocean, Kapahulu Avenue, the *mauka* boundary of the Ala Wai Canal and includes the Ala Wai Boat Harbor.

Impacts on land use compatibility are determined based on whether the activity is consistent with existing land use and zoning for the project area and adjacent areas of the Ala Wai Canal and potential upland placement sites. In addition, hazards associated with flooding and tsunamis are addressed in this section.

4.12.1 Existing Conditions

The Ala Wai Canal is in an urban setting surrounded by apartments, businesses, parks, schools, and a golf course. The Ala Wai Canal serves the purpose of reducing flood hazard for surrounding urban uses and acts as a sediment catchment basin.

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110 Written communication (letter) from DLNR, State Historic Preservation Division, to Sue Sakai at Belt Collins Hawaii (January 28, 1998) entitled "Chapter 6E-8 Historic Preservation Review—Ala Wai Canal Dredging Project: Proposed Disposal Sites, Various Locations, Oahu."

111 City and County of Honolulu (May 1992) Waikiki *Master Plan*.

112 City and County of Honolulu (August 1997) *Land Use Ordinance*.

The Ala Wai Canal is within the 100-year flood inundation zone, which means that the area would be flooded during a 100-year flood event. Flood depths in the area can reach one to three feet, and up to seven feet in the floodway, which includes the Ala Wai Golf Course but not Ala Wai Neighborhood Park A. Magic Island is also in the 100-year flood inundation zone. The Reef Runway has undetermined flood hazard. The outer edge of Sand Island (south side) is in the 100-year flood zone, but the area where dewatering and processing would take place is outside of the 500-year flood zone. The Waipio site is outside of the 500-year flood zone.[113]

Tsunami evacuation zones may be vulnerable to inundation and must be evacuated in case of a tsunami. For the proposed dredging project, areas within tsunami evacuation zones include the lower portion of the Ala Wai Canal (Area 1), all of Magic Island, all of the Ala Wai Boat Harbor, all of the Reef Runway, and the south shore of Sand Island (excluding the area proposed for dewatering and processing of dredged sediments). The Waipio site is not within the tsunami evacuation zone.

4.12.2 Potential Impacts and Operating Constraints

Limits of Dredging

The limits of dredging is an essential part of the overall dredging activity to maintain the capacity of the Ala Wai Canal to reduce flood hazards for surrounding properties and act as a sediment catchment basin. Because the activity is temporary, no potential impacts or operating constraints would occur to conflict with existing land use policies or plans.

Dredge Method and Sediment Transport

The dredge method and sediment transport method would be considered as part of the maintenance activity to maintain the capacity of the Ala Wai Canal to reduce flood hazards for the surrounding properties and act as a sediment catchment basin. Because the activity is temporary, no potential impacts or operating constraints would occur to conflict with existing land use policies or plans.

In case of floods or tsunamis, dredging activities would cease for the period that the flood or tsunami hazard exists. Equipment would be secured in the work support areas. No additional impacts related to the dredging limits would be anticipated due to flood or tsunami hazard. After dredging is completed, flood hazards should be reduced for the vicinity of the Ala Wai Canal.

Work Support Areas

Temporary construction-related land use in the shore-side work support areas would be consistent with construction practices allowed in the vicinity of the Ala Wai Canal and Magic Island. These activities would be covered under an ACOE permit for dredging operations and would comply with restrictions imposed by the DPR on use and restoration of park lands for dredging support.

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[113] Federal Emergency Management Agency, Flood Insurance Rate Maps, City and County of Honolulu, Hawaii, Community-Panel Number 150001 0115 C (revised September 28, 1990), Community-Panel Number 150001 0120 C (revised September 4, 1987), and Community-Panel Number 150001 0110 D (revised September 30, 1995).

In case of floods or tsunamis, dredging activities would cease (as described above), and equipment would be secured in work support areas. The dredging barge would be secured to the shore of the Ala Wai Canal in Area 2 (outside of the tsunami evacuation zone). If merited, the barge moored at Magic Island would be towed out to sea to avoid damage. The dredging crew would follow standard community emergency procedures, and evacuation would progress as required. No additional impacts to work support areas related to the dredging project would be anticipated due to flood or tsunami hazard. Any damage to dredging equipment would be the responsibility of the contractor and contracting agency. Any additional damage to work support areas due to location of dredging equipment would fall within the agreement to restore sites to their original condition.

Processing and Placement

Transfer of materials by barge to the Sand Island or the Reef Runway sites for upland placement would cross ocean recreational areas and a designated seaplane runway (not used at present). Transfer of materials by barge to the Waipio site would cross through a naval defensive sea area and through an active explosive safe quantity distance area. These issues are further discussed in Section 4.4 (Recreation) and 4.6 (Transportation).

Potential impacts of processing and placement at the three potential upland placement sites will vary. Activities at the Reef Runway would be covered under an existing permit from the DOH Office of Solid Waste Management, so impacts and constraints would be addressed through that mechanism. Vertical obstruction limits for airport zoning would be complied with. No dewatering effluent would be discharged from the site since gravity/evaporation basins would be designed to contain all fluids. Dewatering, processing, and placement activities at Sand Island and the Waipio site would require Special Management Area (SMA) permits and grading permits, although use as fill material at these sites would be consistent with existing uses by providing landscape contouring at a presently flat site (Sand Island), and providing landfill cover (Waipio site).

Flood hazards for the upland placement sites are minimal (Sand Island and Waipio sites are in the 500-year flood zone) or unknown (the Reef Runway has undetermined flood hazard). Only the Reef Runway and SMF are within the tsunami evacuation zone (dewatering and processing locations on Sand Island are outside of the evacuation zone). In case of flooding or tsunamis, dewatering and processing operations would cease during the time of hazard, and additional efforts may be necessary to limit surface runoff from dewatering and processing areas.

Because of the location of the SMF, it is likely that dredged sediments undergoing processing would be washed from the site into the ocean in the event of a tsunami. Potential impacts of such an event would be increased turbidity and contaminant loading to the nearshore marine environment. After material is placed, it will be stabilized as structural fill along the shore of the Reef Runway, and the risk of wash off during a tsunami will be no greater than for the surrounding fill material.

In the event of a tsunami, contribution from sediment processing at the Reef Runway SMF to the nearshore marine environment will not be substantial. The tsunami would impact a large area of the south coast of Oahu and the nearshore marine environment. In addition, the risk of a tsunami would not be increased in any way because of the processing at the Reef Runway SMF. To prevent, as much as possible, sediment being washed from the SMF, an Emergency Management Plan for the SMF covering natural disasters would include measures to reduce wash out during a tsunami. These impacts are further discussed under Cumulative Impacts, in Section 4.15.

No Action

The No Action alternative would result in an increased flood hazard for the areas surrounding the Ala Wai Canal, and decreasing water quality for that area. This would not be consistent with General Plan or Waikiki Master Plan goals of improving and enhancing the natural environment.

4.13 ENVIRONMENTAL JUSTICE

Executive Order 12898, dated February 11, 1994, requires federal agencies, and requests other independent agencies, to address the potential for disproportionately high and adverse environmental effects of their actions on minority and low-income populations. Agencies are required to ensure that their programs and activities that affect human health or the environment do not directly or indirectly use criteria, methods, or practices that discriminate on the basis of race, color, or national origin.

The process used by the Federal, State and City governments in their environmental documentation does not discriminate against low-income or minority populations in Hawaii. The proposed action does not discriminate against these populations directly or inadvertently. This EA assesses the human health, economic, social, and environmental effects of the various alternatives. The analysis reveals that the Ala Wai Canal is used by a diverse cross section of the community. However, certain minorities are more likely to be fishing or crabbing in the canal and consuming their catch. This practice potentially exposes some minority and low-income populations to adverse health effects from contaminated fish in the canal. This is an existing condition that would not be substantially changed by the dredging.

4.13.1 Existing Conditions

As described in Section 4.4 (Recreation), fishing occurs along the Ala Wai Canal. The fishermen include a majority of people who may be considered minority and/or low-income. According to a survey of fishermen, many consume their catch (36 percent of those surveyed).[114] Testing of marine biota in the Ala Wai Canal has shown that pesticides may be found in fish, and termicides and lead may be found in crabs. (Section 4.2, Pollutants, has greater detail on this issue.) The levels of pesticides found in fish from the Ala Wai Canal indicate that there is an existing health risk to those who consume these fish. (See Section 4.3, Public Health, for more detail.)

4.13.2 Potential Impacts and Operating Constraints

During the dredging project, sediments at the bottom of the Ala Wai Canal will be disturbed, increasing turbidity in canal waters. These sediments carry adsorbed contaminants. The sediments will settle or disperse within a relatively short period, similar to sediment suspension that occurs during storms. This resuspension is not likely to substantially affect the bioaccumulation of harmful chemicals in fish and crabs caught in the canal. However, the existing concentration of such chemicals in these food species is already unhealthful. To ensure that people are aware of the potential of contamination in fish from the Ala Wai Canal, signs will be posted along all portions of

[114] Chau, Lisa (August 1997) *Fishing Practices of the Ala Wai Canal.* Prepared for Ala Wai Watershed Coordinating Committee and Environmental Center, University of Hawaii at Manoa.

the canal where fishing occurs. These signs will be multilingual to ensure that non-English speakers understand them.

4.14 CULTURAL PRACTICES

The policy of the State of Hawaii, under HRS 343, is to alert decision makers, through the EA process, about the substantial environmental effects that may result from certain actions. This EA process includes an assessment of cultural practices and features that may be affected by actions subject to HRS 343. In addition, Articles IX and XII of the State Constitution, as well as other state laws and the courts of the state, require government agencies to promote and preserve cultural beliefs, practices, and resources of native Hawaiians and other ethnic groups.

4.14.1 Existing Conditions

As described in Section 4.4 (Recreation), outrigger canoeing occurs in the Ala Wai Canal. The outrigger canoe is a traditional Hawaiian water sport and mode of transportation. The Ala Wai Canal provides some of the best area for canoeing throughout the year (see Section 4.4 for further detail).

4.14.2 Potential Impacts and Operating Constraints

As described in Section 4.4, dredging equipment and shore-side support areas along the Ala Wai Canal and at Magic Island will cause temporary obstacles at some canoe entry points and to canoe practicing and racing. To accommodate canoeing, coordination of the dredging activity with the canoe clubs and the DPR Canoe Council may help to limit these constraints. The long-term impact of dredging will be positive for outrigger canoeing since removal of shallow areas will make more of the Ala Wai Canal passable for canoes.

4.15 CUMULATIVE IMPACTS

Cumulative impacts related to the dredging of the Ala Wai Canal, and disposal of sediments at an upland site could occur. The dredging activity itself will have a positive cumulative effect of improving the environment and surrounding recreational and tourism uses in the vicinity of the Ala Wai Canal.

As discussed in Section 4.2.2 under "Limits of Dredging," cumulative impacts on water quality in the Ala Wai Canal and vicinity could occur if large storm events or construction dewatering effluent discharge occur during dredging, leading to an increase in water turbidity. The contribution from dredging would be a non-substantial amount during a naturally occurring storm event, and the turbidity would dissipate. Therefore, these cumulative effects will not be substantial.

Cumulative impacts that are potentially negative are related to upland placement of sediments at the preferred site, the DOT Airport's Reef Runway SMF. In the event of a tsunami, the Reef Runway facility is in the tsunami evacuation zone and may be vulnerable to inundation. If dredged sediment is undergoing dewatering or processing during a tsunami, sediment could be washed into the ocean and cause increased turbidity and contamination of the near shore marine environment, in addition to the sediment that would wash off from shore areas in the vicinity. Such a natural disaster would

have a significant environmental and economic impact of its own; the sediment processing at the SMF will not contribute substantially to this impact.

A second cumulative impact is related to the potential use of the Reef Runway SMF for placement of dredged sediments from other upcoming dredging projects. Upcoming projects include dredging of Pearl Harbor by the Navy (Pacific Division), and of areas within Honolulu Harbor by State Department of Transportation. These projects may make use of the SMF. The theoretical capacity of the SMF is 750,000 CY; this capacity may be used more quickly if large volumes of sediment from the above dredging projects are disposed of upland.

4.16 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

The proposed action will result in the irreversible and irretrievable commitment of fiscal resources and energy sources. Major resource commitments include: money to fund the project; manpower for planning, designing, and constructing the dredging project; and use of fuel for powering heavy equipment. Since the project involves maintenance of an existing canal and use of shore-side support areas is temporary, the proposed action will not constitute an irretrievable or irreversible commitment of land.

4.17 SUMMARY OF OPERATING CONSTRAINTS

Operating constraints discussed in the above sections are summarized in Table 4-7 below.

TABLE 4-7: SUMMARY OF OPERATING CONSTRAINTS

Topic	Potential Effect	Operating Constraints
Terrestrial Flora	• Removal of trees and vegetation for construction staging area and rerouting of bike path at Ala Wai Neighborhood Park A.	• Landscaping and bike path will be restored to preconstruction condition upon completion of the project. Minimal tree removal will occur at Neighborhood Park A, and no trees will be removed at Magic Island.
	• Potential effects of the sediment transfer barge on wetland areas occurring along the shoreline of the Waipio site.	• Wetland transition zones along the shoreline at the Waipio site will be avoided. If required, mangroves along the shore will be cut flush with water line.
Terrestrial Fauna	• Short-term noise nuisance on migratory and other birds from dredging activities along the Ala Wai Canal.	• None. Suitable habitat exists nearby for use by displaced birds.
	• Potential destruction of shoreline habitat along MPDC used by the endangered common moorhen.	• None. Shoreline habitat along MPDC is of low quality, and suitable alternate habitat is available in the vicinity.
	• Short-term noise nuisance on endangered birds using the Pouhala Marsh, adjacent to the Waipio site.	• None. Alternate habitat, the Pearl Harbor NWR, is available in the vicinity.
Marine Biota	• Short-term effects on marine biota and benthic communities from removal of sediments and turbidity.	• None. Recolonization will occur after dredging is completed, and none of the biota living in the canal is rare, threatened, or endangered.
	• Potential for loss of a recruitment class of gobies from dredging.	• None. This is not anticipated to affect goby populations over the long-term; after completion of dredging, recruitment of juveniles will resume.
	• Potential to disrupt endangered humpback whales in Hawaiian Islands National Marine Sanctuary.	• None. Transit of a barge and tugboat through the Marine Sanctuary does not conflict with existing regulations and protections afforded humpback whales. Laws protecting endangered species will be adhered to.
	• Potential spillage from over topping of the barge at the Magic Island work support area would increase turbidity and potentially affect biota at the mouth of the canal.	• No over topping of the barge will be allowed. Silt curtains will be used during sediment transfer by bucket.
	• Potential to disrupt threatened green sea turtles at the mouth of the Ala Wai Canal and near Reef Runway.	• None. One to two barge trips per day will not cause disruption. Laws protecting threatened species will be adhered to.

Table 4-7 (*continued*):

Topic	Potential Effect	Operating Constraints
Marine Biota (*continued*)	• Positive long-term effects on marine biota from removal of accumulated organic material.	• Not applicable.
Pollutants and Water Quality	• Resuspension of sediment, which may contain contaminants, during dredging will increase turbidity and possible uptake of contaminants by biota.	• Silt curtains will be used to minimize movement of suspended sediment outside of the dredge area.
	• Introduction of new pollutants into the canal if the depression in the Kapahulu end is filled.	• Sediments within the canal, with the lowest levels of contaminants, would be used as fill material.
	• Groundwater influx from the caprock aquifer may introduce nutrients into the canal.	• None. Impact from this influx will not be substantial.
	• Release of sediment into nearshore waters from spills or over topping during the transfer of dredged material to the ocean-going barge at Magic Island.	• The dredge operator and receiving barge operator will communicate to avoid spills or over topping, and adequate free board will be maintained.
	• Erosion of stored sediment into surface waters from storm water runoff during processing at upland sites.	• Sediments will be placed and processed to increase stability, thereby reducing runoff potential. Standard construction practices will be used to prevent storm water runoff from reaching adjacent waters.
	• Leaching of contaminants from sediments into surface and groundwater.	• Treatment of sediments at placement site will include a liming agent to raise the pH to reduce acidity and contaminant leaching potential, and binding agents to stabilize material for fill.
	• Long-term water clarity and quality improvements to the Ala Wai Canal are expected as a result of the proposed area.	• Not applicable.
	• Introduction of pollutants in dewatering effluent to surface waters.	• Dewatering discharge to surface waters will not be allowed.

Table 4-7 *(continued)*:

Topic	Potential Effect	Operating Constraints
Public Health	• Dredging may resuspend sediments containing bioavailable contaminants, which could then accumulate in fish and pose a health risk to fishermen consuming their catches.	• In all cases, consumption of fish from the canal is not healthful and should be prohibited before, during, and after dredging. Signs will be posted in areas where fishing occurs. Limits to prevent turbidity will be addressed as above.
Recreational Use: Ala Wai Canal and Boat Harbor	• Dredging equipment constricts access of recreational craft on the canal.	• Moor the dredge barge to allow clear passage of the active dredging area. Coordinate with affected clubs when dredging is occurring adjacent to their launch sites. DLNR will coordinate interaction between the dredging operations and canal users.
	• Scows transporting sediment for mechanical dredging may interfere with navigation in the canal.	• Caution would be required at narrow bridges. The span used by scow traffic will be clearly marked and fendered. Scows will be anchored or berthed at night so as not to impede navigation or canoe launching areas in the canal.
	• Hydraulic dredging lines may interfere with navigation in portions of the canal seaward of the dredging area, including berthing areas in the boat harbor.	• The floating pipeline will be secured against the canal bank or submerged to minimize impacts on waterway usage. It will be clearly marked with buoys, and will be submerged to the bottom where the pipeline extends beyond the Ala Moana Boulevard Bridge.
	• Dredging equipment constricts waterway access at Magic Island.	• The barge at Magic Island will be moored in such a way as to allow continued access to the ocean for recreational users. The mooring cables and buoys will be clearly marked day and night to prevent hazards to navigation. Coordination of tug and barge movements will be made with the Ala Wai Harbor Master's office.
	• Turbidity plumes from dredging or leakage during transport may affect SCUBA diving or surfing in the outer channel.	• Sediment suspended by dredging will be contained with silt curtains to reduce turbidity in the outer channel. Leakage during transport or handling at Magic Island will be contained as above.
	• Positive long-term effects on recreational activities anticipated from removal of sediment and shoal areas, which is expected to improve water quality and navigation.	• Not applicable.

Table 4-7 *(continued)*:

Topic	Potential Effect	Operating Constraints
Recreational Use: Work Support Areas	• Bike path at Neighborhood Park A site blocked during staging/dredging.	• Bike path will be rerouted during dredging operations, and replaced to its original position and relandscaped upon completion of dredging.
	• About 20 percent of parking stalls at Neighborhood Park A site blocked during staging.	• Coordinate with the Ala Wai Elementary School to arrange use of school for overflow parking on weekends.
	• Portions of a canoe-launching site located at the east end of the canal may be temporarily inaccessible during staging operations.	• If the Kapahulu end site is used, portions of the site would remain accessible during staging for recreational users walking boats into the water.
Recreational Use: Upland Sites	• Potential effect on ORMAs.	• At the Sand Island site, the barge would be south of the canoe racing and competitive water-ski zone ORMAs. At the Reef Runway site, the barge would anchor at the southeast end of the thrill craft zone ORMA, and the area would still be available for use.
	• Potential effect on shore access at Sand Island and the Reef Runway.	• Shore access at Sand Island and along the Reef Runway will be maintained.
	• Potential effect at Waipio Peninsula site if soccer facility is developed.	• Closure of landfill site would need to be designed to conform to proposed recreational land use.
Socio-economics	• Short-term noise, odor, and visual nuisance to residents and tourists in the vicinity of the dredging area.	• None. Impacts are short-term. Property values are not expected to be affected by dredging activities. Dredging is not anticipated to cause a decrease in vistas for Waikiki, or to impact business activity in the vicinity of the Ala Wai Canal.
	• Long-term positive aesthetic benefits for residents and visitors from improved water clarity and fewer odors upon completion of dredging.	• Not applicable.
	• Creation of jobs and construction revenue associated with the projects and temporary increases in revenues for support services and suppliers in the vicinity.	• Not applicable.

Table 4-7 (*continued*):

Topic	Potential Effect	Operating Constraints
Transportation	• Available truck hauling routes for mobilization and for the removal of bulky items from the work support area are restricted, due to the turning radii of the larger trucks and existing traffic congestion.	• Wider streets will be used to accommodate trucks. Preferred routes to each of the four potential staging areas are recommended.
	• Short-term marginal increase in traffic in the vicinity of the work sites due to daily arrival of 8 to 12 construction personnel.	• None. Increase not substantial.
	• Temporary inconvenience to marine traffic arriving or departing Ala Wai Boat Harbor due to location of sediment barge at Magic Island.	• Coordination will be required with the Ala Wai Harbor Master, and the U.S. Coast Guard, NOTMAR.
	• Potential obstruction of naval traffic in Pearl Harbor for use of the Waipio site.	• Use of the Waipio site will require permission for entry from the Naval Station Pearl Harbor Port Operations, and coordination of passage in the entrance channel and through explosive safety areas.
	• At the Reef Runway site, limits on vertical structures are imposed to protect air navigation.	• Placement of equipment will comply with limits, NOTAM, and FAA Notice.
	• Potential cumulative impacts from concurrent dredging of Pearl Harbor and possible use of the Reef Runway for upland disposal of sediments.	• Coordination with the Department of the Navy and DOT Airports Division will be necessary to avoid time delays when maneuvering barges in limited water space, and to facilitate efficient deposition of dredge material.
Air Quality	• Emissions from dredging equipment may affect sensitive receptors and cause cumulative increase in existing air quality problem areas, such as busy intersections.	• Dredging equipment will be located where they will not create a nuisance.
	• Combustion engine emissions from 10 to 20 commuter vehicles will occur at the work support site.	• None. These short-term emissions are not expected to create substantial air quality effects.
	• Emission of odors, primarily hydrogen sulfide, in the vicinity of active dredging.	• None. The duration of off-gassing exposure will be too short to allow reactions to occur.
	• Odors at the material-handling site from items dredged from the canal.	• Debris from the canal will be removed daily or contained in a closed dumpster.
	• Potential odors from the dredged sediment at the processing and placement site.	• Odors will be managed by mixing and covering the material to prevent anoxic decomposition.

Table 4-7 *(continued)*:

Topic	Potential Effect	Operating Constraints
Air Quality *(continued)*	• Fugitive dust from drying sediments at upland placement site.	• None. Fugitive dust will be prevented through processing of sediments for fill, including binding agents. Covers on drying piles will be used if needed to prevent airborne dust.
Noise	• Noise impacts on residents and visitors from dredging equipment and work support areas.	• Equipment will be required to have complete and effective mufflers, and will be subject to limitations on hours of operation. The contractor will be required to either attenuate noise or obtain a permit for noise exceeding 55 dBA at the property line.
Aesthetics	• Short-term visual impacts from the presence of construction equipment and from dredging activities in and along the Ala Wai Canal and at the work support areas.	• None. Impacts are temporary and are not anticipated to be substantial.
Utilities	• If dredging activities occur in the area of Princess Kaiulani Hotel's 6-inch PVC line, the line may have to be relocated.	• The hotel owner is aware that the line may have to be relocated. Sheraton Hotels will be kept informed of dredging work scheduling so that they may allocate funds for relocating their water line should this area be considered for inclusion in the dredging area.
	• Possible damage to sewer lines below dredge limits from dredging activities.	• The contractor will be made aware to exercise caution when working near sewer lines. Notify DOH in event of sewage spill.
	• Possible damage to two HECO electrical lines allowed to settle in the silt.	• The contractor will be required to verify location of electrical lines within HECO's easement, and ensure lines are protected during dredging.
	• Existing utilities at the Ala Wai Neighborhood Park A may be affected by staging operations.	• If the Ala Wai Neighborhood Park A site is used, existing water valve and electrical control boxes will be protected and kept accessible.
Cultural Resources	• Dredging could damage the historic walls of the Ala Wai Canal.	• Dredge design will incorporate a setback from the canal edge of at least five feet in the Ala Wai Canal to protect shoreline walls and foundations and will incorporate a stable cut-slope grade. The contractor will not be allowed to dredge in this setback area. In addition, the canal walls will be covered to prevent damage during transfer of material from the bank of the canal to the barge in the water.

Table 4-7 *(continued)*:

Topic	Potential Effect	Operating Constraints
Cultural Resources *(continued)*	• Scows for mechanical dredging could accidentally strike bridge abutments.	• The contractor will be required to install temporary fendering on bridge abutments to prevent accidental damage from a scow or workboat.
Land Use Compatibility	• Impacts on land use constraints from dredge support operations on park lands.	• These activities would comply with restrictions imposed by the DPR on use and restoration of park lands for dredging support.
	• Impacts due to a 100-year flood or tsunami event in the Ala Wai Canal.	• Operations would cease, and equipment be secured, during a flood or tsunami warning.
	• Potential impacts of processing and placement at the three potential upland placement sites.	• Activities at the Reef Runway would be covered under a permit from the DOH OSWM and vertical obstruction limits for airport zoning would be complied with. An SMA permit and grading permit would be obtained for these activities at the Sand Island and Waipio sites.
	• Impacts due to a tsunami at Reef Runway.	• Operations would cease, and additional measures taken to prevent wash out of sediment undergoing processing. Stabilized sediments would be no more vulnerable to wash out than other fill material at the Reef Runway.
Cultural Practices	• Dredging equipment and shore-side support areas along the Ala Wai Canal and at Magic Island will cause temporary obstacles at some entry points for canoes and to canoe practicing and racing.	• To limit these constraints, the dredging activity will be coordinated with canoe clubs and the DPR Canoe Council.
Cumulative	• Impacts to water quality in the case of flooding in the Ala Wai Canal and vicinity.	• None. Contribution of sediment from the canal will not be substantial.
	• Increased contamination of marine environment, due to sediment processing at the Reef Runway, during a tsunami.	• Operational constraints to limit wash out from processing will be imposed. Contribution of sediment from the Reef Runway will not be substantial.

5. COMMENTS AND COORDINATION

The purpose of this chapter is to outline the regulatory issues and coordination associated with the Ala Wai Canal dredging project. Regulatory issues include permits, concurrence, and consultation under a number of federal, state, and city regulations. Coordination has included meetings with and comments from the Ala Wai Canal Agency Working Group (AWG), Technical Advisory Group (TAG), and the public.

5.1 FEDERAL HIGHWAY ADMINISTRATION, SECTION 4(f)

The Ala Wai Canal Dredging environmental assessment (EA), and related work, received funding from the U.S. Department of Transportation (DOT) under the Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA) program. The funds are available for 10 specific types of activities, including transportation enhancements for which the Ala Wai Canal dredging project qualifies. Because of the use of U.S. DOT funds, a consistency determination under Section 4(f) of the Department of Transportation Act (recodified as 49 U.S.C. 303) is required.

Section 4(f) prohibits the use of land from a significant public park, recreation area, or wildlife and waterfowl refuge, or any significant historic site unless 1) there is no prudent and feasible alternative to using such lands, and 2) the program or project includes all possible planning to minimize harm to the property resulting from the use of such lands.

Because the proposed action makes use of park space for temporary construction support, and because of cultural resources eligible or listed on the National Register of Historic Places, a Section 4(f) determination is needed for the Ala Wai Canal Dredging EA. The following definitions of use are applied in evaluating consistency under 4(f):

- When land is permanently incorporated into a transportation facility,
- When there is a temporary occupancy of land that is adverse in terms of the statute's preservationist purposes, or
- When there is a constructive use of land (constructive use occurs when the proximity impacts substantially impair the activities of a Section 4(f) resource).

Temporary construction support areas along the Ala Wai Canal do not comprise a 'use,' as defined above, because the land will be temporarily occupied without substantially affecting recreational uses, and will be relandscaped after the project is completed. The land area affected is minor in relation to the total area available for park use along the canal. The City and County Department of Parks and Recreation has concurred that, with mitigation outlined in this EA, there will be no adverse impact on park use.

The Ala Wai Canal walls and associated structures are eligible or listed on the National Register of Historic Places. Effects on, or uses of these cultural resources will also not occur, as dredging limits will start at least five feet from the banks in the Ala Wai Canal, and walls will be protected where construction activity could accidentally cause damage. The State Historic Preservation Officer

(SHPO) has concurred that there will be no adverse impact on historic resources. The consultation letters and responses related to Section 4(f) are contained in Appendix G.

Long-term positive benefits to recreational resources and uses along the Ala Wai Canal are anticipated due to the dredging project. The improvement in water quality and increase in depth of the canal, especially in areas that presently impede canoe and paddler access, will enhance recreational uses of the Ala Wai Canal.

5.2 PERMITS AND APPROVALS

5.2.1 Coastal Zone Management Act

The Coastal Zone Management (CZM) Act of 1972 (P.L. 92-583) is administered in Hawaii by the Department of Business, Economic Development, and Tourism (DBEDT) and affects all projects on federal lands and/or involving federal agencies.[115] The CZM Program objectives and policies are to provide recreational resources; protect historic, scenic, and coastal ecosystem resources; provide economic uses; reduce coastal hazards; and manage development in the coastal zone. The entire Island of Oahu is within the coastal zone area affected by the CZM Act. A consistency determination of 'no effects' is required under the CZM Program.

Because the Ala Wai Canal dredging project is a temporary construction project that will enhance the recreational resources of the Ala Wai Canal, a determination of 'no effects' is anticipated. The CZM assessment will be submitted to the DBEDT CZM Program, with final processing to occur after the EA process is completed.

5.2.2 Endangered Species Act and Migratory Bird Treaty Act

The Endangered Species Act of 1973 requires that any action authorized by a federal agency be found not likely to jeopardize the continued existence of any endangered or threatened species or result in destruction or adverse impact of habitat critical to that species. The U.S. Fish and Wildlife Service (USFWS) has jurisdiction over endangered and threatened terrestrial flora, fauna, and birds. The National Marine Fisheries Service (NMFS) has jurisdiction over marine mammals and sea turtles. Under Section 7 of the Act, the responsible federal agency must consult with these agencies when a proposed action may have an effect upon listed or candidate species under their jurisdiction. Migratory non-game birds are protected under the authority provided in the Migratory Bird Treaty Act.

Protected biological resources in the vicinity of the Ala Wai Canal and potential upland placement sites include the endangered common moorhen (*Callinula chloropus sandvicensis*), sighted in the vicinity of the Manoa-Palolo Drainage Canal (MPDC), and the Hawaiian black-necked stilt (*Himantopus mexicanus knudseni*), common in wetlands adjacent to the potential upland placement site on the Waipio site. The USFWS has concurred that no endangered, threatened or candidate species are within the project vicinity (i.e., preferred options, including upland placement at Reef Runway), and that the proposed project will not adversely affect any listed species (see Appendix G).

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[115] State of Hawaii (April 1985) *Hawaii Coastal Zone Management Program, Federal Consistency Procedures Guide.*

5.2.3 Fish and Wildlife Coordination Act

Section 2 of the Fish and Wildlife Coordination Act directs federal agencies to consult with USFWS, the Department of Interior, and state agencies before authorizing alterations to water bodies. The USFWS, Department of Land and Natural Resources (DLNR), and other local resource organizations have been provided an opportunity to review this EA and submit comments. All comments have been considered during the preparation of this final EA. Comment letters and responses are contained in Appendix H. As indicated in Section 5.2.2, consultation with the USFWS has occurred.

5.2.4 National Historic Preservation Act

Section 106 of the National Historic Preservation Act (NHPA), as amended, and its implementing regulations (36 CFR 800), requires agencies to identify and consider the potential effects of a proposed action on historical, archaeological, and architectural resources. The Ala Wai Canal is on the national and state historic registers. No alterations of historic resources in the Ala Wai Canal are anticipated during the dredging project. No historic or cultural resources exist at the potential upland placement sites. SHPO has concurred that, with the protection measures outlined in this EA, there will be "no effect" on the historic character of the Ala Wai Canal or known historic resources (see Appendix G).

5.2.5 Marine Protection, Research and Sanctuaries Act of 1972 and Water Resources Development Act of 1992, Section 506

The Marine Protection, Research and Sanctuaries Act (MPRSA) of 1972 (33 U.S.C. Section 1401 *et seq.*, as amended) is the primary legislative authority regulating the disposal of dredged material into the ocean. MPRSA prohibits disposal activities that would unreasonably degrade or endanger human health or the marine environment. Under MPRSA, the Environmental Protection Agency (EPA) and U.S. Army Corps of Engineers (ACOE) have joint authority for regulating ocean disposal of dredged material and for managing ocean dredged material disposal sites in the Hawaiian Islands, including the South Oahu Ocean Dredged Material Disposal Site (ODMDS).

Section 506 of the Water Resources Development Act (WRDA) of 1992 amends Section 102(c) of the MPRSA, and requires, in part, that site management plans be developed for ocean dredged material disposal sites.

Section 103 of the MPRSA specifies that all proposed operations involving the transportation and dumping of dredged material into ocean waters must be evaluated to determine the potential environmental impact of such activities. In accordance with Section 103 of the MPRSA, the ACOE issues permits for transportation of dredged sediment for ocean disposal. The EPA determines whether the sediment is suitable for ocean disposal based on criteria that they developed.[116]

When an ACOE District Engineer's determination to issue a permit for the dumping of dredged material into ocean waters has been rejected by an EPA Regional Administrator upon application of

[116] U.S. Environmental Protection Agency and U.S. Army Corps of Engineers (February 1991) *Evaluation of Dredged Material Proposed for Ocean Disposal (Testing Manual)*. Also referred to as "The Green Book." EPA Ocean Dumping Regulations at 40 CFR Parts 220-227 address the suitability determination of sediment proposed for ocean disposal.

the criteria, the District Engineer may determine that there is no economically feasible alternative method or site available other than the proposed dumping in ocean waters. Upon such a determination, the District Engineer can submit a report of such determination to the ACOE Chief of Engineers and advise the Regional Administrator, setting forth the reasons for the determination. If the Chief of Engineers then decides that ocean dumping at the designated site is required because of unavailability of feasible alternatives, he can then request that the Secretary of the Army seek a waiver from the EPA Administrator. The Administrator shall grant the requested waiver unless within 30 days he determines that the proposed dumping will have an unacceptable adverse effect on municipal water supplies, shellfish beds and fishery areas (including spawning and breeding areas), wildlife, or recreational areas.[117]

In addition to having permitting authority under MPRSA Section 103, the ACOE has jurisdiction under Section 10 of the Rivers and Harbors Act (see Section 5.2.6 below) and Section 404 of the Clean Water Act (see Section 5.2.7 below). Regardless of the number of applicable authorities, the ACOE will issue one permit for the dredging activities. The permit application will be submitted to ACOE after completion of the EA process. Consultations with the ACOE and EPA regarding suitability of Ala Wai Canal sediment for ocean disposal are ongoing and will continue throughout the permitting process.

5.2.6 Rivers and Harbors Act, Section 10

The Rivers and Harbors Act, Section 10, requires an ACOE permit for any activity that obstructs or alters navigable waters of the U.S., or modifies the course, location, condition, or capacity of any port, harbor or refuge, or enclosure within the limits of any breakwater or of the channel of any navigable water. Where dredging limits exceed maintenance dredging limits in navigable waters, and because of the relatively long-term, temporary mooring of barges in navigable waters (at Magic Island), a Section 10 authorization will be necessary as part of the ACOE permit application. As discussed in Section 5.2.5, the permit application will be submitted to ACOE after completion of the EA process.

5.2.7 Clean Water Act, Section 404

The Clean Water Act (CWA), Section 404, defines requirements for discharges in navigable waters of the U.S. and sets limits on the discharge of dredged or fill materials into navigable waters. Permit approval is through the ACOE. Dredging of the Ala Wai Canal and/or filling the depression in Area 3 will trigger the need for a Section 404 permit. Discharge of dewatering effluent from dredged sediment, which is not allowed for this project under its operating constraints, would trigger the need for a Section 404 permit if it were allowed. As discussed in Section 5.2.5, the permit application will be submitted to ACOE after completion of the EA process.

5.2.8 State Water Quality Certification

If a CWA, Section 404 permit is required for a project, then CWA, Section 401, Water Quality Certification (WQC) is also required. Under the federal CWA and Hawaii Revised Statutes (HRS) Chapter 342D, along with their supporting rules in Hawaii Administrative Rules (HAR) 11-54, this

[117] 40 CFR 225.3 and 225.4. Note that such a waiver has never been granted (personal communication with Allan Ota of EPA Region IX, June 23, 1998).

certification is required for activities when proposed construction or operation may result in discharges to state waters. Discharge of dewatering effluent associated with mechanical methods of dewatering dredged sediment would also require this certification.

Site-specific best management practices will be required by DOH for the proposed activities in accordance with Section11-54-03 of HAR Chapter 11-54. If there were to be return flow or runoff from dewatering of the dredged material, the quality of the return flow or runoff will need to meet the State Water Quality Standards established for the Ala Wai Canal. The proposed activities shall not interfere with or become injurious to any assigned uses presently allowed in the Ala Wai Canal under HAR Section 11-54-03,[118] and the proposed activities shall avoid or minimize any discharges into State waters other than the Ala Wai Canal.[119] The WQC application will be submitted to the State Department of Health (DOH) Clean Water Branch after completion of the EA process.

5.2.9 National Pollutant Discharge Elimination System Permit

Discharges of point sources of pollutants into surface waters of the U.S. are controlled under the National Pollutant Discharge Elimination System (NPDES) program, pursuant to CWA, Section 402. The DOH Clean Water Branch, under HAR 11-55, administers the NPDES program. In Hawaii, NPDES permits are available under General or Individual categories. General Permits are available for activities that meet specific criteria, such as construction related storm water runoff and construction dewatering. The Individual Permit has greater flexibility, but involves a longer process, which includes Public Notice of permit application.

Separate Notices of Intent (NOIs) are required for NPDES General Permit coverage for discharges to surface waters of construction related storm water runoff or dewatering on sites sized five acres or greater. For the Ala Wai Canal dredging project, an NPDES permit may be required for discharges of storm water from an upland placement site, if the site is five acres or larger. If necessary, NPDES permitting will occur after the EA process is completed.

5.2.10 DOT Permit and FAA Notice of Proposed Construction or Alteration

HAR 19-12 requires that notice be given to DOT, Airports Division, for activities that have the potential to interfere with airspace. The notice must be accompanied by a construction permit describing the project. In addition, a Federal Aviation Administration (FAA) Form 7460-1 must be submitted to the FAA for simultaneous determination. From this information, DOT and FAA determine whether a Notice to Airmen is required for the project. Upland placement of dredged sediments at the Airport Reef Runway may require a determination from DOT and FAA on whether a Notice to Airmen must be issued. This process will occur after the EA process is completed.

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[118] The Ala Wai Canal is classified as Class 2 inland waters. Under HAR Section 11-54-03, the objective of Class 2 waters is to protect their use for recreational purposes, propagation of fish and aquatic life, and agricultural and industrial water supplies, shipping, navigation and propagation of shellfish. The uses to be protected in this class of waters are all uses compatible with the protection and propagation of fish, shellfish, and wildlife, and with recreation in and on these waters.

[119] Requirements stated in this paragraph are based on the comment letter from DOH dated June 26, 1998 (see Appendix H).

5.2.11 Conservation District Use Application

HRS Chapter 193C and HAR 13-5 pertain to any use of lands in Conservation Districts. The Conservation District Use Application (CDUA) program is implemented by the DLNR. A CDUA permit application must be accompanied by detailed information on the proposed action. Conservation District lands that may be impacted by the proposed action are submerged state lands, including the area off the Reef Runway where a barge would be moored for sediment transfer, and the Reef Runway site. Approval for moorage off Magic Island may be part of a CDUA permit, or would require a 'letter permit' from DLNR, Division of Boating and Ocean Recreation. Application for a CDUA permit and the EA will be submitted to DLNR. Permit processing will occur after the EA process is completed.

5.2.12 Work in Ocean Waters

The DLNR has jurisdiction over work in ocean waters and submerged state land, and as stated under HRS 200-6, application for approval of such work must be submitted to the DLNR Land Division. Activities that would receive a permit under this program include the running of a barge, and possibly barge mooring (if it is not covered under a CDUA permit; refer to Section 5.2.11). If approved, the Land Board, as defined in HAR 13-251, would provide a 'letter permit.' This process would typically be combined with the CDUA proceedings (see Section 5.2.11).

In addition, activities that will impact navigation in ocean waters may require a Notice to Mariners (NOTMAR). This notice would be submitted directly to the U.S. Coast Guard. Informal consultation regarding navigational concerns has occurred with the U.S. Coast Guard and the DLNR Division of Boating and Ocean Recreation (DOBOR), and their input is reflected in the EA.

5.2.13 Noise

Noise regulations are under the jurisdiction of the DOH Noise and Radiation Branch (NRB), and are defined in HAR 11-46. Maximum permissible noise levels during daytime (7:00 a.m. to 10:00 p.m.) are 55 dBA for Class A districts (residential, conservation, preservation, public space, open space, or similar) and 60 dBA for Class B districts (multi-family, apartment, business, commercial, hotel, resort, or similar). Lands adjacent to the Ala Wai Canal and Magic Island contain both Class A and B districts. Noise associated with the dredging activities may exceed the maximum levels during intermittent periods. In this case, noise levels will either be attenuated to meet levels required for the Class A district, or if not possible, a community noise permit would be required from the NRB. This permit covers noise in excess of permissible levels between the hours of 7:00 a.m. and 6:00 p.m. on weekdays (Saturday hours are 9:00 a.m. to 6:00 p.m.; no noise in excess of maximum permissible levels is allowed on Sundays and holidays).

Noise in excess of permissible levels that occurs after 6:00 p.m. and during nighttime work requires a variance. A variance will undergo a 30-day public notice, which leads to a public hearing if community response requires it. If no public hearing is necessary, the variance process can take from one to two months. If a public hearing is required, the variance process can take from two to four months.

Criteria for the community noise permit that are applicable to the proposed action include the following: that best available control technology is provided to control noise, the project is in the

public interest, that the project is temporary, and that the applicant will notify people in the surrounding area of planned nighttime activity. Criteria for a variance include that continuation of the function is in the public interest and the noise emission would not substantially endanger human health or safety. Permit and variance applications would be submitted after completion of the EA process.

5.2.14 Air Permit

Air permit requirements are defined in HAR 11-60.1 and are under the jurisdiction of the DOH Clean Air Branch. Sources of air emissions associated with the proposed action, including fuel-burning cranes and pumps, may require permitting as non-covered sources. Permit application information may include types of equipment, maximum emission rates, and details of any air pollution control equipment or compliance devices planned to be used. Non-covered source permits may be issued for temporary or general permit activities. The general permit involves public notice, and depending on response, may also involve a public hearing. In either case, permit approval or disapproval will occur within six months of application. Limitations and monitoring requirements may be imposed, via permit conditions, at the discretion of the regulator. If necessary, the permitting process will take place after the EA process is completed.

5.2.15 DOH Solid Waste Permit

Management of sediments for upland disposal requires that the following considerations be met prior to placement:

- Material must be tested for hazardous constituents, under requirements specified in the Resource Conservation and Recovery Act (RCRA), and outlined in 40 CFR Part 261, Toxicity Characteristic Leaching Procedure (TCLP). If test results show that the material is hazardous, it must be disposed of as a hazardous waste and cannot be placed at an upland site in Hawaii.

- If TCLP results are negative, the material is considered inert fill or solid waste, and is regulated under City grading ordinances or by the DOH Office of Solid Waste Management (OSWM), respectively.

Inert fill is regulated under City grading ordinances, and is not considered solid waste. It could include materials such as clean concrete.

The DOH OSWM has three categories for solid waste materials: inert waste, construction and demolition waste, and municipal solid waste. The disposal or use of inert waste[120] will be considered based on its (site-specific) environmental risk, which will determine the level of environmental protection needed. Environmental protection includes the use of siting criteria, design requirements such as liners, monitoring requirements such as groundwater, and closure/post-closure care requirements. Typically, landfills also require Notice to Deed documents

[120] "Inert wastes" means wastes which are limited to earth and earth-like products, concrete, cured asphalt, rock, bricks, and material which will not cause a leachate of environmental concern. (HAR 11-58.1-03)

that notify future users and owners of the past history of the site. DOH OSWM is in the process of defining the standards for inert fill and inert waste.[121]

Under existing solid waste regulations (HAR 11-58.1), inert waste landfills are permitted by rule. Requirements of this permit include written notification of the activity 30 days prior to commencement; no acceptance of hazardous waste; nuisance controls; fire prevention and emergency response plans; facility secured and supervised; and an annual report submitted to the Director of Health.

For the Ala Wai Canal Dredging project, TCLP testing of sediment that may be placed at an upland location has been completed, with input from the DOH Solid and Hazardous Waste Branch (SHWB) on the sampling approach. Findings are negative, indicating that the material would be regulated as an inert solid waste. The final report documenting the testing results has been submitted to the DOH SHWB, which has turned over the case to the OSWM. The OSWM has indicated that it may set interim standards for this project. It has also noted that the existing SMF permit does not include conditions to accept dredge spoils for disposal, so a permit modification or new solid waste permit for that purpose would be needed. Permit application would occur after the EA process is completed.

5.2.16 SMA

Chapter 25, Revised Ordinances of Honolulu (1990), defines requirements for activities within Special Management Areas (SMAs). The City and County of Honolulu, Department of Land Utilization (DLU), has jurisdiction over SMAs. Any "development," as defined by statute, including grading or stockpiling of earth, within a SMA would require a SMA Use Permit (SMP). The SMP requires that an EA be submitted with the application to allow DLU to assess the effects of the proposed project on the SMA. Depending on the extent of the anticipated impacts and project cost, a minor or a full (or major) SMP will be issued. Final approval is granted by the City Council.

The Ala Wai Canal is not within a SMA, which is *makai* of Ala Moana Boulevard. Magic Island is within the SMA that is *makai* of Ala Moana Boulevard. All potential upland placement sites are also within SMAs. Therefore, use of Magic Island and of the Reef Runway, or another upland site, would be subject to SMA permit requirements. Consultation with DLU indicates that use of Magic Island will require an SMP, and the SMF at the Reef Runway will require a major SMP.[122] Permit applications, where necessary, will occur after the EA process is completed.

5.2.17 Shoreline Setback

Chapter 23, Revised Ordinances of Honolulu (1990), defines requirements for activities within the shoreline setback (40 feet from certified shoreline) area. Activities within the shoreline setback, including grading or stockpiling of earth, require a shoreline setback variance, which is administered by the City DLU. The shoreline setback variance application can be submitted with the SMP application, accompanied by an EA for the proposed project. Final approval is granted by the City Council. This application will be submitted after the EA process is completed.

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121 Comment letters received via electronic mail from Gary Siu of DOH OSWM dated June 5, 1998 (see Appendix H).

122 Comment letter from the City Department of Land Utilization dated June 3, 1998 (see Appendix H).

5.3 AGENCIES, CITIZEN GROUPS, AND INDIVIDUALS CONSULTED

As discussed in Section 5.2, the SHPO, USFWS, and NMFS were consulted, as required under Section 106 of the National Historic Preservation Act and Section 7 of the Endangered Species Act, respectively. In addition, to meet the requirements of Section 4(f), the City DPR was consulted regarding use of park lands for work support areas. Consultation letters and responses are contained in Appendix G.

As discussed in Chapter 1, input from the AWG, TAG, and the general public was solicited during the conceptual design and environmental assessment process. The draft EA was available for public comment from May 8, 1998 to June 8, 1998, the 30-day comment period for this process. Announcement of EA availability appeared in the Honolulu Advertiser and the Honolulu Star-Bulletin on May 7 and 8, 1998 and in the Office of Environmental Quality Control's (OEQC) bulletin (*The Environmental Notice)* issue dated May 8, 1998.

Two public meetings were held during development of the EA. The first meeting was held on January 22, 1998 to announce the commencement of the EA process and to solicit public comment on potential impacts of the proposed action. The second meeting was held during the 30-day comment period on June 2, 1998. Comments during the second meeting resulted in additional information on potential contaminant leaching at the upland disposal site and recreational schedule information being included in the EA.

Meetings were held with the AWG on February 3, 1997, February 12, 1998, and June 5, 1998. At the first and second meetings, project scope and project component options, respectively, were discussed. At the third meeting, alternatives presented in the draft EA were covered, and AWG concerns about the alternatives and potential impacts were discussed. Based on input received during the first AWG meeting, the dredge limits considered were extended to include the portion of the Ala Wai Canal from the Ala Moana Boulevard Bridge to the McCully Street Bridge. Meetings were held with the TAG on May 22, 1997 and January 9, 1998. Topics discussed at these meetings were sediment sampling and analysis and project component options.

Rosters of the AWG and TAG are in Appendix F. This appendix also contains the current mailing list of public interest groups and individuals. Entities on this list were informed of the first and second public meetings. The 30-day comment period for the draft EA closed on June 8, 1998. Thirty-one comment letters had been received as of July 29, 1998. These letters and associated response letters are contained in Appendix H. Consultations through July 29, 1998 as related to this EA are listed in chronological order and summarized in Table 5-1.

TABLE 5-1: SUMMARY OF CONSULTATIONS

Entity Consulted	Date	Items Discussed
Agency Working Group (AWG)	2/3/97	Held AWG Meeting #1 (Kickoff).
State Department of Land and Natural Resources (DLNR), Historic Preservation Division	2/3/97 1/28/98	Anticipates no effect from dredging unless structures (walls, bridges) are affected. Presence/absence of historic sites at upland sites.
National Marine Fisheries Service	2/3/97, 5/11/98, 8/6/98, 8/24/98, 9/2/98	Main concern is actual dredging operations; retain as much material at the site without off-shore flow.
U.S. Army Corps of Engineers (ACOE)	2/19/97 3/5/97	Request to be Cooperating Agency (see Appendix G). Response that ACOE will participate as a cooperating agency (see Appendix G).
U.S. Environmental Protection Agency, Region IX (EPA) ACOE	3/3/97	Sampling and analysis plan (draft) for sediment chemistry testing of Areas 2, 3, and 4.
Technical Advisory Group (TAG)	5/22/97	Held TAG Meeting #1.
EPA ACOE	6/10/97	Results of sediment chemistry testing of Areas 2, 3, and 4.
State Department of Transportation (DOT), Harbors Division	7/16/97	DOT concerns and potential use of sites for upland processing and placement.
DLNR, Land Division	7/16/97	Potential sites for upland processing and placement.
City and County Department of Public Works (DPW), Refuse Division	7/16/97	Possible use of landfills and other sites for upland processing and placement.
DLNR, Boating and Ocean Recreation Division	7/25/97, 3/2/98	Concerns regarding dredging operations; possible barge mooring locations.
DOT, Airports Division	8/5/97 to present	Possible use of DOT sites for upland processing and placement.
DLNR, State Parks Division	8/6/97	Possible use of state parks for upland processing and placement.
Campbell Estate	8/13/97	Possible use of Campbell Estate lands for upland processing and placement.
City and County Department of Parks and Recreation	8/19/97, 1/8/98, 1/22/98, 2/6/98, 6/24/98	Possible use of shore-side areas for dredging support activities.
State Department of Health (DOH), Environmental Management Division	9/10/97, 9/16/97, 9/18/97	Regulatory issues regarding upland processing and placement.
DOH, Solid and Hazardous Waste Branch	10/9/97, 10/31/97	Testing for upland placement.

Table 5-1 (*continued*):

Entity Consulted	Date	Items Discussed
EPA ACOE	10/10/97	Sampling and analysis plan (draft) for sediment chemistry testing of Area 1.
Public	1/22/98	Held Public Meeting #1.
EPA ACOE	1/23/98	Results of sediment chemistry testing of Area 1.
AWG	2/12/98	Held AWG Meeting #2.
DPW	2/26/98	Possible use of Waipahu Ash Landfill for upland processing and placement.
TAG	1/9/98	Held TAG Meeting #2.
ACOE	3/18/98	Project status and developments.
U.S. Coast Guard	3/26/98, 4/23/98, 6/9/98	Navigation issues.
U.S. Fish and Wildlife Service	3/27/98	Common moorhen.
Public	6/2/98	Held Public Meeting #2.
AWG	6/5/98	Held third meeting, to discuss the draft EA and component options.
Kalihi-Palama Neighborhood Board (#15)	7/15/98	Presentation at neighborhood board meeting regarding upland placement at Reef Runway and Sand Island.
Waipahu Neighborhood Board (#22)	8/20/98	Presentation at neighborhood board meeting regarding upland placement at Waipio Peninsula.

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APPENDICES

APPENDIX A
Regulatory Documentation and Conceptual Design

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

MEMORANDUM FOR THE RECORD

DATE: August 5, 1998

FROM: Allan Ota
Dredging and Sediment Management Team
Wetlands and Sediment Management Office (WTR-8)

TO: Alan Everson
U.S. Army Corps of Engineers
Honolulu District

SUBJECT: EPA Region IX Comments on Sediment Testing Results for the Ala Wai Canal Dredging Project - Sediment Chemistry

This memorandum provides additional detail regarding EPA Region IX's suitability determinations for ocean disposal to date of the sediment chemistry testing results for the above referenced dredging project. Suitability determinations for ocean disposal have been discussed in previous meetings (June 1997, February 1998) and summarized by Belt-Collins.

As you know already, the Ocean Dumping Program (EPA Ocean Dumping Regulations at 40 CFR Parts 220-228, and national and regional guidance) encompasses a tiered, weight of evidence approach for providing determinations of suitability for ocean disposal. While it is customary to consider full Green Book testing (i.e., Tier 3--including acute toxicity tests and bioaccumulation tests) for any urbanized harbor sediments (previously untested under Green Book requirements) proposed for ocean disposal, our determinations here were based on a limited amount of data (sediment chemistry only) because of the project proponent's desire to initially limit the amount of testing during this phase of the project. Our screening approach provided one of three possible determinations: (1) suitable for ocean disposal because sediment chemistry values are generally lower than concentrations known to be associated with adverse acute or chronic effects; (2) potential for adverse acute or chronic - full Tier 3 testing required to provide a weight of evidence determination; or (3) unsuitable for ocean disposal because sediment chemstry values are generally at or exceed concentrations known to be associated with adverse acute or chronic effects.

EPA Region 9's screening determinations are based on singular chemical concentrations associated with known adverse acute or chronic effects (Region 9-wide experience). Keep in mind that contamination involving more than one chemical compound (as seen in Ala Wai Canal sediments) increases the potential of synergistic

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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
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75 Hawthorne Street
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EPA Region 9's screening determinations are based on singular chemical concentrations associated with known adverse acute or chronic effects (Region 9-wide experience). Keep in mind that contamination involving more than one chemical compound (as seen in Ala Wai Canal sediments) increases the potential of synergistic

interaction related to adverse acute or chronic effects. Any uncertainties involving the use of this screening approach would be resolved by performing full Greenbook Tier 3 testing, as required by EPA Ocean Dumping Regulations. Furthermore, the use of full Green Book testing for Hawaii sediments would provide valuable information for developing a Hawaii-specific (regional) database that could be used to determine Hawaii-specific sediment chemistry screening criteria.

GENERAL COMMENTS--

1. The current collection of sediment chemistry represents the best set of data, collected to date, and provides Tier 1 information for the sediments within the proposed project area as defined by the project proponents.

2. As such, this data allows EPA Region 9 to make recommendations for preparation of any appropriate Tier 3 sampling and analysis plan for additional testing, as well as providing Tier 1 (sufficient) assessments on certain portions of the project area without further testing.

3. A more complete, weight of evidence determination would be possible by implementing full Green Book (Tier 3) bioassay and bioaccumulation tests on sediments that are not clearly suitable for ocean disposal based on our screening determinations.

4 Generally, we have determined a high probability that a large portion of the sediments could be unsuitable for ocean disposal based on our screening determinations. There are portions of these sediments that may pass full Green Book (i.e., Tier 3) testing as well as portions that are likely to fail.

5. As indicated in earlier meetings, the Ala Wai proponents must seriously consider the need for an alternative disposal site.

SPECIFIC COMMENTS/DETERMINATIONS--

1. The detection limits for a number of compounds, such as chlordane and toxaphene, are unacceptably high. Chemicals with high detection limits which are listed as non-detects cannot be eliminated as contaminants of concern. Corrective actions for any additional testing are necessary.

2. High detection limits/non-detects aside, the contamination level for many compounds is relatively high for many of the locations sampled.

3. Refer to attached summary table of sediment chemistry for sampled areas as you read through the following determinations.

4. Polygons represented by 1-1, 1-2, and 1-3 appear to be unsuitable for ocean disposal based on high levels of contaminants. Of particular concern are (in various combinations) mercury, organotins, PCBs, and PAHs. Further testing may not be warranted.

5. Polygons represented by 1-4, 1-5, 1-6 top, 1-6 bottom, 1-7, and 1-8 cannot be determined suitable for ocean disposal based on the elevated sediment chemistry alone, and would require Tier 3 testing. Of particular concern are high levels (singularly, or in various combinations) of mercury, organotins, PCBs, and PAHs.

6. Polygons represented by sampling locations 2A-1 and 2A-2 are suitable for ocean disposal based on sediment chemistry, and would not require additional testing.

7. High levels of contaminants, including chlordane, PCBs, and PAHs, were found in the areas represented by 2A-3, 2A-4, and 2A-5. These areas would require additional (higher resolution) testing to determine suitability for ocean disposal of additional material by identifying hotspots of contamination.

8. Similaryly, high levels of the same general contaminants were found in the areas represented by 2B-1, 2B-2, 2B-3, 2B-4, and 2B-5. These areas would require additional (higher resolution) testing to determine suitability for ocean disposal of additional material by identifying hotspots of contamination.

9. Polygons represented by sampling locations 3-1 and 3-2 are suitable for ocean disposal based on sediment chemistry, and would not require additional testing.

10. Polygons represented by 3-3 should not be tested any further; EPA suggests that any funds for additional testing could be better spent for the establishment of alternatives to ocean disposal (i.e., upland disposal). There are high levels of contaminants in general for the area represented by 3-3. Chlordane, in particular, is a concern in the area incorporating 3-3 because the TBP calculation shows that chlordane would be above the FDA action limit for tissues.

11. Polygons represented by sampling locations (and down to sampling depth) in Area 4 are suitable for ocean disposal based on sediment chemistry, and would not require additional testing.

Attachment (Ala Wai Canal sediment chemistry table - 6 pages)

Ala Wai Canal Dredging
Conceptual Design and Environmental Assessment
COMMENTS FROM EPA/ACOE ON SEDIMENT CHEMISTRY RESULTS - Summary

Date:	Tuesday, June 10, 1997
Time:	10:30 a.m. - 12:00 noon
Location:	Belt Collins Hawaii Conference Room 2A
Purpose:	Discuss EPA and ACOE comments on Sediment Chemistry Results
Attendees:	ACOE - Kathy Dadey; DTS - Lois Chong, Faith Miyamoto; Belt Collins - John Goody, Molly Kihara
Via conference call:	EPA - Janet Hashimoto, Brian Ross, Allan Ota; MEC Analytical Systems - John Hardin

U.S. Environmental Protection Agency (EPA) and U.S. Army Corps of Engineers (ACOE) staff were sent for review and comment the Draft Sediment Chemistry Laboratory and Data Report dated May 30, 1997. The same report was packaged as the Sediment Chemistry Field Trip Report and Sediment Chemistry Laboratory and Data Analysis, dated May 30, 1997, for distribution to project proponent agencies. A conference call was held to discuss the results and findings in the report. This summary addresses points discussed during the conference call.

1. Project Update

The State Legislature has appropriated funds for dredging the portion of the Ala Wai Canal from McCully Street Bridge to the Ala Wai Boat Harbor. The State Department of Land and Natural Resources will try to expedite the release of funds to amend Belt Collins' current contract. The timing of funds release and integration with work in progress is to be determined.

2. Comments from EPA/ACOE on the Sediment Chemistry Report

In general, EPA and ACOE do not agree with the MEC characterization of the sediment as homogeneous and having low probability of failing the tests for ocean disposal; however, there is enough information to go forward in the permitting and testing process. The following paragraphs summarize the EPA and ACOE comments on each area.

Area 4

Cores in Area 4 did not reach project depths due to the presence of cobbles and rocks that the vibracore was unable to penetrate. The bulk of fine material was in the bottom portion, as described by MEC. Existing data adequately characterize the upper layer (to approximately 3 feet). There is not enough information to characterize the deeper sediments, which consist of a finer silt. The organic content is higher in the upper reaches of the Manoa-Palolo Drainage Canal (Stations 4-3 and 4-4) than at lower stations. From existing samples, it is not clear whether the lower layers are suitable for ocean disposal. The lower layers at Stations 4-

1, 4-2, and 4-4 need further characterization if these sediments are proposed for dredging and ocean disposal. The upper layer is well-characterized and is suitable for ocean disposal based on Tier I evaluation and no further testing is necessary.

If only the upper three feet are dredged and a transition needs to be made from -10' MSL in the Ala Wai Canal to the Manoa-Palolo Drainage Canal, at least one sample from the deeper layer within the transition area would be needed.

Area 2

Tier I evaluation of sediments in the vicinity of Stations 2A-1 and 2A-2 indicate that they are suitable for ocean disposal without further testing.

Between Stations 2A-3 and 2A-5 (shoal area), there is no pattern that indicates the lower layers are "cleaner" than the top, or vice versa. This area is of concern, because of elevated concentrations of lead, chlordane, PAHs, and possibly PCBs. Based on these concentrations, EPA believes that at least some part of this area will be determined unsuitable for ocean disposal in Tier III. To maximize the identification of suitable material, EPA and ACOE recommend that four Tier III biological testing samples be taken in this particular area, from the tops and bottoms of two composites, with each sample representing one quarter of the total volume of this area.

Area 3

The limited volume of sediment in the vicinity of Stations 3-1 and 3-2 has been determined suitable for ocean disposal based on a Tier I evaluation. The EPA-calculated theoretical bioaccumulation potential (TBP) for chlordane at Station 3-3 is above the Food and Drug Administration (FDA) action level; bioaccumulation testing results above FDA action levels fail on suitability for ocean disposal. It is recommended that Tier III testing not be pursued and an upland disposal site be found for the sediment associated with Station 3-3.

Summary

Chlordane levels are very high in some core samples. Chlordane is not the only problem (metals and possibly PCBs are also of concern). Only two stations (2B-1 and 3-3) showed high PAH levels, near identifiable sources. Ammonia and sulfide adjustments will be necessary for biological testing.

Other

There are concerns regarding the attained detection limits for PCBs, toxaphene, and chlordane. For PCBs, the attained method reporting limit (MRL) of 50 μg/kg is higher than the target MRL of 10 μg/kg. Because of the high MRL, PCBs cannot be eliminated as a parameter for bioaccumulation testing. For toxaphene, why was the attained MRL 300 μg/kg (target MRL is 20 μg/kg)? [Note: Upon checking with Columbia Analytical Services, MEC reports that the interference appeared to be due to chlorinated compounds that are not part of the test list and were not identifiable.] If it is possible to re-test the archived samples, DDT readings should be ignored if they are causing interference. For chlordane, a MRL of 100 μg/kg is high, but the fact that 10 of the 19 samples exhibited concentrations greater than 100 μg/kg is of greater concern.

The MEC statement regarding contamination levels causing biological effects less than 50 percent of the time does not translate into a 50 percent likelihood of passing. Long and Morgan's work is not really empirically-based but rather is an accumulation of end-points. EPA and ACOE prefer more empirically-based criteria such as Apparent Effects Thresholds (AETs).

Further refinement of the 'hot spot' at Station 3-3 would require gradients of samples, taken on a grid, on the margins and down the center. Even with a reduced suite of analytes, the same chemicals of concern at Station 3-3 would need to be included. More than six samples would be necessary (10 to 12 would be okay). The options of push core sampling could be explored.

Belt Collins noted that further investigation of the channel labeled as a storm drain at Station 3-2 found it is not connected to the storm drain system. This is consistent with the sediment chemistry results at this station.

3. Specific Comments and Recommendations

Overall this is the best chemical data set that exists for the Ala Wai Canal. EPA and ACOE recommend taking the approach that some of the sediments will likely fail ocean disposal criteria.

Based on the Sediment Chemistry results, it appears that there will be some material unsuitable for ocean disposal in the major shoal area (Stations 2A-3 to 2B-5). Due to the large quantity of dredging in this area, EPA and ACOE strongly suggest reconsidering the next step in the project. Rather than spending more money on testing, EPA and ACOE recommend refocusing efforts on other alternatives, such as upland disposal. There may be a site that could accommodate the entire volume.

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Ala Wai Canal Dredging
Conceptual Design and Environmental Assessment
COMMENTS FROM EPA ON SEDIMENT CHEMISTRY RESULTS
- Summary

Date:	Friday, January 23, 1998
Time:	11:20 a.m. - 12:00 noon
Location:	Belt Collins Hawaii, Conference Room 2A
Purpose:	Discuss EPA comments on Sediment Chemistry Results for Area 1
Attendees:	DTS - Marvin Char, Lois Chong; DLNR - Zosima Agraan; Belt Collins - Molly Kihara
Via conference call:	EPA - Allan Ota; MEC Analytical Systems - John Hardin

The purpose of this conference call was to discuss sediment chemistry results for samples collected from Area 1, the downstream end of the shoal in Area 2, and the transition in Area 4 between the Ala Wai Canal and the Manoa-Palolo Drainage Canal.[a] The results are presented in *Ala Wai Canal Conceptual Design and Environmental Assessment, Dredge Sediment Characterization, Sediment Chemistry Field Trip Report and Sediment Chemistry Laboratory and Data Report*, dated December 29, 1997. Copies of the report were provided to the U.S. Environmental Protection Agency (EPA) and intended for review by the U.S. Army Corps of Engineers (ACOE). However, due to recent staffing changes at ACOE, only EPA was in a position to discuss their review comments.

In a previous conference call with EPA and ACOE on June 10, 1997, sediment chemistry results for samples collected in April 1997 were discussed (see conference call summary dated October 6, 1997). Sediment determined suitable for ocean disposal were represented by Stations 2A-1, 2A-2, 4-1 through 4-4, 3-1, and 3-2.

1. Area 1

Generally, EPA was hopeful that Area 1 would be "cleaner" than Areas 2 and 4. However, chemical levels overall were in the "gray area" such that suitability for ocean disposal could not be determined based on the sediment chemistry results.

- EPA recommended that the following Stations may not be worth Tier III testing due to likelihood of failure: 1-2, 1-3, possibly 1-1, 1-6B, and 2A-5. 1-2 and 1-3 are of concern due to mercury levels greater than 0.5 parts per million (ppm), PCBs, and chlordane. 1-1 is of concern because of butyltin levels.

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[a]

Area	Location
1	Ala Wai Canal from Ala Moana Boulevard Bridge to McCully Street Bridge
2	Ala Wai Canal from McCully Street Bridge to upstream of the Manoa-Palolo Drainage Canal confluence
3	Ala Wai Canal from upstream of the Manoa-Palolo Drainage Canal confluence to the Kapahulu end
4	Manoa-Palolo Drainage Canal from Ala Wai Canal to Date Street Bridge

- All other Stations (1-8, 1-4, 1-5, 1-6T, and 1-7) would have to go through further testing (Tier III) in order to determine if the material is suitable for ocean disposal. EPA felt that 1-6T and 1-7 could possibly pass.

2. Area 2 (downstream end of shoal)

The results at Station 2A-5 show that it cannot be approved for ocean disposal based on sediment chemistry. Therefore, the upstream boundary of the ocean-suitable portion (represented by Stations 2A-1 and 2A-2) is halfway between Stations 2A-2 and 2A-5. The downstream boundary is halfway between Stations 1-7 and 2A-1 (downstream side of the McCully Street Bridge).

3. Area 4 (transition)

Sediment at Station 4-5 is deemed suitable for ocean disposal based on the sampling results. Because vibracore penetration of the sediment was limited at some locations in Area 4 due to the presence of large rocks, EPA determined that ocean disposal of sediments dredged to B8 feet MSL was acceptable. EPA also advised against over-dredging. The transition from a B10 feet MSL dredge depth in the Ala Wai Canal can begin in the Manoa-Palolo Drainage Canal, with a transition depth of B9 feet MSL. This determination was based on the penetrations listed below.

Core Location	*Water depth (feet Mean Sea Level [MSL]) + Core length (feet)*
4-5	9
4-1	6.8
4-2	7.6
4-3	11.1
4-4	4.9

4. Other

EPA inquired as to the status of pursuing upland disposal sites. Upland sites are being investigated. There remains the possibility of performing Tier III sampling and analysis during the final design phase of the dredging project, which might result in more sediment being determined suitable for ocean disposal.

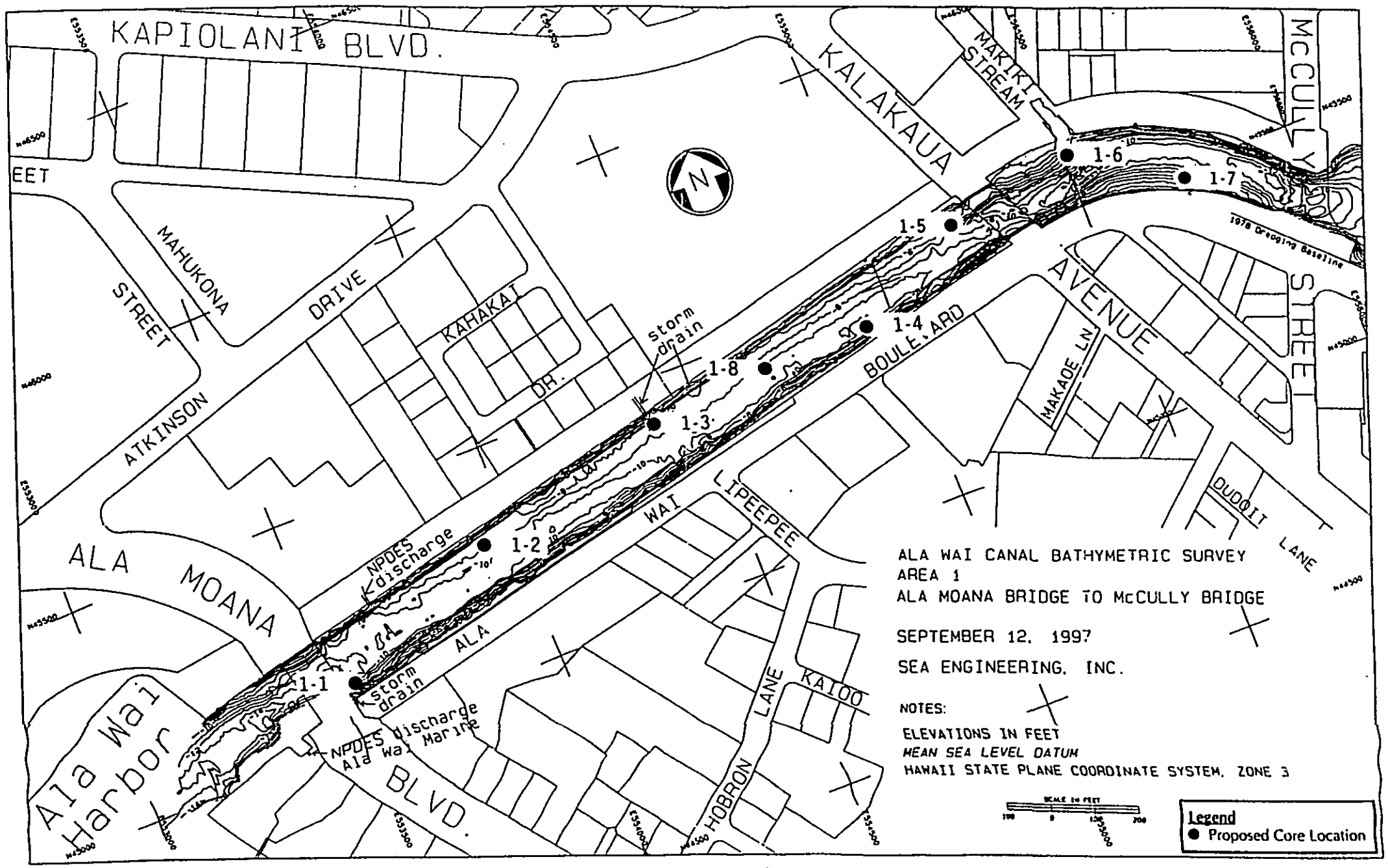

FIGURE 2.1a Sediment Sampling Locations

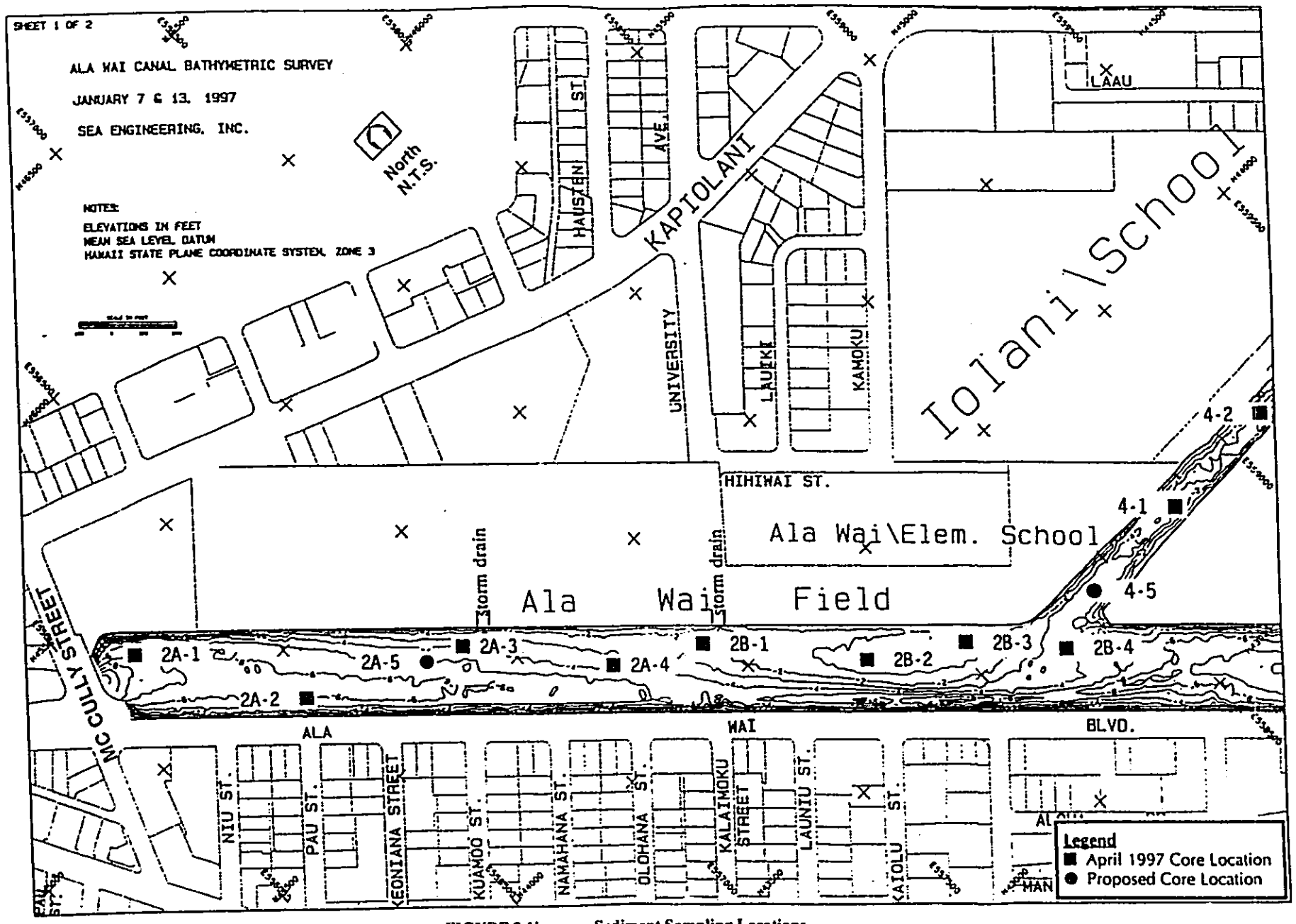

FIGURE 2.1b Sediment Sampling Locations

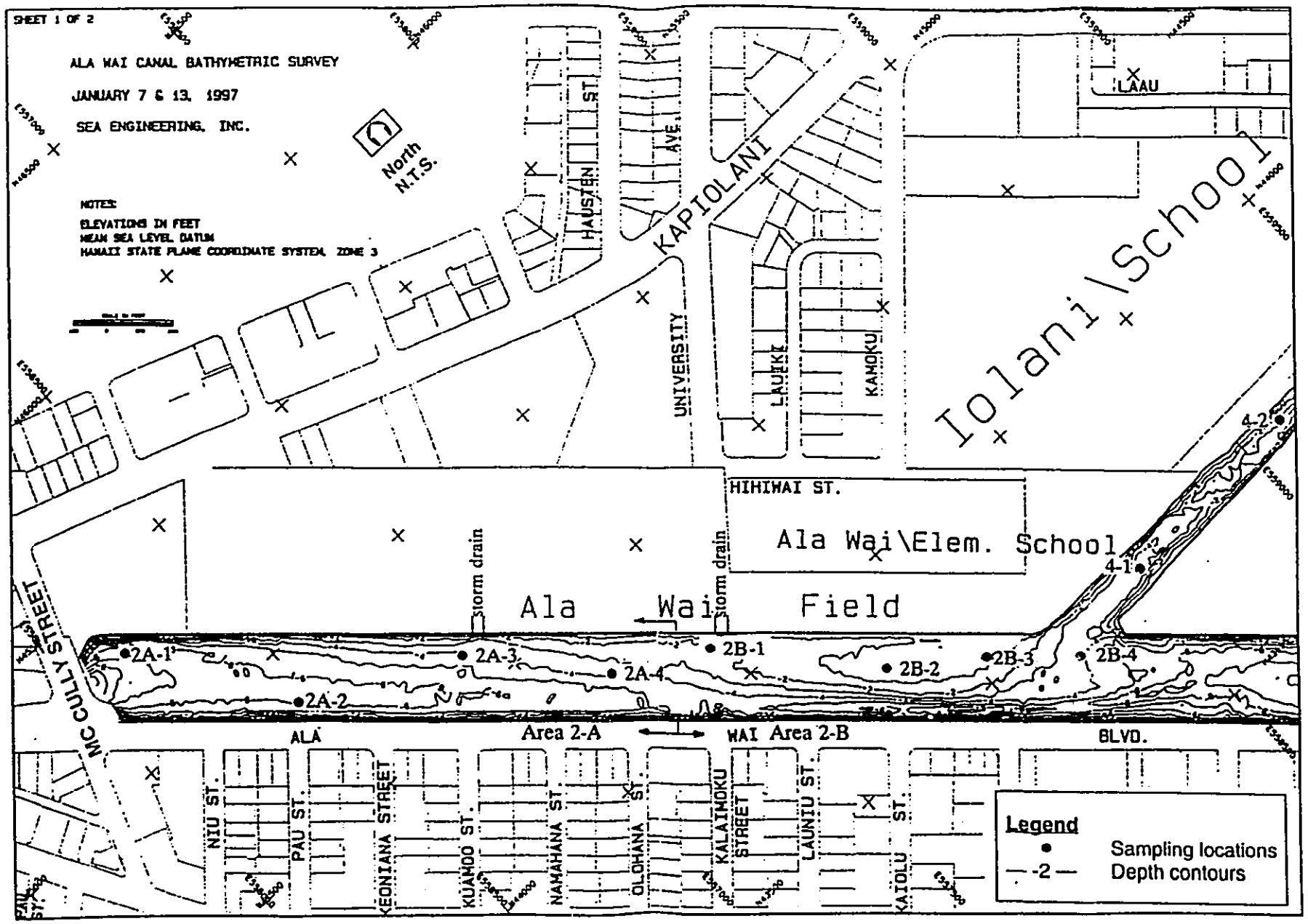

FIGURE 2.1a Sediment Sampling Locations

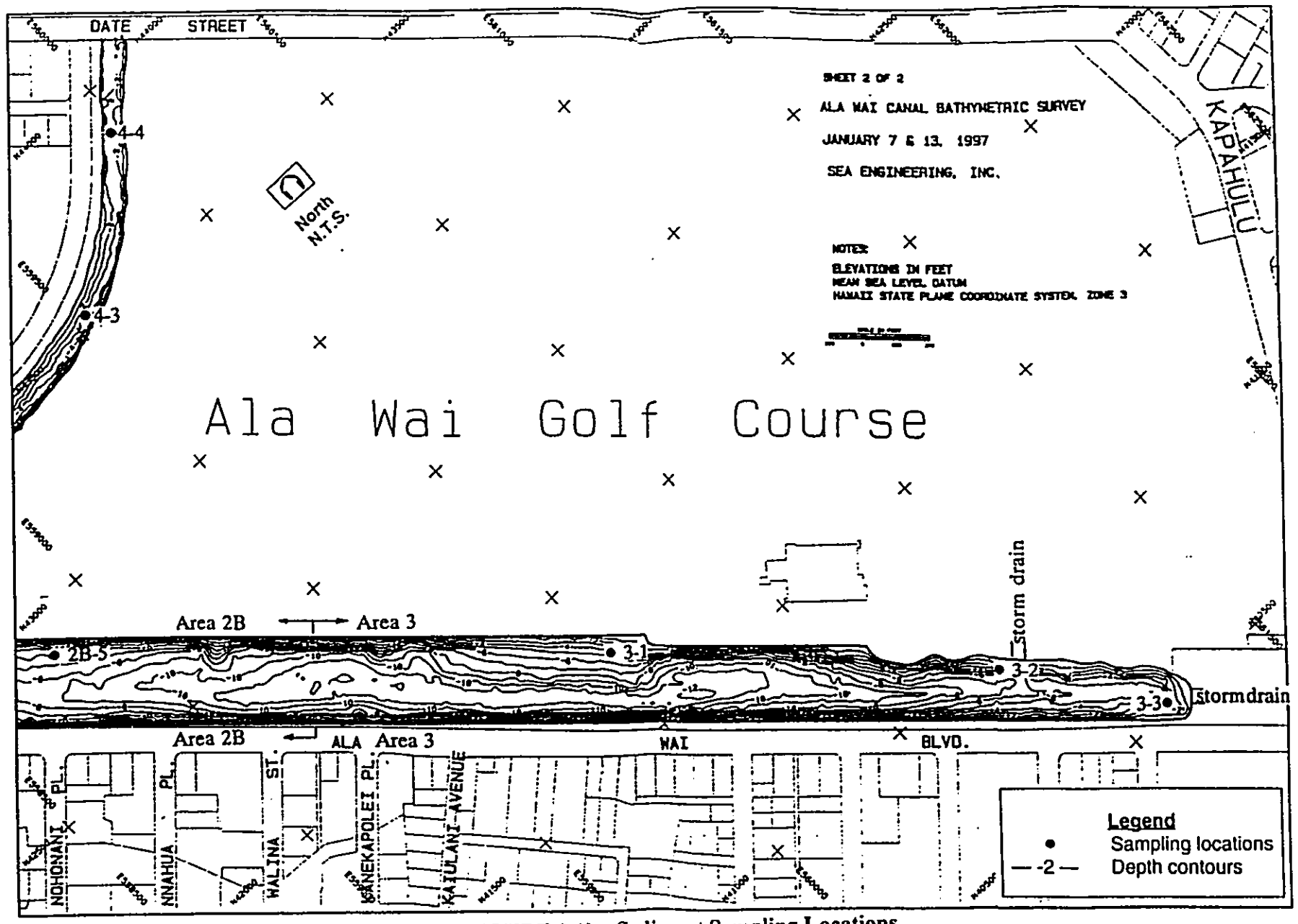

FIGURE 2.1b Sediment Sampling Locations

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Ala Wai Sediment Chemistry

AREA	1-1		Tier 3 testing required for ocean disposal option			
Lead	208	ppm				
Mercury	0.6	ppm				
Organotins	120	ppb				
Chlordane	110	ppb				
PCB	113	ppb - MRLs elevated for other aroclors				
TPAH	889	ppb				
Silt/clay	75	%				
AREA	1-2		Tier 3 testing required for ocean disposal option			
Lead	289	ppm				
Mercury	0.8	ppm				
Organotin	70	ppb				
Chlordane	230	ppb				
PCB	1230	ppb - MRLs elevated for other aroclors				
TPAH	1713	ppb				
Silt/clay	82	%				
AREA	1-3		Tier 3 testing required for ocean disposal option			
Lead	185	ppm				
Mercury	0.6	ppm				
Organotins	68	ppb				
Chlordane	140	ppb				
PCB	180	ppb - MRLs elevated for other aroclors				
TPAH	1356	ppb				
Silt/clay	68	%				
AREA	1-4		Tier 3 testing required for ocean disposal option			
Lead	182	ppm				
Mercury	0.7	ppm				
Organotins	14	ppb				
Chlordane	28	ppb				
PCB	116	ppb - MRLs elevated for other aroclors				
TPAH	1350	ppb				
Silt/clay	69	%				
AREA	1-5		Tier 3 testing required for ocean disposal option			
Lead	66	ppm				
Mercury	ND	ppm				
Organotins	34	ppb				
Chlordane	33	ppb				
PCB	47	ppb - MRLs elevated for other aroclors				
TPAH	203	ppb				
Silt/clay	32	%				

Ala Wai Sediment Chemistry

AREA	1-6 Top		Tier 3 testing required for ocean disposal option			
Lead	175	ppm				
Mercury	0.2	ppm				
Organotins	24	ppb				
Chlordane	48	ppb				
PCB	114	ppb - MRLs elevated for other aroclors				
TPAH	679	ppb				
Silt/clay	14	%				
AREA	1-6 Bottom		Tier 3 testing required for ocean disposal option			
Lead	150	ppm				
Mercury	0.2	ppm				
Organotins	25	ppb				
Chlordane	90	ppb				
PCB	142	ppb - MRLs elevated for other aroclors				
TPAH	551	ppb				
Silt/clay	15	%				
AREA	1-7		Tier 3 testing required for ocean disposal option			
Lead	134	ppm				
Mercury	0.9	ppm				
Organotins	23	ppb				
Chlordane	52	ppb				
PCB	210	ppb - MRLs elevated for other aroclors				
TPAH	656	ppb				
Silt/clay	96	%				
AREA	1-8		Tier 3 testing required for ocean disposal option			
Lead	123	ppm				
Mercury	0.3	ppm				
Organotins	22	ppb				
Chlordane	30	ppb				
PCB	84	ppb - MRLs elevated for other aroclors				
TPAH	527	ppb				
Silt/clay	78	%				
AREA	2A-1		Suitable for ocean disposal			
TPAH	921	ppb				
Silt/clay	95	%				

Ala Wai Sediment Chemistry

AREA	2A-2		Suitable for ocean disposal			
PCB	66	ppb				
TPAH	1165	ppb				
Silt/clay	92	%				
*NOTE: Chlordane boundary set between 2A-2 and 2A-3						
AREA	2A-3		Tier 3 testing required for ocean disposal option			
Chlordane	283	ppb				
PCB	72	ppb				
TPAH	1769	ppb				
Silt/clay	95	%				
AREA	2A-4		Tier 3 testing required for ocean disposal option			
Chromium	223	ppm				
Zinc	269	ppm				
Nickel	169	ppm				
Chlordane	527	ppb				
TPAH	2065	ppb				
Silt/clay	81	%				
AREA	2A-5		Tier 3 testing required for ocean disposal option			
Organotins	39	ppb				
Chlordane	180	ppb				
PCB	270	ppb - MRLs elevated for other aroclors				
TPAH	1045	ppb				
Silt/clay	95	%				
AREA	2B-1 Top		Tier 3 testing required for ocean disposal option			
Chromium	202	ppm				
Nickel	165	ppm				
Chlordane	379	ppb				
TPAH	11102	ppb				
Ammonia	33	mg/l				
Silt/clay	93	%				
AREA	2B-1 Bottom		Tier 3 testing required for ocean disposal option			
Lead	224	ppm				
Chlordane	150	ppb				
PCB	63	ppb				
TPAH	1954	ppb				
Ammonia	64	mg/l				
Silt/clay	93	%				

Ala Wai Sediment Chemistry

AREA	2B-2		Tier 3 testing required for ocean disposal option			
Chromium	227	ppm				
Lead	285	ppm				
Nickel	177	ppm				
Chlordane	310	ppb				
PCB	101	ppb				
TPAH	1348	ppb				
Ammonia	57	mg/l				
Silt/clay	64	%				
AREA	2B-3 Top		Tier 3 testing required for ocean disposal option			
Chlordane	403	ppb				
TPAH	1972	ppb				
Ammonia	33	mg/l				
Silt/clay	76	%				
AREA	2B-3 Bottom		Tier 3 testing required for ocean disposal option			
Chromium	208	ppm				
Lead	316	ppm				
Nickel	179	ppm				
Chlordane	557	ppb				
PCB	88	ppb				
TPAH	2521	ppb				
Silt/clay	87	%				
AREA	2B-4 Top		Tier 3 testing required for ocean disposal option			
Organotin	64	ppb				
Chlordane	391	ppb				
TPAH	2479	ppb				
Silt/clay	53	%				
AREA	2B-4 Bottom		Tier 3 testing required for ocean disposal option			
Lead	310	ppm				
Chlordane	144	ppb				
PCB	81	ppb				
TPAH	1052	ppb				
Ammonia	45	mg/l				
Silt/clay	89	%				

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Ala Wai Sediment Chemistry

AREA	2B-5		Tier 3 testing required for ocean disposal			
Lead	329	ppm				
PCB	61	ppm				
Chlordane	0	ppb				
TPAH	798	ppb				
Ammonia	33	mg/l				
Silt/clay	99	%				
AREA	3-1		Suitable for ocean disposal			
No indicators						
Silt/clay	62	%				
TOC	5.2	%				
AREA	3-2		Suitable for ocean disposal			
Mercury	0.97	ppm				
TPAH	371	ppb				
Silt/clay	50	%				
Salinity	28	ppt				
AREA	3-3		Unsuitable for ocean disposal			
Cadmium	1.4	ppm				
Lead	647	ppm				
Zinc	427	ppm				
Chlordane	831	ppb	867	Theoretical Bioaccumulation Potential		
PCB	183	ppb				
TPAH	8897	ppb				
Salinity	16.5	ppt				
Silt/clay	72	%				
AREA	4-1		Suitable for ocean disposal			
No indicators						
Silt/clay	8	%				
TOC	2.2	%				
AREA	4-2		Suitable for ocean disposal			
Nickel	152	ppm				
TPAH	1164	ppb				
Silt/clay	22	%				
TOC	1.8	%				
AREA	4-3		Suitable for ocean disposal			
No indicators						
Silt/clay	39	%				
TOC	6.7	%				

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Ala Wai Sediment Chemistry

AREA	4-4		Suitable for ocean disposal			
No indicators						
Silt/clay	30	%				
TOC	6.1	%				
AREA	4-5		Suitable for ocean disposal			
No indicators						
Silt/clay	30	%				
TOC	3.3	%				

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Ala Wai Canal Dredging
Conceptual Design and Environmental Assessment
DEFINITION AND EVALUATION OF ALTERNATIVES
Deliverable No. 4.2.1

1 INTRODUCTION

The City and County of Honolulu, Department of Transportation Services (DTS) has contracted with Belt Collins Hawaii to develop a conceptual design, an environmental assessment, and related documents for dredging the Ala Wai Canal. The objective of this technical memorandum is to evaluate feasible dredging project options.

At this point in the project, various components of possible dredging activities have been evaluated for its technical feasibility. These options have been summarized in Deliverable 3.2.1 - Feasibility Assessment; Deliverable 3.2.2 - Assessment of Dredge Volumes and Limits; and Deliverable 9.1.1 - Upland Disposal Study. Feasible staging area locations have been examined in the document titled, Alssues for Discussion with Department of Parks and Recreation (DPR).[1]

This technical memorandum is organized in the following manner: Section 2 - a brief discussion of technically feasible options for the six project components; Section 3 - description of the evaluation criteria for this project; Section 4 - a discussion of the pros and cons of each feasible option; and Section 5 - summary of conclusions and recommendations.

Unless otherwise noted, canal depths noted are referenced to mean sea level (MSL).

2 PROJECT COMPONENTS

Dredging activities for this project have been separated into six project components. These are briefly described and summarized in Table 1.

[1]December 19,1997. Prepared by Belt Collins Hawaii.

Table 1. PROJECT OPTIONS - SIX COMPONENTS

Component	Description
1. Limits of dredging	The horizontal and vertical aspects of dredging, including locations within the canal to be dredged, and dredging depth and width.
2. Dredge method	Means by which sediment will be removed from canal bottom.
3. Sediment transportation	How dredged materials will be transported from the canal to the various staging/ processing areas and, ultimately, to the disposal/reuse sites.
4. Work support areas	*The needed dredging-related shore-side facilities. For this project, three work* support areas will be needed: 1) a lower canal staging area, 2) an upper canal staging area, and 3) a barge mooring area. Staging areas in or near Ala Wai Canal are needed for: • Construction work area (fabricating, repair, etc. of materials and equipment) • Storage of construction materials and equipment • Temporary storage of bulky items removed from canal • Truck access and turnaround for material delivery and for daily pickup of bulky items for transport to disposal or salvage facility (one truckload per day) • Contractor's office trailer An area located near the mouth of Ala Wai Canal is needed for: • Mooring a large barge (100- to 150-feet long and 30- to 40-feet wide), with smaller support barge and boats • Activities supporting barge operations
5. Sediment processing	The supplemental processing/preparation of dredge materials, prior to transport or placement, necessary to enable beneficial use of the sediments for upland placement or other disposal. The need for sediment processing is closely related to the dredge method utilized. The primary element of this is dewatering but can also include sediment stabilization.
6. Sediment placement	Final disposal or reuse of dredged sediments. Final disposal or reuse could be into the ocean or on land.

3 TECHNICALLY FEASIBLE OPTIONS

Table 2 highlights technically feasible options for each of the 6 project components. It is noted that these options are discussed in detail in the reference documents noted in Section 1. For reference purposes, brief descriptions of the technically feasible options are provided following Table 2.

Table 2. POTENTIAL PROJECT ALTERNATIVES - COMPONENTS AND OPTIONS CONSIDERED

Component	Options
1. Limits of dredging (locations and depths)	Various combinations of dredge depths, cross sections, and dredge areas for the following areas (see Figure 1): • Area 1: Ala Wai Canal from the Ala Moana Boulevard Bridge to McCully Street Bridge. Maximum dredge depth of -12 feet. • Area 2: Ala Wai Canal from the McCully Street Bridge to Manoa-Palolo Drainage Canal. Maximum dredge depth of -10 feet. • Area 3: Ala Wai Canal from the Manoa-Palolo Drainage Canal to the Kapahulu Avenue end. Maximum dredge depth of -10 or -6 feet. • Area 4: Manoa-Palolo Drainage Canal from the Ala Wai Canal to the Date Street Bridge. Maximum dredge depth of-10 feet.
2. Dredge method	• Hydraulic • Mechanical
3. Sediment transportation	• Pipeline • Barge • Truck
4. Work support areas (see Figure 1)	• Kapahulu Avenue end of Ala Wai Canal • Ala Wai Golf Course • Ala Wai Neighborhood Park A • Ala Wai Neighborhood Park B • Ala Wai Community Park 1 • Ala Wai Community Park 2 • Vacant private parcel on Kalakaua Avenue • Magic Island
5. Sediment processing	• Gravity dewatering • Mechanical dewatering • Mechanical dewatering with additives • Placement with additives
6. Sediment placement (see Figure 2)	• South Oahu Ocean Dredge Material Disposal Site • Sand Island as fill • Reef Runway as fill • City and County Waipahu Ash Landfill as clay impermeable cover • Coral pits as fill (after barging to Barbers Point Deep Draft Harbor) • Nanakuli Construction and Demolition Material Landfill as waste (after barging to Barbers Point Deep Draft Harbor)

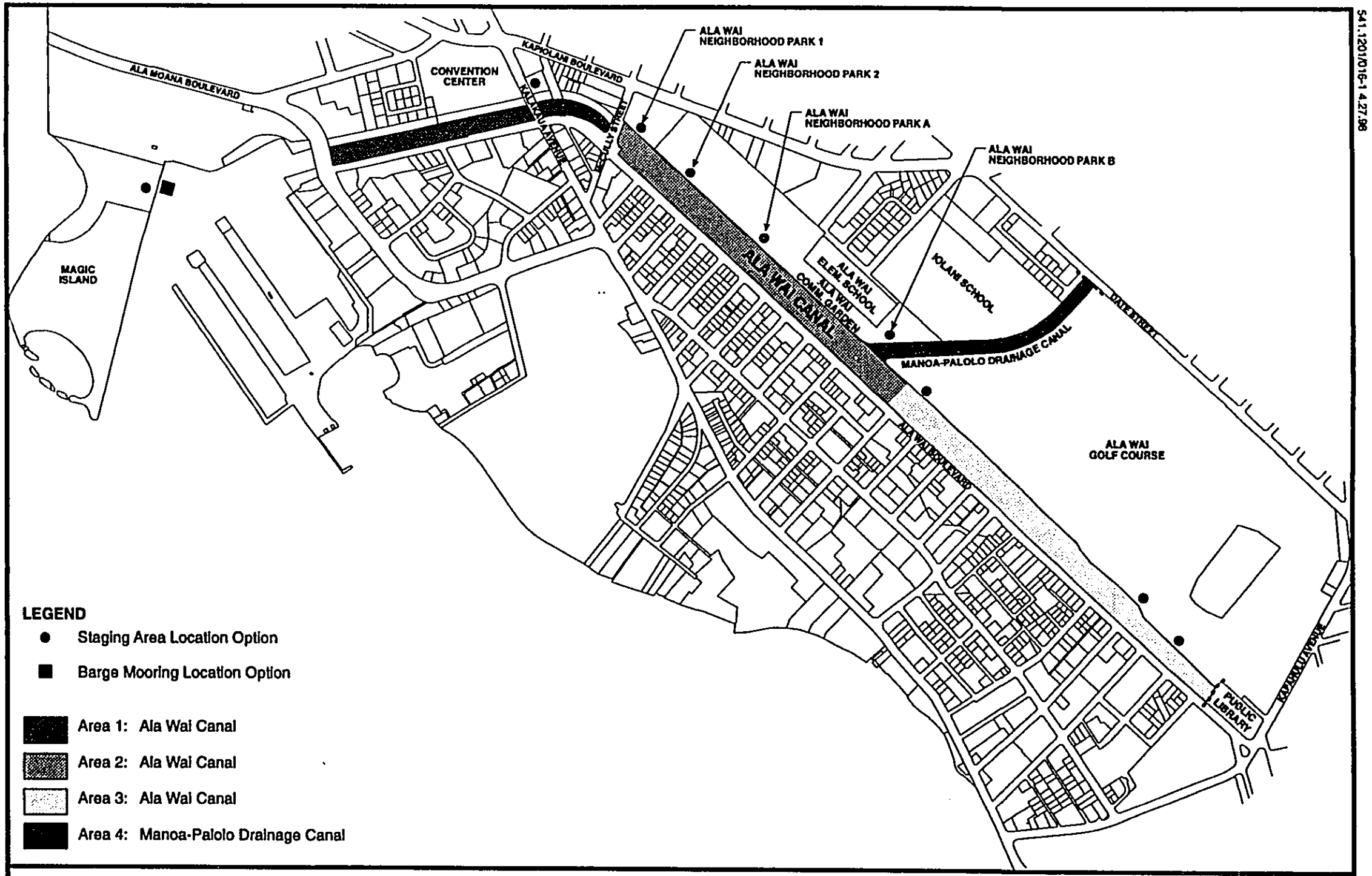


Figure 1
PROJECT SITE AND POTENTIAL WORK STAGING AREAS

Ala Wai Canal Dredging Environmental Assessment
Belt Collins Hawaii

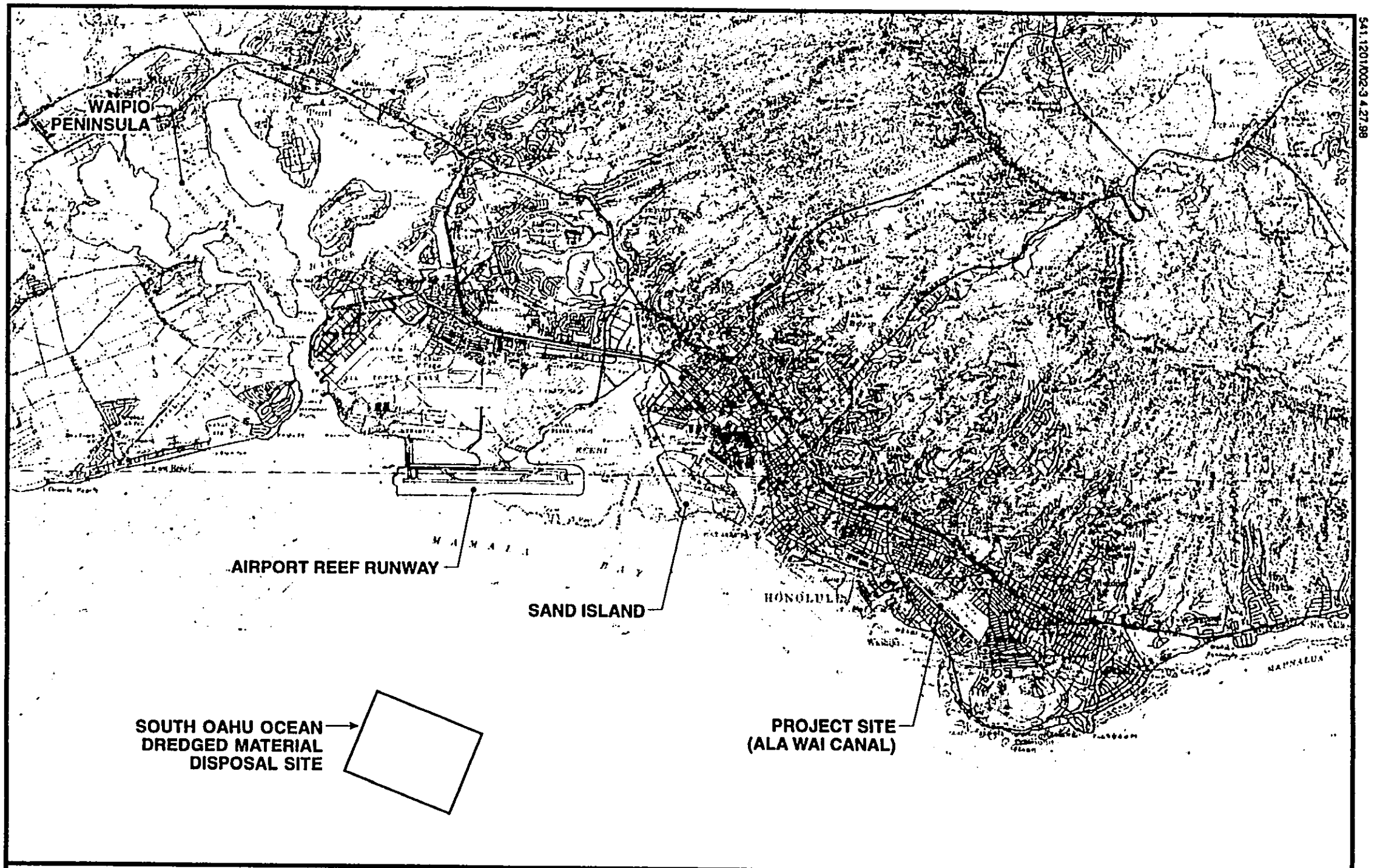


Figure 2
POTENTIAL DISPOSAL AND REUSE LOCATIONS

Ala Wai Canal Dredging Environmental Assessment
Belt Collins Hawaii

Technically Feasible Combinations

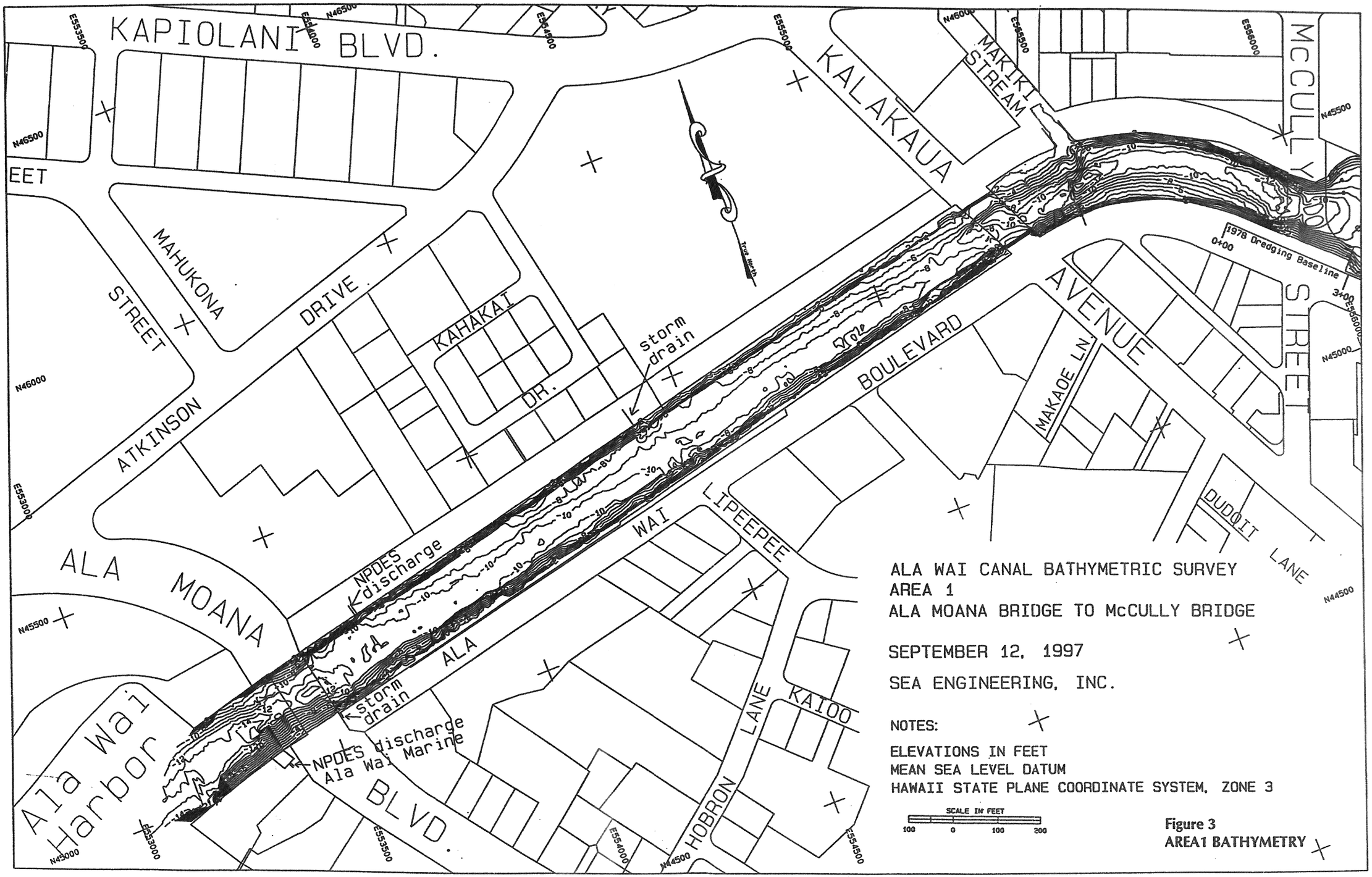
Component options highlighted in Table 2 can be combined in numerous ways to achieve successful dredging of the project site. It is noted that the selection of sediment processing method(s) are closely tied to the dredging method used and desired sediments disposal and/or reuse option(s) selected.

The extent to which dewatering activities are necessary will be affected by the type of dredge method used. Hydraulic dredging will result in a water content of as high as 80 percent of the dredged material, and will therefore require more extensive dewatering prior to placement at an upland site than would be necessary from the mechanical dredging process, which has approximately 50 percent water content.

3.1 Component 1: Dredge Limits

(Reference: Deliverable 3.2.2)

- **Area 1: Ala Wai Canal from the Ala Wai Boulevard Bridge to the McCully Street Bridge** (see Figures 1 and 3)
  - Dredge depth: -12 feet or shallower.
  - Typical cross section top and base widths: Dependent on the location of the existing coral ledges. (The location of the ledges need to be accurately identified during the design phase and the ledges should not be damaged by dredging activities.)
  - Dredge section side slopes: Maximum of 5:1 (horizontal:vertical), based on available information. (Steeper side slopes may be feasible; however, this will require additional evaluation of wall stability during the design phase.)
  - Area 1 to Area 2 transition zone: Downstream portion extends about 10 feet into Area 1 (downstream of the McCully Street Bridge). The upstream portion of the transition zone extends upstream under the McCully Street Bridge a distance of about 12 feet from the upstream side of the bridge.
  - Dredge entire section to -12 feet: Holding the 5:1 side slope and an average offset of 6 feet from the canal walls, about 8,500 cubic yards (CY) of material will be dredged from this area.
  - Dredge upper 950 feet (Makiki Stream shoal area) to -10 feet with remaining section of Area 1 dredged to -12 feet: Holding 5:1 side slope and 6-foot offset from the canal walls, about 3,000 CY of material will be removed.
- **Area 2: Ala Wai Canal from the McCully Street Bridge to the Manoa-Palolo Drainage Canal** (see Figures 1 and 4)
  - Dredge depths: -10 feet or shallower.
  - Dredge section side slopes: Maximum of 5:1 (horizontal:vertical), based on available information. (Steeper side slopes may be feasible; however, this will require additional evaluation of wall stability during the design phase.)



ALA WAI CANAL BATHYMETRIC SURVEY
AREA 1
ALA MOANA BRIDGE TO McCULLY BRIDGE

SEPTEMBER 12, 1997

SEA ENGINEERING, INC.

NOTES:

ELEVATIONS IN FEET
MEAN SEA LEVEL DATUM
HAWAII STATE PLANE COORDINATE SYSTEM, ZONE 3

SCALE IN FEET
100 0 100 200

Figure 3
AREA1 BATHYMETRY

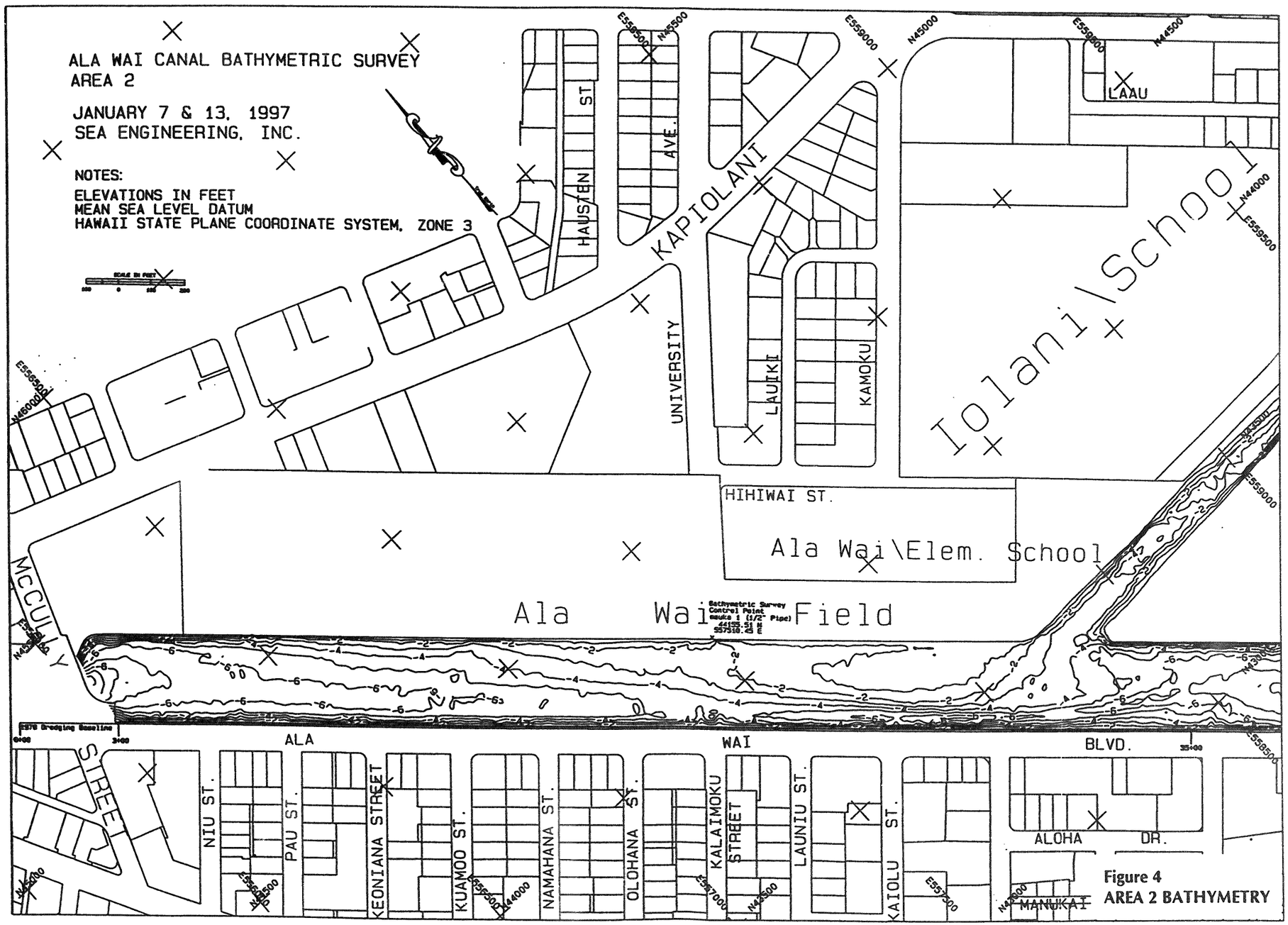


Figure 4
AREA 2 BATHYMETRY

- Typical cross section top and base widths: Dependent on the location of the existing coral ledges. (The location of the ledges need to be accurately identified during the design phase and the ledges should not be damaged by dredging activities.)

- Area 1 to Area 2 transition zone: The upstream portion extends into Area 1 (proceeding upstream from under the McCully Street Bridge for a distance of about 12 feet). The downstream section of the transition zone extends about 10 feet into Area 1 (downstream from the McCully Street Bridge).

- Area 2 to 3 transition zone: Exact location may vary dependent on the dredge depth option selected in Area 3. In general, the transition will occur upstream of the confluence with the Manoa-Palolo Drainage Canal.

- Area 2 to 4 transition zone: Transition will be located in Area 4.

- Dredge entire area to -10 feet: Holding the typical section characteristics used in the 1978 dredging project would remove about 123,500 CY of material.

- Extending the upstream limit of Area 2: Extending the upper boundary of Area 2 a distance of about 1,100 feet and dredging to -10 feet will open up existing deep pool areas in the canal. This should improve circulation and water quality. This would remove an additional 11,000 CY of material.

- **Area 3: Ala Wai Canal from the Manoa-Palolo Drainage Canal to the Kapahulu Avenue End** (see Figures 1 and 5)
  - Dredge depths: -6 feet or less.
  - Dredge section side slopes: Maximum of 5:1 (horizontal:vertical), based on available information. (Steeper side slopes may be feasible; however, this will require additional evaluation of wall stability during the design phase.)
  - Typical cross section top and base widths: The width of the canal in this area decreases as it proceeds towards the Kapahulu Avenue end. Typical sections in this area will vary accordingly.
  - Dredge the Kapahulu Avenue end of the canal only, no alteration of existing deep areas: Dredging to -6 feet would be necessary only in the uppermost 500 feet of the canal. Holding the maximum side slope, about 3,500 CY of material will be removed.
  - Dredge the downstream 1,100 feet of Area 3 to -10 feet: This is the same option as extending the upper limit of Area 2 into Area 3. Dredging this area will remove an additional 11,000 CY of material. This will help improve water quality in this section of the canal. Additional testing of sediments in this section will be required to determine appropriate disposal requirements.

CORRECTION

- Typical cross section top and base widths: Dependent on the location of the existing coral ledges. (The location of the ledges need to be accurately identified during the design phase and the ledges should not be damaged by dredging activities.)

- Area 1 to Area 2 transition zone: The upstream portion extends into Area 1 (proceeding upstream from under the McCully Street Bridge for a distance of about 12 feet). The downstream section of the transition zone extends about 10 feet into Area 1 (downstream from the McCully Street Bridge).

- Area 2 to 3 transition zone: Exact location may vary dependent on the dredge depth option selected in Area 3. In general, the transition will occur upstream of the confluence with the Manoa-Palolo Drainage Canal.

- Area 2 to 4 transition zone: Transition will be located in Area 4.

- Dredge entire area to -10 feet: Holding the typical section characteristics used in the 1978 dredging project would remove about 123,500 CY of material.

- Extending the upstream limit of Area 2: Extending the upper boundary of Area 2 a distance of about 1,100 feet and dredging to -10 feet will open up existing deep pool areas in the canal. This should improve circulation and water quality. This would remove an additional 11,000 CY of material.

- **Area 3: Ala Wai Canal from the Manoa-Palolo Drainage Canal to the Kapahulu Avenue End** (see Figures 1 and 5)
  - Dredge depths: -6 feet or less.
  - Dredge section side slopes: Maximum of 5:1 (horizontal:vertical), based on available information. (Steeper side slopes may be feasible; however, this will require additional evaluation of wall stability during the design phase.)
  - Typical cross section top and base widths: The width of the canal in this area decreases as it proceeds towards the Kapahulu Avenue end. Typical sections in this area will vary accordingly.
  - Dredge the Kapahulu Avenue end of the canal only, no alteration of existing deep areas: Dredging to -6 feet would be necessary only in the uppermost 500 feet of the canal. Holding the maximum side slope, about 3,500 CY of material will be removed.
  - Dredge the downstream 1,100 feet of Area 3 to -10 feet: This is the same option as extending the upper limit of Area 2 into Area 3. Dredging this area will remove an additional 11,000 CY of material. This will help improve water quality in this section of the canal. Additional testing of sediments in this section will be required to determine appropriate disposal requirements.

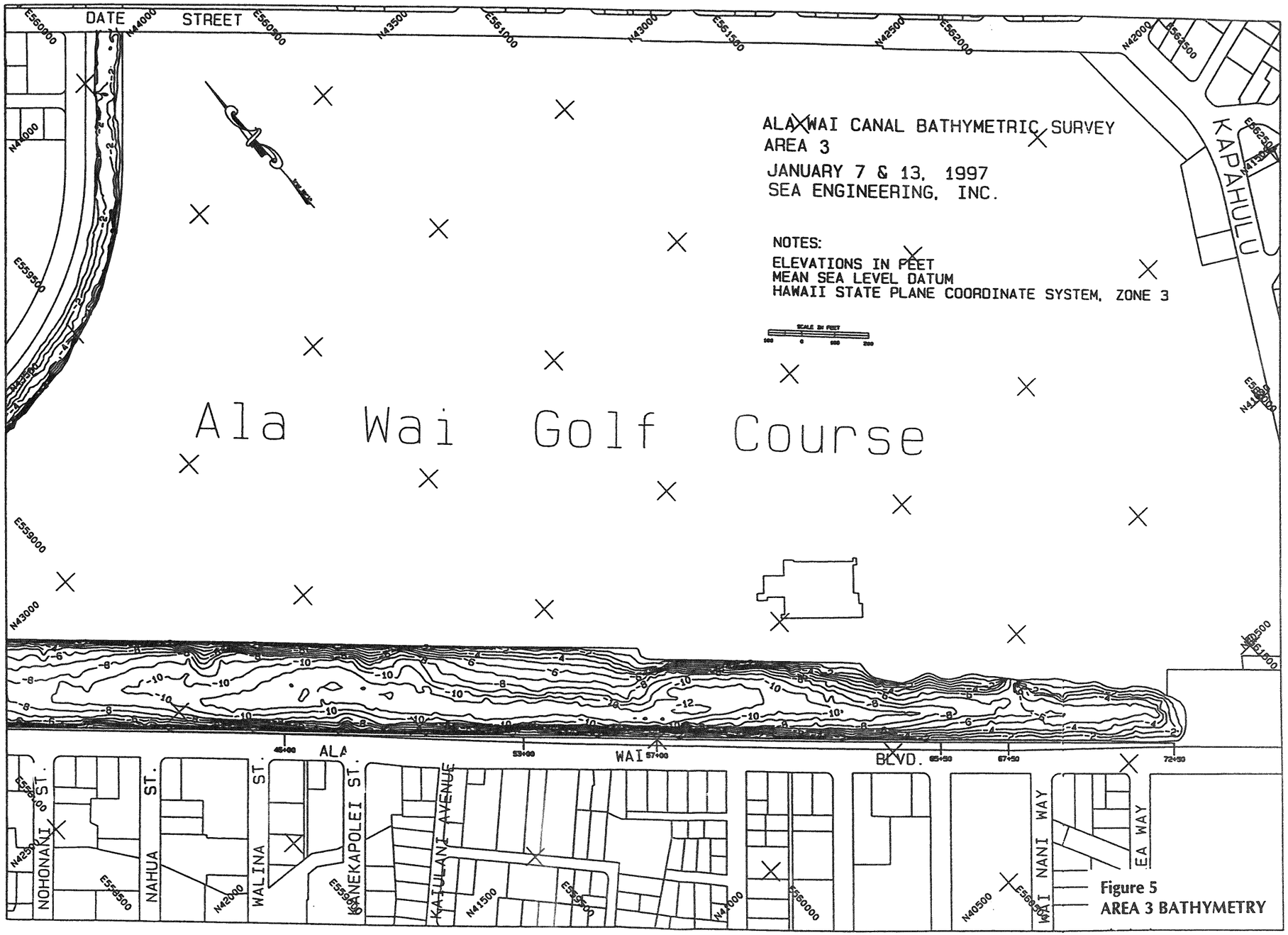


Figure 5
AREA 3 BATHYMETRY

- Dredge Kapahulu Avenue end to -6 feet, fill existing deep pool areas to -6 feet: This is another option to help improve water quality.

- Dredge mauka bank shoal area (station 53+00 to 57+00) to -6 feet: Holding the maximum side slope, this will remove an additional 1,500 CY of material.

- Area 2 to Area 3 transition zone: Location of this transition zone is dependent on the dredging or fill option(s) selected for Area 3.

- **Area 4: Manoa-Palolo Drainage Canal from the Ala Wai Canal to the Date Street Bridge** (see Figures 1 and 6)

  - Dredge depth: -10 feet or less. Based on evaluation of vibracore testing and with input from EPA Region IX, a maximum dredge depth of -8 feet has been approved for ocean disposal.

  - Dredge sections side slopes: Maximum of 3:1, based on available information. (Steeper side slopes may be feasible; however, this will require additional evaluation of wall stability during the design phase.)

  - Typical section top and base widths: Existing canal width varies along Area 4. Top and base widths will vary accordingly while holding the maximum side slopes. Typical sections will be offset 0 feet from the existing canal top of bank.

  - Area 2 to Area 4 transition zone: The transition will be located in Area 4, just upstream of the confluence with the Ala Wai Canal.

  - Area 4 to existing upstream canal transition zone: Transition from Area 4 to existing conditions in the Manoa-Palolo Drainage Canal will occur just downstream of the Date Street Bridge.

  - Dredge to -8 feet depth: Dredging to the EPA-approved -8 feet will remove about 26,500 CY of material

3.2 Components 2 and 3: Dredge and Transport Methods

(Reference: Deliverable 3.2.1)

- **Mechanical with Scow**

  This option combines the use of mechanical dredge technology (such as clamshells and backhoes) with the use of scows for the transport of the dredged materials (transport to a designated processing or other staging site).

- **Mechanical with Truck**

  This option combines the use of mechanical dredge technology with the use of trucks to transport materials to the next processing/staging/disposal site. A scow would still be required to transfer materials from the dredge to the on-shore transfer facility.

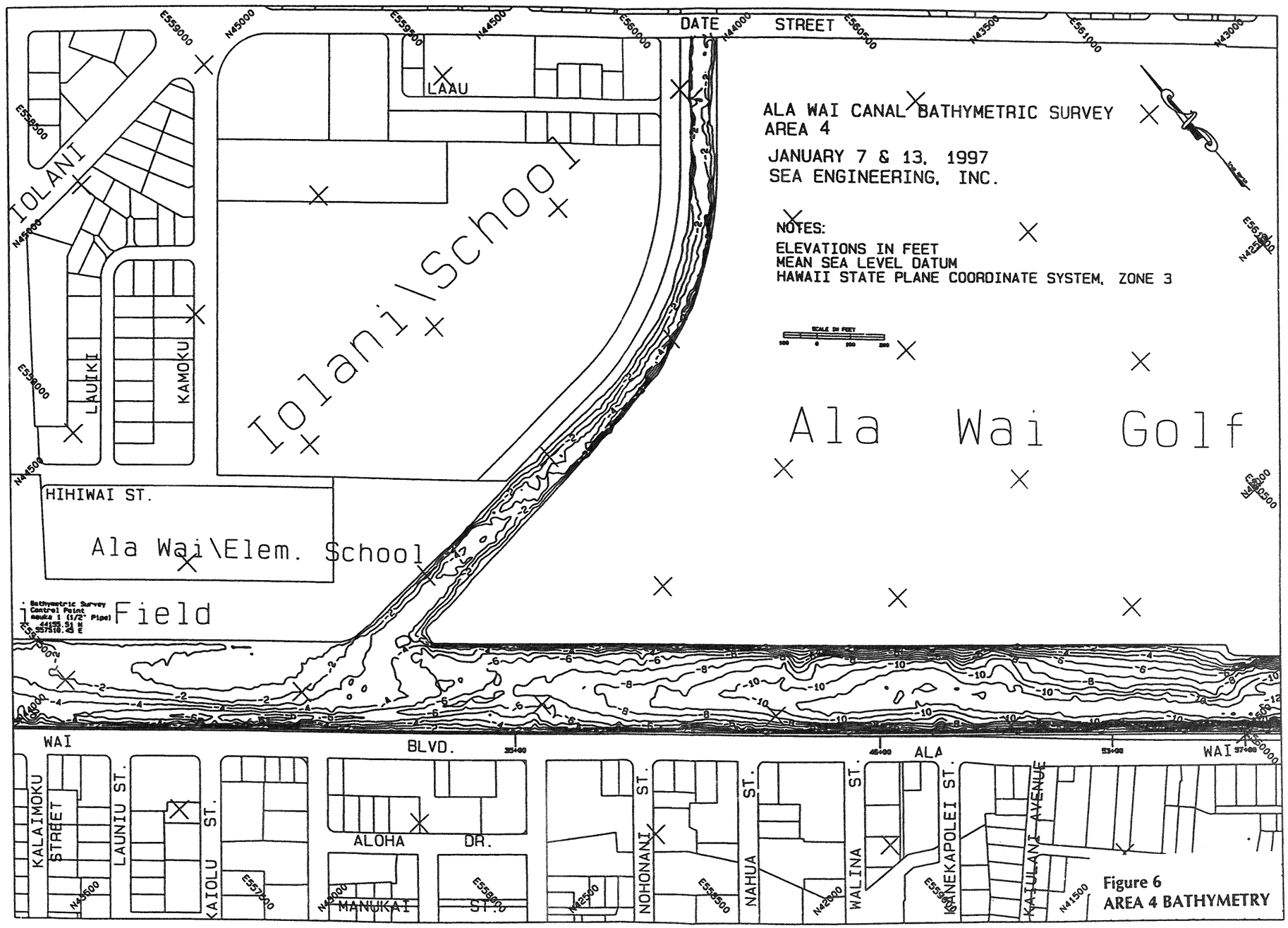


Figure 6
AREA 4 BATHYMETRY

- **Hydraulic with Pipeline**

  Hydraulic dredges consist of pumps which suck in mixtures of sediment and water from the canal bottom. This option includes the construction of a transport pipeline connecting the hydraulic dredge directly to the designated processing/staging site. This makes it possible to pump the dredged sediments directly from the dredge site.

3.3 Component 4: Work Support Areas (see Figure 1)

- **Barge Mooring**

  A location on the west side of the Magic Island parking lot (approximately 100 feet makai of the Ala Moana Park Access Road) is the only possible barge mooring area near the project site. In addition to the barge mooring area, a shoreside work and storage area (of about 200 feet by 500 feet) and loading area (of about 100 feet by 100 feet) is needed. These shoreside areas will be located in the existing (Magic Island) parking lot. They will temporarily occupy about 43 out of the existing 437 parking stalls (equivalent to about 10 percent of the existing parking stalls) and 3 to 4 bus parking stalls.

- **Canal Staging Areas**

  Two on-shore staging areas will be required to accommodate construction activities including storage of dredging equipment and materials, contractor field office facilities, truck access, scow mooring areas, and processing of bulky debris. One staging area is required upstream and a second is required downstream of the McCully Street Bridge. The staging upstream of the McCully Street Bridge will be utilized for the dredging of Areas 2, 3 and 4 (about 80 percent of the project site dredging). Both staging areas will require enough room for truck access, a secure storage area, working areas, and a construction office.

  Possible upstream staging areas include:

  - Two Ala Wai Golf Course sites

  - Ala Wai Neighborhood Park A: The Ala Wai Neighborhood Park A staging site is located between Ala Wai Community Park 2 and the Ala Wai Community Garden. A canoe halau is located nearby.

  - Ala Wai Neighborhood Park B: The Ala Wai Neighborhood Park B staging site is located at the confluence of the Ala Wai Canal and the Manoa-Palolo Drainage Canal. This site is adjacent to the Ala Wai Community Gardens and the Ala Wai Elementary School.

  - Ala Wai Neighborhood Park 2: This site is located within the existing park, along the canal boundary. This location will encroach on the existing ballfield.

  - Ala Wai Neighborhood Park 1: This site is also located within the existing park, along the canal boundary (adjacent to the McCully Street Bridge). This location will encroach on the existing ballfield.

  - Kapahulu Avenue End: Located near the Waikiki regional public library.

Possible downstream staging areas include:

- Vacant lot across Convention Center: This lot is located between the McCully Street Bridge and Kalakaua Avenue Bridge.

- Magic Island parking lot: Location as described in the preceding barge mooring discussion section.

3.4 Components 5 and 6: Processing and Disposal/Reuse

(Reference: Deliverables 3.2.1 and 9.1.1)

Dredging by mechanical or hydraulic methods produce sediments of varying water contents. Sediments may therefore require additional processing (dewatering) in order to be disposed of or reused. (Refer to Figure 2 for location of disposal/reuse sites.)

• Dewatering Options

- No on-site dewatering: This is the simplest option. The dredged slurry is not processed and is transported directly out to sea for disposal, or to another off-site location for processing and disposal.

- Dewatering in barge: This option utilizes two large dump barges for initial receipt of the slurry. Solids in one barge are allowed to settle while the other is being filled. The decanted water would be returned to the removal area (the canal) via a return pipeline.

- Settling basins: Dredged materials would be transferred into settling basins to allow solids to settle out by gravity.

- Mechanical solids removal: Screening and filtering devices are examples of mechanical solids removal options.

- Admixtures: Admixtures are chemical additives that can be applied to improve the settling characteristics of the dredged slurry. An example of an admixture is portland cement, which absorbs water.

- Hybrid technologies: This method combines various dewatering technologies to enhance dewatering.

• Ocean Disposal (South Oahu ODMDS)

Sediment may be disposed of at the EPA approved Ocean Dredge Material Disposal Site (ODMDS) located at 21°15'10" north latitude and 157°56'50" west longitude (approximately four nautical miles southwest of the mouth of the Ala Wai Canal). Only those materials deemed suitable for ocean disposal by the EPA and the ACOE can be disposed of at this site.

- **Upland Reuse**

  Sediments that are not approved (by the EPA and the ACOE) for ocean disposal will be disposed of upland. The following locations have been identified as possible upland reuse/disposal sites:

  - Reef runway as fill (with or without dewatering on-site): The Honolulu Airport Reef Runway Soil Management Facility (SMF) is under jurisdiction of DOT Airports Division. From a barge, sediment would be transferred to land by a crane or hydraulic pipeline. (Figure 7)

  - Sand Island as fill (with or without dewatering on-site): The DLNR Sand Island properties are under the jurisdiction of the DLNR State Parks Division. The area is designated as the Sand Island State Recreational Area. The east half of the property is a developed park, and the west half of the property is undeveloped but open to public access. Mauka of the Recreational Area, and adjacent to the Sand Island Wastewater Treatment Plant, is land managed by DLNR Water and Land Management Division. (Figure 8)

  - Waipio Peninsula as fill (with or without dewatering on-site): The Waipio site is the former incinerator ash landfill owned by the City. Dredged materials may be used as landfill cover if permeability is less than 10^{-7}. Dewatering at the landfill site may not be feasible; therefore, materials may need to be dewatered off-site and trucked to the landfill. (Figure 9)

4 EVALUATION

4.1 Evaluation Criteria

The various dredging options summarized in Section 3 have been evaluated in Deliverables 3.2.1 and 3.2.2 to determine technical feasibility and ability to meet overall project objectives. Evaluation based on regulatory compliance and the ability to meet time and cost constraints will be presented in the following sections. Discussion of environmental/social impacts will be presented in the Environmental Assessment being prepared for this project.

- **Time and Cost Constraints**

  As a general guideline, the dredge methods were screened for technical feasibility based on capability to complete the project over a one-year time span. The evaluation in this document goes one step further and compares the technically feasible options for time and cost tradeoffs. The Hawaii State Legislature during its 1997 session appropriated $10.35 million in construction costs for dredging the Ala Wai Canal. These funds must be committed by June 30, 2000 or they will lapse.

- **Regulatory Constraints**

  There are four types of regulatory constraints that apply to Ala Wai Canal dredging: (1) permits, (2) consultations and coordination, (3) notifications, and (4) permissions for land use. Permits refer to permissions granted from regulatory agencies for activities that would otherwise be illegal. Consultations are those required with natural resource agencies such as the U.S. Fish and Wildlife Service, the National Marine Fisheries Service, and the State Historic Preservation Office. Notifications such as notification to mariners are made to entities that may be affected by dredging activities. Permissions for land use would be necessary from government agencies with jurisdiction over public lands used for dredging activities.

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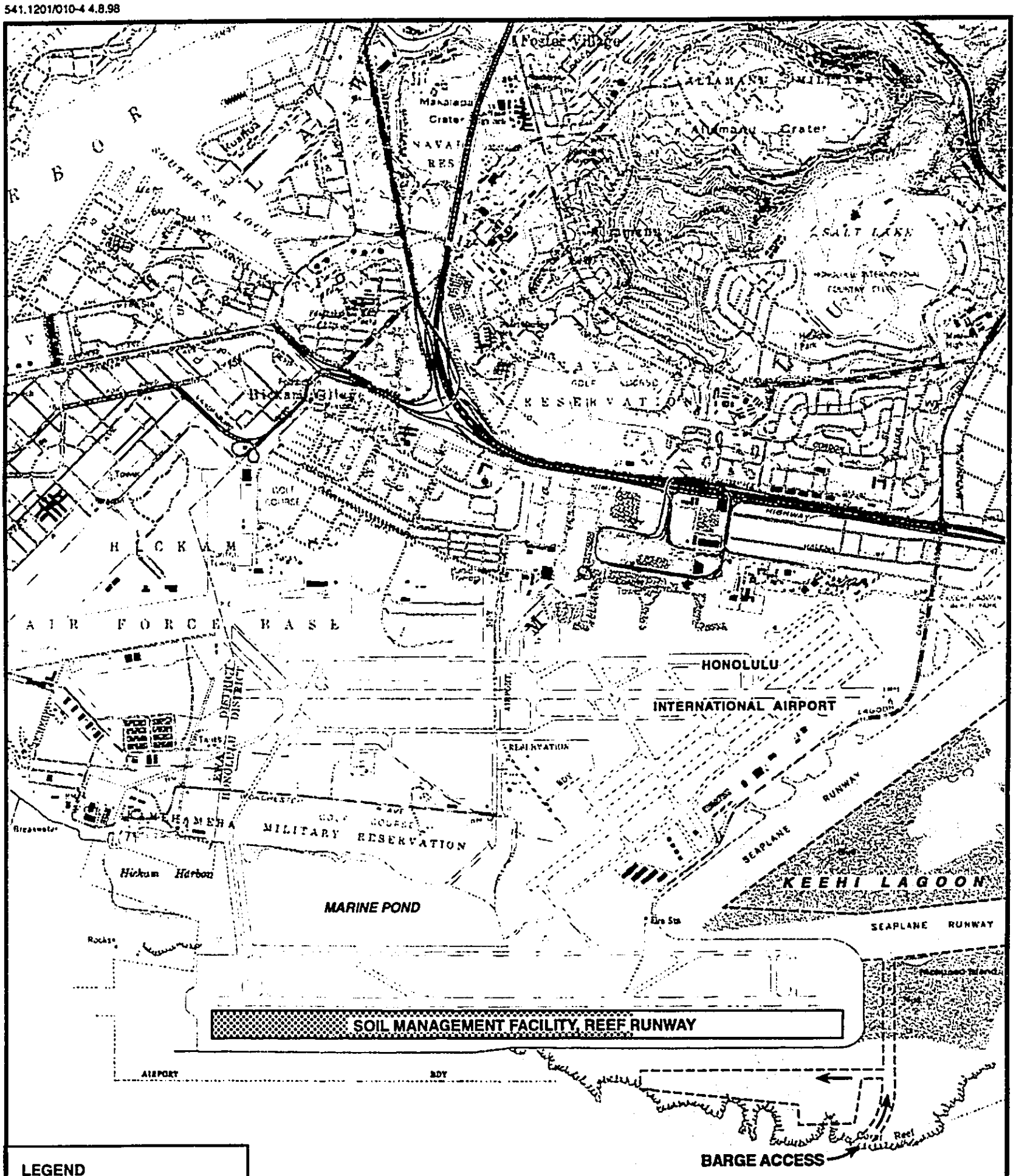

Figure 7
POTENTIAL PROCESSING AND PLACEMENT LOCATION AT THE REEF RUNWAY SITE

Ala Wai Canal Dredging Environmental Assessment
Belt Collins Hawaii

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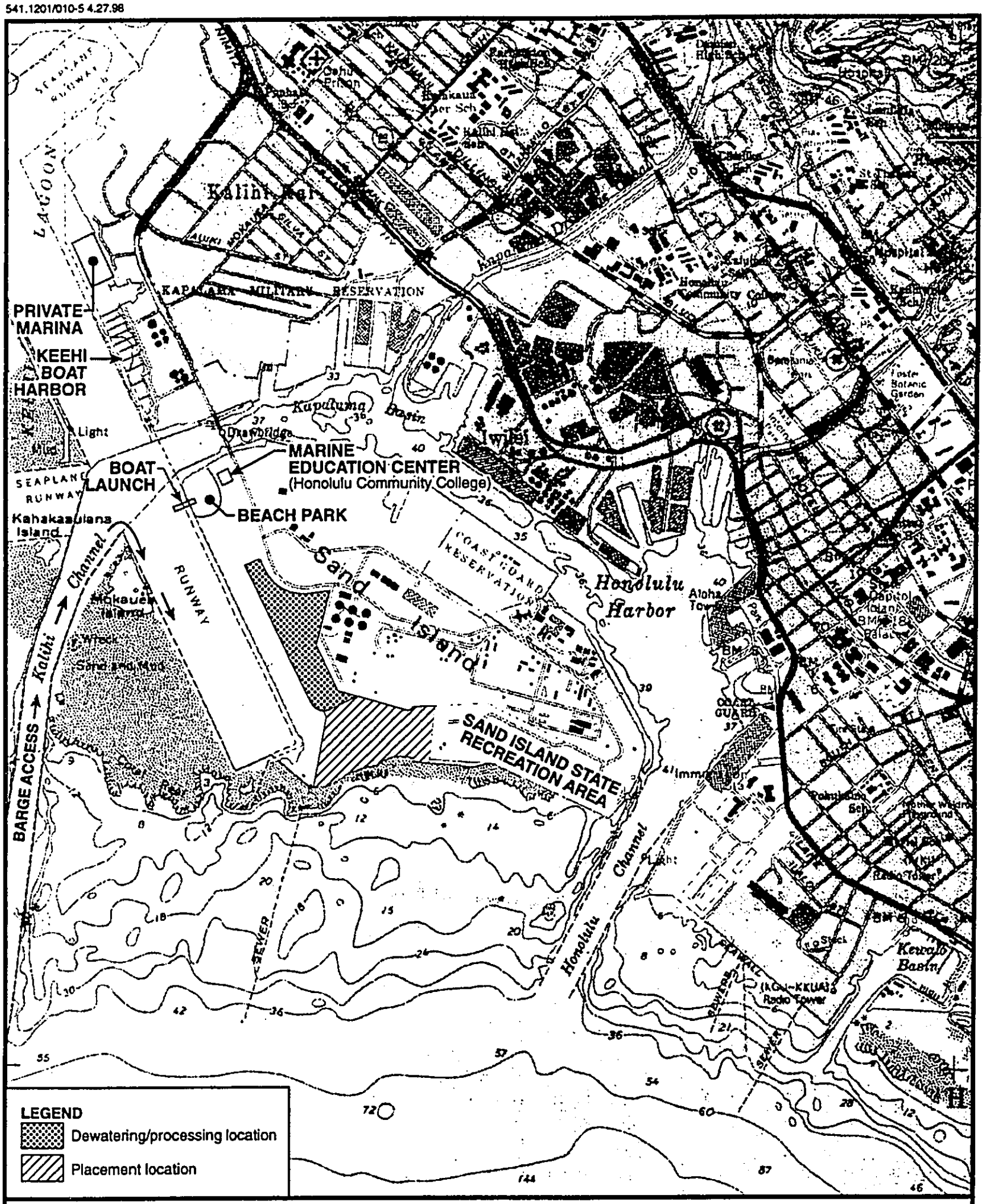

Figure 8
POTENTIAL PROCESSING AND PLACEMENT LOCATIONS AT THE SAND ISLAND SITE

Ala Wai Canal Dredging Environmental Assessment
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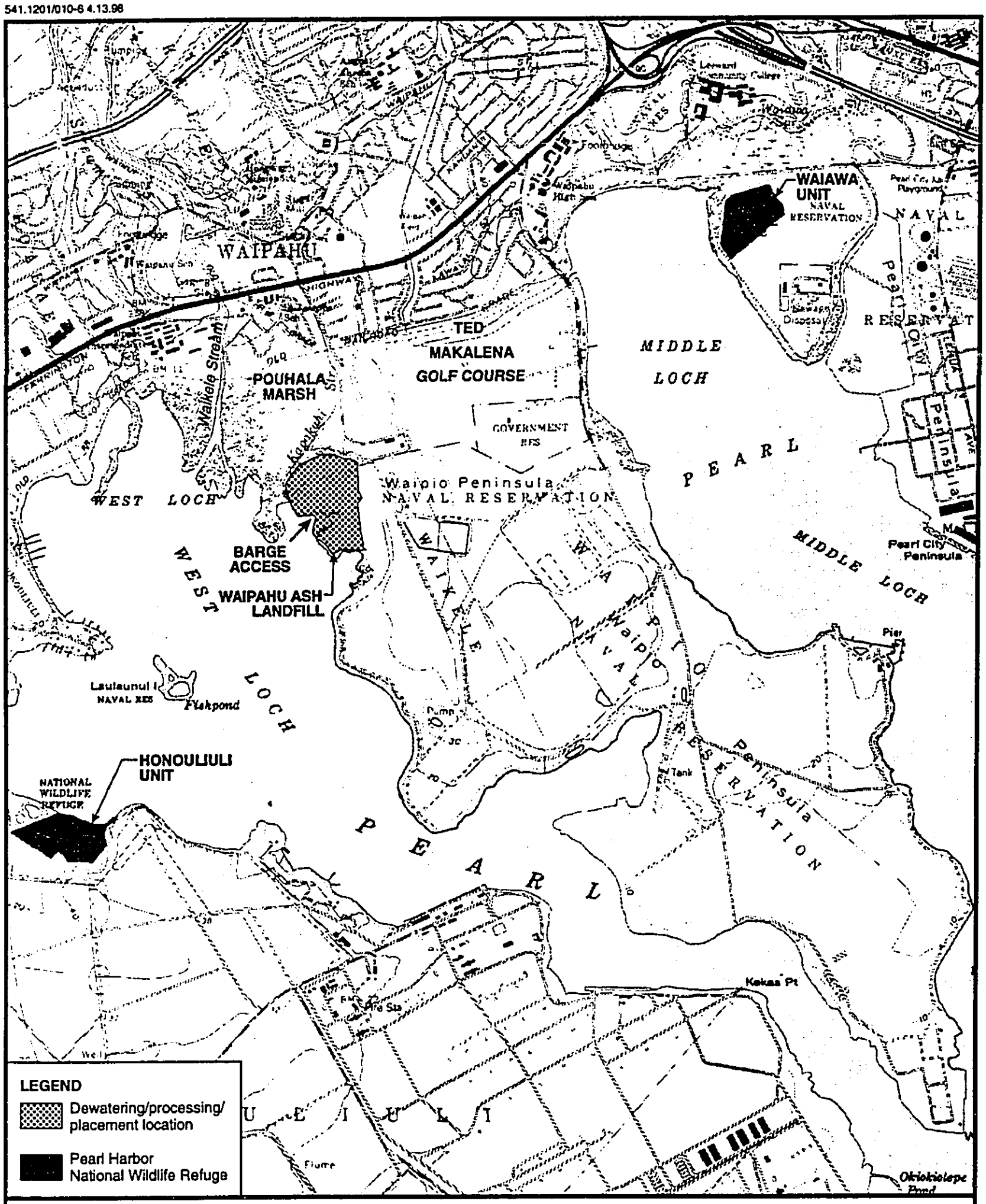


Figure 9
POTENTIAL PROCESSING AND PLACEMENT LOCATION AT WAIPIO PENINSULA SITE

Ala Wai Canal Dredging Environmental Assessment
Belt Collins Hawaii

Dredge Limits

If any dredging is performed, regardless of the specific limits, a Department of the Army permit will be required under the Marine Protection, Research and Sanctuaries Act Section 103, Rivers and Harbors Act Section 10, and Clean Water Act Section 404. Under the current determination from the U.S. Army Corps of Engineers (ACOE), an exemption from Section 404 requirements due to maintenance dredging for navigation purposes is not applicable, because the purpose of the proposed dredging would not be considered as navigation.

Dredge limits could be established such that only material approved as suitable for ocean disposal would be dredged. However, under this scenario, based on the sediment testing conducted to date, the majority of sediment, including the shoal area, would not be dredged.

The Ala Wai Canal is listed on the National Register of Historic Places and the State Register of Historic Places. Section 106 of the National Historic Preservation Act (NHPA) requires coordination with the Department of Land and Natural Resources (DLNR), State Historic Preservation Office (SHPO). Based on preliminary input from SHPO, if the walls of the Ala Wai Canal are not affected by dredging activity, then it would concur with a "no effects" determination. Therefore, dredge limits are to account for the need to keep the walls intact.

The Coastal Zone Management (CZM) Act of 1972, as amended, requires federal agencies to conduct their activities in a manner consistent to the maximum extent practicable with the State's CZM Program. The entire Island of Oahu is in the coastal zone, and therefore a consistency determination is necessary from the Department of Business, Economic Development and Tourism, CZM Program. In addition, Magic Island is zoned as conservation district lands. Therefore, a conservation district use application (CDUA) and Work in Ocean Waters Permit are also required, from DLNR. No design constraints are anticipated from these permits.

Dredge and Transport Method

The use of a mechanical dredge with scow transport or hydraulic dredge with pipeline transport does not require a permit. Coordination will be required with the Coast Guard regarding obstructions to navigation.

Use of Shore-side Areas

The use of shore-side areas requires permission for use, and constraints may be imposed by the land owner. The majority of shore-side open space that could be used to support dredging activity is under the jurisdiction of the City and County of Honolulu, Department of Parks and Recreation (DPR). Therefore, based on discussions with DPR, the use of Magic Island and Ala Wai Neighborhood Park A has been identified as workable.

Processing and Placement

Regulation of dredged material processing and placement is authorized under several different statutes and implemented by several agencies. These are summarized in Table 3.

Table 3. PROCESSING AND PLACEMENT AUTHORIZATION SUMMARY

Activity	Federal Statute	Regulatory Jurisdiction
Transport and Disposal Within Waters of the U.S. and Ocean Waters	Marine Protection, Research, and Sanctuaries Act	• EPA is authorized under Section 102 to establish criteria for evaluating all dumping permit actions and designate ocean dredged material disposal sites • ACOE is authorized under Section 103 to issue permits for the transportation of dredged material for the purposes of disposal in the ocean.
Transport	Rivers and Harbors Act	ACOE is authorized under Section 10 to regulate obstruction to navigation; all dredging projects must comply
Discharges to State Waters	Federal Water Pollution Control Act (Clean Water Act)	• DOH is authorized under Section 401 to issue water quality certification or waiver for compliance with water quality standards • DOH is authorized under Section 402 to issue NPDES permits for point source discharges, including dewatering effluent • ACOE is authorized under Section 404 to regulate discharge of dredged or fill materials (including dewatering return flow), with guidelines developed by EPA
Upland Placement	Resource Conservation and Recovery Act	Responsibility for placement on land lies with the states (in Hawaii, DOH has jurisdiction)

If dewatering of sediment results in the discharge of effluent, a permit for the discharge will be required. If effluent is discharged back to the Ala Wai Canal, it would need to be covered under the permit issued by the Department of the Army. If effluent is discharged to state waters from dewatering operations that take place on land, it would require a NPDES permit from the DOH Clean Water Branch. Both permits would likely place limitations on the quality of the discharge; these limitations may require constraints be placed on operating parameters to ensure compliance.

For ocean disposal approval, sediment in the proposed dredge areas has been tested for physical and chemical parameters. The EPA and ACOE have found a portion of the material to be suitable for ocean disposal without further testing. The remaining portion would have to undergo additional testing for toxicity (Tier III bioassay and bioaccumulation testing) to determine whether the material is suitable for ocean disposal. EPA has indicated their opinion that it is unlikely that all of the material will be found suitable for ocean disposal.

For upland placement approval, sediment in the proposed dredge areas has been tested using the toxicity characteristic leaching procedure (TCLP) to determine if it must be regulated as a hazardous waste or solid waste. Results were below the TCLP trigger levels, and therefore the material will be regulated as a solid waste by DOH, pending concurrence from DOH. Specifically, it will be regulated as an inert solid waste, which is the lowest level of regulatory involvement.

Use of upland disposal sites may require land use permits, depending on their specific location: a CDUA, shoreline setback variance, and/or a special management area (SMA) use permit. If the

site is located within a conservation district, a CDUA is required. For work within the 40 feet setback of the certified shoreline, activities (including grading or stockpiling of earth) require a shoreline setback variance. Any "development," including grading or stockpiling of earth, within a SMA would require a permit. The CDUA is administered by DLNR. The shoreline setback variance and SMA permit are administered by the City and County of Honolulu, Department of Land Utilization, with final approval granted by the City Council. These permits will impose conditions that may affect operations; these requirements are not expected to preclude use of the upland sites.

4.2 Comparison of Feasible Options

Remaining feasible component options will be compared, relative to each other, based on how well they meet project objectives, regulatory compliance, and time and cost constraints.

Unless otherwise noted, all costs presented in this section are estimated average costs developed in the document entitled, "Ala Wai Canal Dredging Conceptual Design and Environmental Assessment, Estimates of Dredging Cost" (prepared for this project). High, low and average estimated project costs are developed in the reference document. It is noted that high and low estimated costs may vary by over 20 percent from the average cost figures. (A copy of the preliminary costs estimate, dated April 3, 1998, is provided in Appendix A for reference.) Cost estimates have been based on the estimated dredge quantities summarized in Table 4[2].

Table 4. ESTIMATED DREDGE QUANTITIES USED IN COST ESTIMATE

Project Area	Dredged Material Volume, CY		
	Ocean Disposal	Upland Disposal	Total
Area 1	0	8,500	**8,500**
Area 2	19,000	104,500	**123,500**
Area 3	0	14,500	**14,500**
Area 4	26,500	0	**26,500**
Total	**45,500**	**127,500**	**173,000**

It is noted that the quantities summarized in Table 4 will be refined as the project progresses and upon proponent agency review of this document. The overall conclusions drawn from the cost analyses; however, is expected to remain unchanged.

- **Component 1: Dredge Limits**

  The two main objectives of the setting of dredging limits are to: 1) increase the long term sediment holding capacity of the canal, and 2) to increase flood control capacity of the canal. All feasible options will accomplish these objectives. As far as time and cost, it is apparent that, generally, the deeper and wider the cross section, the longer and more expensive the project.

[2] Estimated dredge volumes summarized in Table 4 include the option of dredging the initial 1,100 linear feet of Area 3 to a depth of -10 feet. It is noted that including this Area 3 option increases the estimated dredge volume from 3,500 CY to 14,500 CY. The additional volume for this Area 3 option has been included to facilitate evaluation of "worst case" costs.

4, and -10 feet in Area 4. Deeper dredge depths of -10 feet in the lower 1,100 feet of Area 2 and in Area 4 are still technically feasible. It is noted dredging to these deeper depths will require additional testing of these deeper dredge materials will require additional testing and EPA approval to establish disposal requirements.

With regards to ocean disposal of dredged materials, the EPA has determined that only materials dredged from a portion of Area 2 is suitable for disposal in this manner. The section of canal is located between the upstream side of the McCully Street Bridge and station 10+20. Dredging to the Area 2 maximum dredge depth of -10 feet corresponds to about 19,000 CY of material.

- Water quality improvement in Area 3: With regards to improvement water quality in Area 3, there are two dredging options that address improving water circulation of the deep pool area. One option is to dredge 1,100 linear feet at the downstream end of Area 3 to a depth of -10 feet. An alternate option is to fill the deep area to a depth of -6 feet (the target maximum dredge depth for the Kapahulu Avenue end of the canal).

- **Components 2 and 3: Dredge Method and Transport**

The following three dredge method and transport combinations are evaluated below: 1) mechanical dredging with truck transport; 2) mechanical dredging with scow transport; and hydraulic dredging with pipeline transport. A comparison of these options is presented in Table 5.

Table 5. COMPARISON OF DREDGE METHOD AND TRANSPORT OPTIONS

Parameter	Mechanical with Truck	Mechanical with Scow	Hydraulic with Pipeline
Cost	Exceeds cost parameter	$3.7 million	w/dewatering: $7.5 million w/o dewatering: $ 2.9 million
Dewatering required	no	no	May be required
Dredging production rates, CY/day	640 to 720	640 to 720	600 to 800
Number of trips	Possible 64 or more truckloads/day	2,000 scow round trips over the duration of the project*	n/a
Return flow to the canal	no	no	yes – if sediments are dewatered
Time requirement	52 weeks	52 weeks	51 weeks
Impact on vehicle traffic	8+ truckloads /hour – based on using 15 cubic yard capacity trucks hauling full loads	Minimal – concentrated at staging areas and for removal of bulky items	Minimal – concentrated at staging areas and for removal of bulky items
Other considerations	- Possible spillage of materials along the transport route. - Special preparation of trucks (to minimize spillage).	Bridge piles and piers to be protected from damage by constant scow movement in the canal	Pipeline to be constructed from dredge site to barge mooring area.

* Based on an assumed scow capacity of 150 CY.

Based on this comparison, the mechanical dredging with truck transport option will not be further evaluated. This option is eliminated based primarily on its inability to meet cost criteria.

Costs associated with the two remaining dredge method and transport options are summarized in Table 6.

Table 6. DREDGE METHOD AND TRANSPORT COST SUMMARY

Cost Item	Total Cost	
	Mechanical Dredge with Scow	Hydraulic Dredge with Pipeline
Mobilization	$285,000	$590,000
Dredging	$1,603,000	$2,096,000
Debris Removal/Disposal	$167,000	$167,000
Landscape Restoration	$50,000	$50,000
Subtotal 1* ($/CY**)	$2,105,000 ($12.17)	$2,903,000 ($16.78)
Transport to Magic Island	$585,000	n/a
Transfer to Barge	$985,000	n/a
Subtotal 2 ($/CY**)	$1,570,000 ($9.08)	n/a
Dewatering	n/a	$2,595,000
Return Flow to Canal	n/a	$813,000
Load to Barge	n/a	$1,180,000
Subtotal 3 ($/CY+)	n/a	$4,588,000 ($26.52)
TOTAL ($/CY)**	**$3,675,000 ($21.24)**	**$7,491,000 ($43.30)**

* Hydraulic Dredge with Pipeline, Subtotal 1 = estimated cost without dewatering.

** $/CY computed based on a dredge volume of 173,000 CY.

+ $/CY computed based on 154,000 CY of non-ocean disposal materials.

- **Component 4: Work Support Areas**

  Criteria used for the evaluation of the various staging area sites are summarized in Table 7.

Table 7. CRITERIA FOR EVALUATION OF STAGING AREA SITES

Parameter	Criteria
Location	▪ One site upstream of the McCully Street Bridge, near the majority of sediment to be dredged ▪ One site downstream of the McCully Street Bridge ▪ Along shore of the Ala Wai Canal, with no encumbrances to working (e.g., shallow sills, historic walls, vegetation) ▪ Truck access to regional roadways ▪ Minimal disruption to children at nearby schools. ▪ Minimum Temporary impacts to recreational park and canal uses
Site	▪ Contiguous area ▪ Minimum ¼ acre + space for truck turnaround ▪ Can be restored ▪ Available for approximately 9 to 12 months

Upper canal staging sites located at the Ala Wai Golf Course, Ala Wai Neighborhood Park B, Ala Wai Community Park 1, and Ala Wai Community Park 2 are eliminated based on discussion with City DPR (refer to the preceding Regulatory Constraints section).

The remaining sites include: the Kapahulu Avenue end site (located near the Waikiki regional library) and the Ala Wai Neighborhood Park A site (both in the upper portion of the canal); the vacant lot across the Convention Center (in the lower portion of the canal); and the Magic Island site (for both a barge mooring site and lower canal staging area). It is noted that the Magic Island site is the only site identified and that is feasible for barge mooring.

Of these potential staging areas, the vacant lot across the Convention Center is least favorable because of its location between the McCully Street Bridge and the Kalakaua Avenue Bridge. The proximity to these two bridges makes access to the site difficult (from the canal and for on-shore vehicles). The most favorable site is the Ala Wai Neighborhood Park A due to its proximity to the majority of the sediments to be dredged (i.e., the shoal in Area 2).

- **Component 5: Sediment Processing**

Sediment processing requirements are highly dependent on the selection of dredge method uses. Three technically feasible options under consideration for this dredging project include: 1) off-site dewatering basins, 2) mechanical dewatering using hybrid systems, and 3) dewatering on barges. If dewatering results in discharge of effluent, regulatory requirements discussed in Section 4.1 will need to be met.

It is noted that hydraulic dredging methods typically generate sediments containing a higher percentage of water than those from mechanical methods. Mechanically dredged material, therefore, may require less processing prior to final placement.

All three options could possibly be used for this project; however, the following constraining factors are noted: 1) dewatering basins – require the most land area of the three options noted; 2) mechanical dewatering technologies – typically more expensive than other options, may not achieve adequate solids removal, and may be subject to mechanical failures; 3) dewatering on

barges – dewatering may take too long due to the limited size of the barge and may require mooring of more than one barge at a time at the Magic Island site.

- **Component 6: Disposal/Reuse**

  - Ocean Disposal: Ocean disposal at the EPA approved ODMDS is the only option available for ocean disposal. The estimated cost for this option is $358,000 ($7.87/CY) for the options of hydraulic dredging with dewatering and mechanical dredging, and $354,000 ($7.77/CY) for hydraulic dredging without dewatering.

  - Upland Reuse:

    1. Reef runway as fill (with or without dewatering on site): This site is permitted by DOH OSWM to accept, remediate, and then use as fill, soil contaminated with petroleum hydrocarbons. It can receive materials from public projects, and may need a permit modification to receive Ala Wai Canal contaminated sediments. A shoreline setback variance may be required for any activities occurring within the 40-foot shoreline setback. The Reef Runway is within a SMA, therefore a SMA permit may also be required.

       Costs specific to the facility include reimbursement to DOT Airports for managing the SMF facility. The estimated cost for disposal at this site was estimated at $4,054,000 ($31.80/CY) for the options of hydraulic dredging with dewatering and mechanical dredging, and $4,186,000 ($32.83/CY) for hydraulic dredging without dewatering. These cost figures do include possible SMF fees (estimated based on $4/CY).

       Factors favorable to this site include: the available disposal site capacity; good accessibility by barge; relatively close proximity to the project site; remoteness – no public access to the site; adequate capacity for disposal of sediments; and available nearby space for dewatering activities. Constraints at this site include: vertical clearance limitations (due to air traffic in the area and the limited on-land vehicle accessibility to the site).

    2. Sand Island as fill (with or without dewatering on site): The shore area is accessible by barge with some surge protection offered by the south-west point of Sand Island. A shoreline setback variance may be required for any activities occurring within the 40-foot shoreline setback. All of Sand Island is within a SMA, so a SMA permit may also be required.

       Factors favorable to this site include: the potential processing/dewatering site is located close enough to the shore (about 150 feet inland) to allow transfer of sediment (from the barge) by crane or hydraulic pipeline; land area is available for dewatering activities; nearby land area is available for beneficial use as fill and/or top soil (with minimal truck transport requirements for placement at the park); relatively close proximity to the project site.

       Possible constraints include: potential conflicts between dewatering and placement activities and recreational activities; uncertainty regarding how much and what types of processed the sediments can be placed for use in the park; possible environmental

risks associated with exposure of the public to contaminants in the dredged sediment; and uncertainty regarding the feasibility of processing technologies to be used to make sediments ready for reuse as topsoil or as a subsurface layer below the topsoil.

The estimated cost for disposal at this site is about $3,268,083 ($25.63/CY) for the options of hydraulic dredging with dewatering and mechanical dredging, and $3,234,000 ($25.37/CY) for hydraulic dredging without dewatering.

3. City and County Waipahu Ash Landfill (for use as clay-impermeable cover): Factors favorable to this site include the limited public accessibility to the site and the need for appropriate cover material for the ash landfill.

   Constraining factors associated with this site include: greater distance to this site (as compared to the Sand Island and the Reef Runway sites); barges will access the site from the south and need to travel through both the Naval Defensive Sea Area and an active explosives safe quantity area; on-site dewatering basins may not be feasible; materials need to be processed to meet 10^{-7} permeability to be used as cover.

4. Other Sites: When evaluated in combination with other project component options, use of the remaining upland disposal sites (Nanakuli and Barbers Point sites) are eliminated. Total costs exceed the cost criteria.

5 SUMMARY

Table 8 summarizes the options that meet all project criteria. These will be evaluated further in the Environmental Assessment.

Table 8. SUMMARY OF REMAINING OPTIONS

Component Number	Description of Option	Special Considerations
1	Area 1: -12 feet maximum dredge depth	
	Area 2: -10 feet maximum dredge depth	Area from McCully Bridge to station 10+20 currently approved for ocean disposal.
	Area 3: -6 feet maximum dredge depth	- Deeper dredging may be possible to improve water quality – will require additional testing and regulatory approvals. - Filling of deep areas may be possible to improve water quality – will require additional regulatory requirements.
	Area 4: -8 feet maximum dredge depth	- Deeper dredging may be possible – will require additional testing and regulatory approvals.
2	Mechanical Dredging	
	Hydraulic Dredging	
3	Scow transport to barge mooring site	
	Pipeline transport to barge mooring site	
	Barge transport to processing/disposal site	
4	Upper Canal: Ala Wai Neighborhood Park A Kapahulu Avenue end site (near the library)	
	Lower Canal: Magic Island	Temporary loss of a few parking stalls in the parking lot area.
	Barge Mooring: Magic Island	
5	Offsite dewatering basins	- Admixtures may be added to sediments facilitate better removal of solids (can be done for all options). - All options except the barge option requires additional land area. - Minimum of two barges will be required to accomplish dewatering onboard the barge.
	Hybrid mechanical dewatering systems	
	Dewatering on barges	
6	Ocean Disposal	ACOE and EPA approved materials only.
	Upland Disposal: - Reef Runway site - Sand Island - City and County Waipahu Ash Landfill	Use of the City and County Waipahu Ash Landfill is subject to more stringent sediment quality requirements, since sediments will be used as landfill cover. If dewatering is required, dewatering activities may need to be located offsite. Barges accessing the site will pass through Navy controlled waters, and an active explosive safe zone.

APPENDIX A: COST ESTIMATE MEMO

Ala Wai Canal Dredging
Conceptual Design and Environmental Assessment
ESTIMATES OF DREDGING COST

1 INTRODUCTION

Separate cost estimates are attached for dredging the Ala Wai Canal using hydraulic and mechanical excavation methods. There are two primary differences between these methods for cost estimating purposes, other than the fundamental differences in equipment and production rates. These are the amount of water entrained with the sediments, and the consequences of that water on transportation and ultimate disposal. The cost proposals are based on a number of potentially feasible methods of transportation and disposal, since some material will be suitable for ocean disposal, and some will be disposed or reused upland. Costs related to a number of upland reuse and disposal sites are evaluated.

2 COST ESTIMATING FACTORS AND ASSUMPTIONS

The attached costs are estimates based on conceptual construction methodologies with no contingency factor applied to the totals. The cost estimates have been prepared using the following factors and assumptions:

A. Each dredge method has an expected range of productivity associated with it, given the constraints of the working area. The expected volume of material that can be dredged on a daily basis determines the labor effort and equipment needed to transport, process, and dispose of the material. Costs for labor and equipment are first estimated on a per-day basis, and then unitized to the daily in-situ numerical volumes of sediment removed, considering low, high, and average rates of productivity. Transportation, handling, and disposal work elements are sized to the anticipated production rate.

B. Fixed costs for mobilization and demobilization have been included; barge and dredge mobilization is assumed to occur from the West Coast. However, certain other fixed costs such as for landscape restoration, lease rent for private lands used under some options, and management fees for some disposal options are not known.

C. Unit costs include both direct and overhead expenses (16% on direct), 15% profit, bond, and Hawaii State tax. A total multiplier of 1.45 was applied to direct expenses. Estimates are in 1998 dollars.

D. The estimate is sensitive to rates of dredging productivity, volumes to be dredged, and the amount of material for disposal to the ocean versus upland. For purposes of transportation and dewatering cost estimation, it is assumed that mechanical dredging will result in an average sediment mix of 50% solids, while hydraulic dredging will result in a slurry of 20% solids.

3 DREDGING SCENARIOS

The dredging scenarios used in the hydraulic and mechanical dredging cost estimates have been compiled from sets of feasible and compatible dredging, transportation, processing, and disposal options. These sets of feasible and compatible options are derived from "Ala Wai Canal Dredging Upland Disposal Study Summary," Belt Collins Hawaii, October 1997; and "Ala Wai Canal Dredging Feasibility Assessment," Belt Collins Hawaii and Sea Engineering, December 1997. The essential elements of these sets of options include the following:

A. Dredging costs include mobilization, dredging, debris removal, and deposition of the sediments into a transportation mode for removal from the canal.

B. Some portions of the sediment will be suitable for ocean disposal, and these will be transferred to an ocean-going barge outside the canal. For hydraulic dredging, dewatering may or may not occur prior to ocean transportation.

C. For upland disposal, sediments will be transferred to an ocean-going barge for transportation to one of several potential disposal sites. Costs include handling, dewatering, treating, and final placement. Costs vary significantly depending on location of the disposal site, and associated handling en route. Truck transportation was eliminated from detailed cost evaluation because of high marginal costs over long distances.

D. Total costs reflect the sum for dredging, transportation, ocean disposal of a portion, dewatering, transportation, handling and upland placement of a portion. Cost estimates are provided for high productivity (low unit costs), low productivity (high unit costs), and an average, based on an assumed split between ocean and upland disposal volumes, which can be modified based on regulatory outcomes.

4 PROJECT DURATION

Dredging productivity is a fundamental element of the cost estimate, and also provides a comparable basis for estimating project duration. The high, low, and average productivity figures for each dredging method have been used to estimate the required number of working days to complete the project, assuming a 5-day work week.

Ala Wai Cost Estimate: Mechanical Dredging

Total in situ Volume (cy) = 173,000

	TASK TOTAL	CUMULATIVE SUM
Mobilize (fixed) $285,000	$ 285,000	$ 285,000
Landscape Restoration $50,000	$ 50,000	$ 335,000
Dredge with bucket High $ 9.81 /cy Avg. $ 9.27 /cy Low $ 8.72 /cy	High $ 1,697,563 Avg $ 1,603,253 Low $ 1,508,944	$ 2,032,563 $ 1,938,253 $ 1,843,944
Remove Dispose Debris $ 0.97 /cy	High $ 167,233 Avg $ 167,233 Low $ 167,233	$ 2,199,796 $ 2,105,487 $ 2,011,178
Transport to Magic Island Facility for Transfer High $ 3.58 /cy Avg $ 3.38 /cy Low $ 3.18 /cy	High $ 619,556 Avg $ 585,136 Low $ 550,717	$ 2,819,352 $ 2,690,623 $ 2,561,894
Transport to Barge @ Magic Island Facility High $ 6.03 /cy Avg $ 5.69 /cy Low $ 5.36 /cy	High $ 1,042,866 Avg $ 984,929 Low $ 926,992	$ 3,862,218 $ 3,675,552 $ 3,488,886

Cost per cubic yard
High $ 22.32
Avg $ 21.25
Low $ 20.17

PROJECT DURATION

High	270.3	working days
Avg	255.3	working days
Low	240.3	working days

Assuming 5 working days per week,

High	54.1	weeks
Avg	51.1	weeks
Low	48.1	weeks

Relationship between Cost and Production Rate

High Cost	=	Low Production Rate (640 yd^3/d)
Avg Cost	=	Avg Production Rate (680 yd^3/d)
Low Cost	=	High Production Rate (720 yd^3/d)

ocean (cy) 45,500

non-ocean, use barge (cy) 127,500

Barge to sea & dump

High $ 8.33 /cy
Avg $ 7.87 /cy
Low $ 7.40 /cy

Cost per cubic yard
High $ 8.33
Avg $ 7.87
Low $ 7.40

Total Cost
High $ 378,930
Avg $ 357,878
Low $ 336,826

Barge to Sand Island

High $ 8.33 /cy
Avg $ 7.87 /cy
Low $ 7.40 /cy

Transport ashore & process
High $ 8.86 /cy
Avg $ 8.45 /cy
Low $ 8.04 /cy

Load from ponds & stockpile
High $ 1.57 /cy
Avg $ 1.48 /cy
Low $ 1.39 /cy

Load for disposal
High $ 1.57 /cy
Avg $ 1.48 /cy
Low $ 1.39 /cy

Truck to Sand Island Park & spread
$6.35 /cy

Cost per cubic yard
High $ 26.68
Avg $ 25.63
Low $ 24.58

Upland Total
High $ 3,401,063
Avg $ 3,267,719
Low $ 3,134,375

Barge to Reef Runway

High $ 11.15 /cy
Avg $ 10.53 /cy
Low $ 9.91 /cy

Transport ashore & process (lime)
High $ 8.86 /cy
Avg $ 8.45 /cy
Low $ 8.04 /cy

Load from ponds & stockpile
High $ 1.57 /cy
Avg $ 1.48 /cy
Low $ 1.39 /cy

Load for disposal
High $ 1.57 /cy
Avg $ 1.48 /cy
Low $ 1.39 /cy

Truck to disposal location at Reef Runway & spread
High $ 6.08 /cy
Avg $ 5.85 /cy
Low $ 5.63 /cy

Soil Management Facility mgt costs
$ 4 /cy

Cost per cubic yard
High $ 33.23
Avg $ 31.80
Low $ 30.37

Upland Total
High $ 4,236,188
Avg $ 4,053,969
Low $ 3,871,750

Barge to Barber's Point

High $ 33.10 /cy
Avg $ 31.26 /cy
Low $ 29.42 /cy

Transport ashore & process
High $ 8.86 /cy
Avg $ 8.45 /cy
Low $ 8.04 /cy

Load from ponds & stockpile
High $ 1.57 /cy
Avg $ 1.48 /cy
Low $ 1.39 /cy

Load for disposal
High $ 1.57 /cy
Avg $ 1.48 /cy
Low $ 1.39 /cy

Lease rent (fixed)
??????

Truck to disposal site & spread
Coral Sea $ 9.98 /cy
Nanakuli $ 10.15 /cy

Cost per cubic yard

Coral Sea		Nanakuli	
High	$ 55.08	High	$ 55.25
Avg	$ 52.65	Avg	$ 52.82
Low	$ 50.23	Low	$ 50.40

Upland Total

Coral Sea		Nanakuli	
High	$ 7,022,302	High	$ 7,043,977
Avg	$ 6,713,490	Avg	$ 6,735,165
Low	$ 6,404,679	Low	$ 6,426,354

Barge to Waipio Ash Landfill

High $ 13.43 /cy
Avg $ 12.64 /cy
Low $ 11.94 /cy

Transport ashore & process (lime)
High $ 8.86 /cy
Avg $ 8.45 /cy
Low $ 8.04 /cy

Load from ponds & stockpile
High $ 1.57 /cy
Avg $ 1.48 /cy
Low $ 1.39 /cy

Load for disposal
High $ 1.57 /cy
Avg $ 1.48 /cy
Low $ 1.39 /cy

Truck to disposal location at Reef Runway & spread
High $ 6.08 /cy
Avg $ 5.85 /cy
Low $ 5.63 /cy

Soil Management Facility mgt costs
$ - /cy

Cost per cubic yard
High $ 31.51
Avg $ 29.91
Low $ 28.40

Upland Total
High $ 4,016,888
Avg $ 3,812,923
Low $ 3,620,433

CUMULATIVE TOTAL COST= Dredge/handle + Ocean + Upland

Cost	Dredge/ handle
High	$ 3,862,218
Avg	$ 3,675,552
Low	$ 3,488,886

+

Ocean Disposal
$ 378,930
$ 357,878
$ 336,826

+

Upland Disposal
Sand Island
$ 3,401,063
$ 3,267,719
$ 3,134,375
Reef Runway
$ 4,236,188
$ 4,053,969
$ 3,871,750
Barbers Point: Coral Sea
$ 7,022,302
$ 6,713,490
$ 6,404,679
Barbers Point: Nanakuli
$ 7,043,977
$ 6,735,165
$ 6,426,354
Waipio
$ 4,016,888
$ 3,812,923
$ 3,620,433

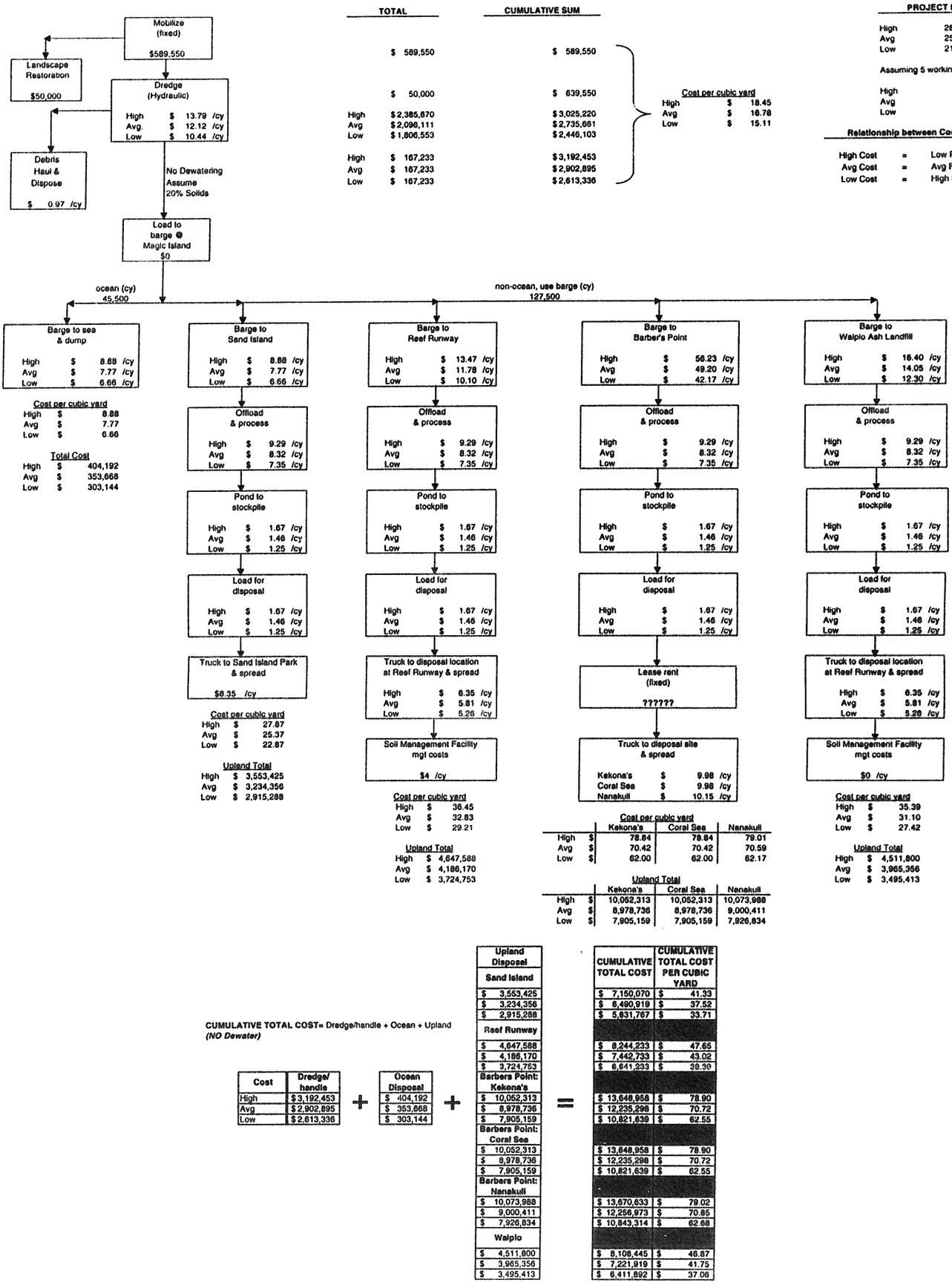
=

CUMULATIVE TOTAL COST	CUMULATIVE TOTAL COST PER CUBIC YARD
$ 7,642,210	$ 44.17
$ 7,301,149	$ 42.20
$ 6,980,088	$ 40.23
$ 8,477,335	$ 49.00
$ 8,087,399	$ 46.75
$ 7,697,463	$ 44.49
$ 11,263,449	$ 65.11
$ 10,746,920	$ 62.12
$ 10,230,392	$ 59.14
$ 11,285,124	$ 65.23
$ 10,768,595	$ 62.25
$ 10,252,067	$ 59.26
$ 8,258,035	$ 47.73
$ 7,846,353	$ 45.35
$ 7,446,146	$ 43.04

6/23/98

Ala Wai Cost Estimate: Hydraulic Dredging - No Dewatering

Total In situ Volume (cy) = 173,000



TOTAL	CUMULATIVE SUM
$ 589,550	$ 589,550
$ 50,000	$ 639,550
High $ 2,385,670	$ 3,025,220
Avg $ 2,096,111	$ 2,735,661
Low $ 1,806,553	$ 2,446,103
High $ 167,233	$ 3,192,453
Avg $ 167,233	$ 2,902,895
Low $ 167,233	$ 2,613,336

Cost per cubic yard
High $ 18.45
Avg $ 16.78
Low $ 15.11

PROJECT DURATION

High	288.3	working days
Avg	252.3	working days
Low	216.3	working days

Assuming 5 working days per week,

High	57.7 weeks
Avg	50.5 weeks
Low	43.3 weeks

Relationship between Cost and Production Rate

High Cost	=	Low Production Rate (600 yd^3/d)
Avg Cost	=	Avg Production Rate (700 yd^3/d)
Low Cost	=	High Production Rate (800 yd^3/d)

Cost per cubic yard	Kekona's	Coral Sea	Nanakuli
High	$ 78.84	78.84	79.01
Avg	$ 70.42	70.42	70.59
Low	$ 62.00	62.00	62.17

Upland Total	Kekona's	Coral Sea	Nanakuli
High	$ 10,052,313	10,052,313	10,073,988
Avg	$ 8,978,736	8,978,736	9,000,411
Low	$ 7,905,159	7,905,159	7,926,834

CUMULATIVE TOTAL COST= Dredge/handle + Ocean + Upland
(NO Dewater)

Cost	Dredge/ handle
High	$3,192,453
Avg	$2,902,895
Low	$2,613,336

+

Ocean Disposal
$ 404,192
$ 353,668
$ 303,144

+

Upland Disposal
Sand Island
$ 3,553,425
$ 3,234,356
$ 2,915,288
Reef Runway
$ 4,647,588
$ 4,186,170
$ 3,724,753
Barbers Point: Kekona's
$ 10,052,313
$ 8,978,736
$ 7,905,159
Barbers Point: Coral Sea
$ 10,052,313
$ 8,978,736
$ 7,905,159
Barbers Point: Nanakuli
$ 10,073,988
$ 9,000,411
$ 7,926,834
Waipio
$ 4,511,800
$ 3,965,356
$ 3,495,413

=

CUMULATIVE TOTAL COST	CUMULATIVE TOTAL COST PER CUBIC YARD
$ 7,150,070	$ 41.33
$ 6,490,919	$ 37.52
$ 5,831,767	$ 33.71
$ 8,244,233	$ 47.65
$ 7,442,733	$ 43.02
$ 6,641,233	$ 38.39
$ 13,648,958	$ 78.90
$ 12,235,298	$ 70.72
$ 10,821,639	$ 62.55
$ 13,648,958	$ 78.90
$ 12,235,298	$ 70.72
$ 10,821,639	$ 62.55
$ 13,670,633	$ 79.02
$ 12,256,973	$ 70.85
$ 10,843,314	$ 62.68
$ 8,108,445	$ 46.87
$ 7,221,919	$ 41.75
$ 6,411,892	$ 37.06

6/23/98

Ala Wai Cost Estimate: Hydraulic Dredging - With Dewatering

Total in situ Volume (cy) = 173,000

	TOTAL	CUMULATIVE SUM
Mobilize (fixed) $589,550	$ 589,550	$ 589,550
Landscape Restoration $50,000	$ 50,000	$ 639,550
Dredge (Hydraulic)		
High	$2,365,670	$3,005,220
Avg	$2,096,111	$2,735,661
Low	$1,806,553	$2,446,103
Debris Haul & Dispose $ 0.97 /cy		
High	$ 167,233	$3,192,453
Avg	$ 167,233	$2,902,895
Low	$ 167,233	$2,613,336
Dewatering Assume 20% Solids		
Dewater (Mechanical) @ Magic Island		
High	$4,325,000	$4,325,000
Avg	$2,595,000	$2,595,000
Low	$ 865,000	$ 865,000
Return flow to Ala Wai Canal		
High	$ 929,010	$5,254,010
Avg	$ 812,884	$3,407,884
Low	$ 696,758	$1,561,758
Load to barge (no lime/cement) Assumes 50% Solids		
High	$1,348,247	$6,602,257
Avg	$1,179,716	$4,587,600
Low	$1,011,185	$2,572,943

PROJECT DURATION

High	288.3	working days
Avg	252.3	working days
Low	216.3	working days

Assuming 5 working days per week.

High	57.7 weeks
Avg	50.5 weeks
Low	43.3 weeks

Relationship between Cost and Production Rate

High Cost	=	Low Production Rate (600 yd³/d)
Avg Cost	=	Avg Production Rate (700 yd³/d)
Low Cost	=	High Production Rate (800 yd³/d)

ocean (cy) 45,500

Barge to sea & dump

High	$ 9.93	/cy
Avg	$ 7.97	/cy
Low	$ 7.40	/cy

Cost per cubic yard: High $ 9.93; Avg $ 7.97; Low $ 7.40

Total Cost: High $ 379,909; Avg $ 362,778; Low $ 336,826

non-ocean, use barge (cy) 127,500

Barge to Barber's Point

High	$ 33.10	/cy
Avg	$ 31.26	/cy
Low	$ 29.42	/cy

Barge to Sand Island

High	$ 9.93	/cy
Avg	$ 7.97	/cy
Low	$ 7.40	/cy

Barge to Reef Runway

High	$ 11.16	/cy
Avg	$ 10.53	/cy
Low	$ 9.91	/cy

Barge to Waipio Ash Landfill

High	$ 13.43	/cy
Avg	$ 12.64	/cy
Low	$ 11.84	/cy

Transfer ashore & process

High	$ 8.86	/cy
Avg	$ 8.45	/cy
Low	$ 8.04	/cy

Transfer ashore & process (lime)

High	$ 8.86	/cy
Avg	$ 8.45	/cy
Low	$ 8.04	/cy

Load from ponds & stockpile

High	$ 1.67	/cy
Avg	$ 1.48	/cy
Low	$ 1.39	/cy

Load for disposal

High	$ 1.67	/cy
Avg	$ 1.48	/cy
Low	$ 1.39	/cy

Lease rent (fixed) ??????

Truck to disposal site & spread

Coral Sea	$ 9.98	/cy
Nanakuli	$ 10.15	/cy

Truck to disposal location at Reef Runway & spread

High	$ 6.08	/cy
Avg	$ 5.85	/cy
Low	$ 5.63	/cy

Soil Management Facility mgt costs

$0 /cy

Cost per cubic yard

	Coral Sea	Nanakuli
High	$ 55.09	$ 56.25
Avg	$ 52.66	$ 52.82
Low	$ 50.23	$ 50.40

Upland Total

	Coral Sea	Nanakuli
High	$ 7,002,302	$ 7,043,977
Avg	$ 6,713,490	$ 6,735,165
Low	$ 6,404,679	$ 6,426,354

Cost per cubic yard: High $ 33.10; Avg $ 31.26; Low $ 29.42

Upland Total: High $ 4,016,888; Avg $ 3,912,823; Low $ 3,808,758

Upland Disposal

Sand Island		CUMULATIVE TOTAL COST	CUMULATIVE TOTAL COST
High	$ 3,401,063	$ 13,574,709	$ 78.47
Avg	$ 3,297,719	$ 11,116,091	$ 64.25
Low	$ 3,194,375	$ 8,657,480	$ 50.04
Reef Runway			
High	$ 4,236,188	$ 14,409,827	$ 83.28
Avg	$ 4,053,969	$ 11,907,241	$ 68.83
Low	$ 3,871,750	$ 9,344,655	$ 54.01
Barbers Point:			
Coral Sea			
High	$ 7,002,302	$ 17,185,941	$ 99.40
Avg	$ 6,713,490	$ 14,561,863	$ 84.17
Low	$ 6,404,679	$ 11,927,764	$ 68.96
Barbers Point:			
Nanakuli			
High	$ 7,043,977	$ 17,317,616	$ 99.82
Avg	$ 6,735,165	$ 14,583,538	$ 84.39
Low	$ 6,426,354	$ 11,949,439	$ 69.07
Waipio			
High	$ 4,016,888	$ 14,190,527	$ 82.03
Avg	$ 3,912,823	$ 11,661,295	$ 67.41
Low	$ 3,808,758	$ 9,143,536	$ 52.85

CUMULATIVE TOTAL COST = Dredge/handle + Dewater + Ocean + Upland *(WITH Dewater)*

Cost	Dredge/ handle		Dewater		Ocean Disposal		
High	$3,005,220	+	$6,602,257	+	$337,670	+	$4,016,888
Avg	$2,735,661		$4,587,600		$357,776		$3,912,823
Low	$2,613,336		$2,572,943		$336,826		$3,808,758

6/23/98

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APPENDIX B
Terrestrial Flora Report

BOTANICAL RESOURCES ASSESSMENT
ALA WAI CANAL DREDGING PROJECT
HONOLULU DISTRICT, O'AHU

by

Winona P. Char

CHAR & ASSOCIATES
Botanical Consultants
Honolulu, Hawai'i

Prepared for: BELT COLLINS HAWAII

Revised March 1998

BOTANICAL RESOURCES ASSESSMENT
ALA WAI CANAL DREDGING PROJECT
HONOLULU DISTRICT, O'AHU

INTRODUCTION

Maintenance dredging of the Ala Wai Canal is proposed; the estimated duration of the dredging is 9 to 12 months. The limits of dreding along the Ala Wai Canal are from the Ala Moana Boulevard Bridge to the Kapahulu Avenue end. The Manoa-Palolo Drainage Canal, from the Ala Wai Canal to the Date Street Bridge, is also included within the project limits.

Land areas which would be disturbed during the dredging project are the bulky item handling site and the staging area. No disturbance to the canal walls are anticipated.

Field studies to assess the botanical resources found on the land areas which would be affected by the dredging project were conducted on 26 November 1997. The primary objectives of the field studies were to provide a general description of the vegetation on the proposed sites, and to search for threatened and endangered species as well as species of concern.

DESCRIPTION OF THE VEGETATION

The plant names used in the following discussion are in accordance with the most recent treatment of the Hawaiian flora by Wagner et al. (1990).

Bulky Item Handling

Bulky items from the canal may be stored on a barge and transferred to trucks at one or more of three locations: A) the parking lot at the end of University Avenue; B) near the Kapahulu end of the Ala Wai Canal via the access road to the Ala Wai Golf Course; and C) the Magic Island parking lot.

Option A: The asphalt-covered parking lot at the end of University Avenue services Ala Wai Neighborhood Park A. The vegetation immediately adjacent to the parking lot consists of a grassy lawn composed primarily of Bermuda grass or manienie (Cynodon dactylon) and Hilo grass (Paspalum conjugatum). Monkeypod trees (Samanea saman), 18 to 20 ft. tall, are found on the makai side of the lot, while a row of coconut palms (Cocos nucifera) grows on the mauka side of the parking lot. A few of the weedy species growing along the edge of the asphalt pavement include wiregrass (Eleusine indica), hairy spurge (Chamaesyce hirta), pitted beardgrass (Bothriochloa pertusa), and pigweed (Portulaca oleracea).

Option B: There is an asphalt-covered City and County parking lot on the mauka side of the access road just before the golf course parking lot. Where the lot faces the access road, there is a grassy strip with a row of monkeypod trees. Several smaller landscape plantings found on the lot include naupaka kahakai (Scaevola sericea) hedges, a few trees of kamanai (Calophyllum inophyllum), and oleander shrubs (Nerium oleander).

On the canal side of the golf course access road, there is a grassy strip composed primarily of pitted beardgrass with scattered plantings of date palm (Phoenix cf. sylvestris) on sandy substrate. Along the banks of the canal are scattered

patches of Indian fleabane (Pluchea indica), 2 to 3 ft. tall, and low mats of pickleweed (Batis maritima) and 'akulikuli (Sesuvium portulacastrum). Young saplings of American mangrove (Rhizophora mangle) and milo (Thespesia populnea) are also found along the canal banks. Other weedy species occurring here occasionally include swollen fingergrass (Chloris barbata), false mallow (Malva parviflora), golden crownbeard (Verbesina encelioides), Australian saltbush (Atriplex semibaccata), koa haole (Leucaena leucocephala), buffel grass (Cenchrus ciliaris), etc.

Option C: The asphalt-covered Magic Island parking lot supports plantings of monkeypod trees, 18 to 25 ft. tall, within concrete rimmed islands. Ground cover within these areas consists of a varied mixture of plants which include wedelia (Wedelia trilobata) -- a commonly planted, yellow-flowered ground cover specimen, Hilo grass, McCoy grass (Cyperus gracilis), West Indian dropseed (Sporobolus indicus), swollen fingergrass, Bermuda grass, kili-'o'opu (Kyllinga nemoralis), and creeping indigo (Indigofera spicata). Along the edge of the Magic Island parking lot where it fronts the boat harbor, the vegetation consists of a grassy lawn with a row of milo trees and coconut palms.

Staging Area

Land will be used for contractor staging and possible mechanical dewatering of the sediment. Locations being considered are: A) a portion of the Magic Island parking lot in the vicinity of the moored barge; B) Ala Wai Canal Neighborhood Park A (field closest to the parking lot at the end of University Avenue); and C) at the vacant lot across the street from the Convention Center.

Option A: This site is on a portion of the Magic Island parking lot which is also being considered for the bulky item handling.

Again, the parking lot supports several rows of medium-sized monkeypod trees, with each tree enclosed within a low, concrete rimmed island. At the base of each tree is a low cover of various grasses and weedy herbs and forbs. A grassy lawn with plantings of milo and coconut trees is found along the boat harbor area.

Option B: The Ala Wai Canal Neighborhood Park A field closest to the parking lot at the end of University Avenue supports primarily Bermuda grass and Hilo grass with smaller patches of pitted beardgrass, swollen fingergrass, wiregrass, creeping indigo, and West Indian dropseed. Small clumps or individual plantings of trees such as coconut, monkeypod, date palm, Madagascar olive (Noronhia emarginata), Pterocarpus sp., and Chinese banyan (Ficus microcarpa) are found around the field. Along the canal is a row of milo trees, about 15 ft. tall, and several hybrid Bougainvillea shrubs, 6 to 10 inches tall; these are in poor shape. Low mats of water hyssop (Bacopa monnieri) are planted along the canal wall.

Option C: The vacant lot across the street from the Convention Center and immediately south of the Hard Rock Cafe is leveled and covered with coarse gravel (crushed blue rock). Along the canal side of the vacant lot is a maintained planting of Bermuda grass and a row of banyan trees (Ficus sp.), 18 to 20 ft. tall.

DISCUSSION AND RECOMMENDATIONS

The proposed dredging project is sited on urbanized, developed lands. The vegetation on the sites proposed for the bulky item handling and the storage area is periodically maintained. These sites are dominated by introduced or alien plants, most of them used in landscaping. Introduced species are all those plants which were brought to the Hawaiian Islands by humans, intentionally or

accidentally, after Western contact, that is, Cook's discovery of the islands in 1778. Two of the plants observed on the sites are originally of Polynesian introduction; these are the coconut and kamani. Six of the plants found during the field studies are indigenous, that is, they are native to the Hawaiian Islands and also elsewhere throughout the Pacific. These species are: milo, 'akulikuli, ricegrass or mau'u laiki (Paspalum scrobiculatum), Pycreus polystachyos, naupaka kahakai or beach naupaka, and water hyssop. Both beach naupaka and water hyssop are frequently cultivated and used for landscaping material.

None of the plants found on the areas to be affected by the dredging project is a listed, proposed, or candidate threatened and endangered species; nor is any plant a species of concern (U.S. Fish and Wildlife Service 1997). The large banyan trees found on Ala Moana Park, across from the Magic Island parking lot site, are protected under the City and County of Honolulu's exceptional trees ordinance; the proposed project should not affect these trees.

Four of the sites are asphalt-covered parking lots. The vacant lot across from the Convention Center is covered by gravel. There are a few grassy strips of vegetation along the perimeters of these sites or a few rows of trees. The Ala Wai Canal Neighborhood Park A site is a large grassy field with scattered trees.

The areas cleared of vegetation will be relandscaped after the dredging project is completed. Wherever possible, it is recommended that trees and shrubs which would be directly impacted by the project be transplanted to a temporary holding area. The plants could then be replanted in about the same area after the work is completed.

LITERATURE CITED

U.S. Fish and Wildlife Service. 1997. U.S. Fish and Wildlife Service species list, plants. September 25, 1997. Pacific Islands Ecoregion Office, Honolulu, HI.

Wagner, W.L., D.R. Herbst, and S.H. Sohmer. 1990. Manual of the flowering plants of Hawai'i. 2 vols. University of Hawai'i Press and B.P. Bishop Museum Press, Honolulu. B.P. Bishop Museum Press Special Publication 83.

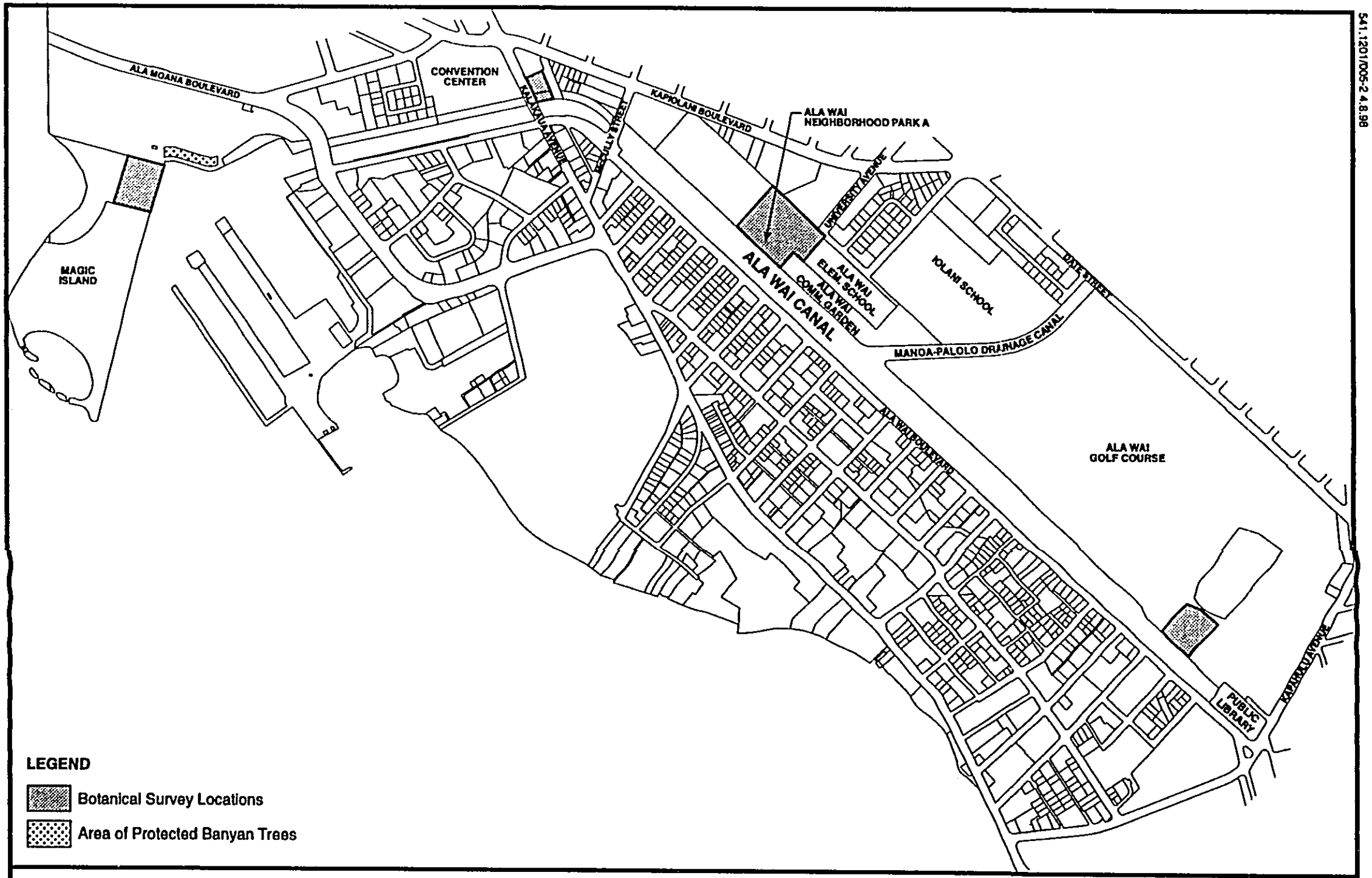

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Figure 1
BOTANICAL SURVEY LOCATIONS

Ala Wai Canal Dredging Environmental Assessment
Belt Collins Hawaii

TABLE 1: Plant List for Ala Wai Canal Dredging Project

Scientific Name	Common Name	Growth Habit
AIZOACEAE	**Fig-marigold Family**	
Sesuvium portulacastrum	'akulikuli	L
APOCYNACEAE	**Dogbane Family**	
Nerium oleander	oleander	S
ARECACEAE	**Palm Family**	
Areca sp.	Manila palm	T
Cocos nucifera	Coconut palm	T
Phoenix cf. *sylvestris*	date palm	T
ASTERACEAE	**Sunflower Family**	
Calyptocarpus vialis	————	L
Pluchea indica	Indian fleabane	S
Verbesina encelioides	golden crownbeard	L
Wedelia trilobata	wedelia	L
BATACEAE	**Saltwort Family**	
Batis maritima	pickleweed	L
BORAGINACEAE	**Borage Family**	
Tournefortia argentea	tree heliotrope	T
CHENOPODIACEAE	**Goosefoot Family**	
Atriplex semibaccata	Australian saltbush	L
CLUSIACEAE	**Mangosteen Family**	
Calophyllum inophyllum	kamani	T

Abbreviation Key:
L = low-growing or grass-like
S = shrub
T = tree

Scientific Name	Common Name	Growth Habit
CYPERACEAE	**Sedge Family**	
Cyperus gracilis	McCoy grass	L
Kyllinga nemoralis	kili'o'opu	L
Pycreus polystachyos	———	L
EUPHORBIACEAE	**Spurge Family**	
Chamaesyce hirta	hairy spurge	L
FABACEAE	**Pea Family**	
Leucaena leucocephala	koa haole	S
Samamea saman	monkey-pod tree	T
Indigofera spicata	creeping indigo	L
Pterocarpus sp.	———	T
GOODENIACEAE	**Goodenia Family**	
Scaevola sericea	beach naupaka	S
MALVACEAE	**Mallow Family**	
Malva parviflora	false mallow	L
Thespesia populnea	milo	T
MORACEAE	**Mulberry Family**	
Ficus spp.	banyan	T
Ficus microcarpa	Chinese banyan	T
NYCTAGINACEAE	**Four-o'clock Family**	
Bougainvillea spp.	bougainvillea	S
OLEACEAE	**Olive Family**	
Noronhia emarginata	Madagascar olive	T

Scientific Name	Common Name	Growth Habit
POACEAE	**Grass Family**	
Bothriochloa pertusa	pitted beardgrass	L
Cenchrus ciliaris	buffel grass	L
Chloris barbata	swollen fingergrass	L
Cynodon dactylon	Bermuda grass	L
Eleusine indica	wiregrass	L
Paspalum conjugatum	Hilo grass	L
P.scrobiculatum	ricegrass	L
Sporobolus diander	Indian dropseed	L
Sporobolus indicus	West Indian dropseed	L
PORTULACACEAE	**Purslane Family**	
Portulaca oleracea	pigweed	L
RHIZOPHORACEAE	**Mangrove Family**	
Rhizophora mangle	American mangrove	T
SCROPHULARIACEAE	**Figwort Family**	
Bacopa monnieri	water hyssop	L

Attachment
Exceptional Trees Ordinance

ORDINANCE NO. (GW) 78-91 BILL NO. 85 (1978)
(Draft No. 2)

A BILL FOR AN ORDINANCE TO AMEND THE REVISED ORDINANCES OF HONOLULU 1969, AS AMENDED, BY ADDING A NEW ARTICLE TO CHAPTER 13 RELATING TO EXCEPTIONAL TREES.

BE IT ORDAINED by the People of the City and County of Honolulu:

SECTION 1. The Revised Ordinances of Honolulu 1969, as amended, is hereby further amended by adding thereto a new Article to Chapter 13 to read as follows; further, the Corporation Counsel is authorized to add the appropriate numbers when codifying the R.O. 1969:

"Article _____

PROTECTIVE REGULATIONS FOR EXCEPTIONAL TREES

_____.1. Declaration of Legislative Intent.

The Council of the City and County of Honolulu desires to provide for better environmental control in order to improve the quality of life of its citizens by enacting protective regulations to safeguard exceptional trees. The purpose of this Article is to preserve exceptional trees within the City and County of Honolulu. The Council finds that not only are trees of value for their beauty, but that they perform an important ecological function in that they prevent soil erosion, purify the air, as well as retard flooding. The Council also finds that inasmuch as trees contribute to the beauty of the island, they are an important element in achieving the objectives of the New General Plan "to protect and preserve the natural environment of Oahu" and "to maintain the viability of Oahu's resort industry."

In the belief that protective regulations to safeguard exceptional trees will promote the health, safety and general welfare of the citizens of the City and County of Honolulu, the City Council enacts this ordinance as a means of preserving the environmental character of the City and County within the provisions of Act 105, Session Laws of Hawaii, 1975. The terms of this Article shall be liberally construed to effectuate the purpose stated herein.

_____.2. Definitions.

The term "exceptional trees," for the purposes of this Article, means a tree or grove of trees with historic or cultural value, or which by reason of its age, rarity, location, size, esthetic quality, or endemic status has been designated by the City Council as worthy of preservation.

_____.3. Arborist Advisory Committee.

There shall be an Arborist Advisory Committee consisting of five members who shall be appointed by the Mayor. The Committee shall include the Director of the Department of Land Utilization, or his designee; one member who shall be actively employed in the practice of landscape architecture, and three other members selected on the bases of active participation in programs of community beautification, or research or organization in the ecological sciences, including ethnobotany or Hawaiiana. The Committee shall be attached to the Department of Parks and Recreation for administrative purposes and the Director shall cause employees of his office to furnish such technical, administrative or clerical services as may be needed by the Committee.

_____.4. Powers and Duties.

The Arborist Advisory Committee shall have the following powers and duties:

(1) To research, prepare, and recommend to the City Council exceptional trees to be protected by city ordinance or regulation.

(2) To advise property owners relative to the preservation and enhancement of exceptional trees.

(3) To recommend to the City Council appropriate protective ordinances, regulations, and procedures.

(4) To review all actions deemed by the City Council to endanger exceptional trees.

_____.5. Procedures.

(1) Any citizen or citizen group may petition the Arborist Advisory Committee to examine a particular tree or grove of trees for the purpose of having it recommended to the City Council for designation as an exceptional tree.

(2) The Arborist Advisory Committee, on at least an annual basis, shall re-examine the exceptional trees and in the event such tree is found to be dangerous or diseased beyond repair, the Council, upon recommendation from the Committee, may remove such tree from the register.

(3) Upon designation by the Council of an exceptional tree, the City Clerk shall notify the property owner and/or the occupant of the property by registered mail that such a designation has been made.

_____.6. Enforcing Authority.

The Building Department, the Department of Land Utilization, and the Department of Public Works shall be charged with the enforcement of this ordinance and shall be clothed with police power to do all acts necessary to ensure that the provisions of this ordinance are not violated including, but not limited to, the issuance of citations for the violation of any provisions of this ordinance. The provisions of this ordinance shall not be superseded by any permit issued by any county agency under any other ordinance.

_____.7. Register of Exceptional Trees.

The following are hereby designated "exceptional trees":

*(1) Adansonia digitata, Baobab (Queen's Medical Center, 1301 Punchbowl Street, TMK: 2-1-35:3).

(2) Adansonia digitata, Baobab (Ala Moana Park, TMK: 2-3-37:1).

*(3) Agathis robusta, Australian Kauri, Queensland Kauri (Foster Botanic Garden, 180 North Vineyard Boulevard, TMK: 1-7-07:2).

(4) Agathis robusta F. Muell., Kauri (Harold L. Lyon Arboretum, 3860 Manoa Road, TMK: 2-9-55:6).

(5) Anacardium occidentale, Cashew Nut (Castle Ranch, 1385 Maunawili Rd., TMK: 4-2-09:1).

(6) Araucaria bidwillii, Bunya-bunya or Monkey Puzzle Tree (Castle Ranch, 1385 Maunawili Road, TMK: 4-2-09:1).

(7) Araucaria cunninghamii Sweet, Hoop Pine (Harold L. Lyon Arboretum, TMK: 2-9-55:6).

*(8) Araucaria cunninghamii, Hoop Pine (Foster Botanic Garden, TMK: 1-7-07:2).

(9) Araucaria excelsa, Norfolk Island Pine (Castle Ranch, 1385 Maunawili Road, TMK: 4-2-01:1).

(10) Arecastrum romanzoffianum, Queens Palm, Monkey Nut (10 in a row) (1071 Young Street, TMK: 2-4-02:27, 3).

(11) Artocarpus incisus, Breadfruit, 'Ulu (Castle Ranch, 1385 Maunawili Road, TMK: 4-2-09:1).

(12) Bertholletia excelsa, Brazil Nut (2616 Pali Highway, TMK: 1-8-08:1).

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* "Champion Trees of Hawaii," in American Forests, May 1974.

*(13) Bombax malabaricum, Red Silk Cotton, Simal Tree (Salmalia malabarica) (Queen's Medical Center, TMK: 2-1-35:3).

(14) Bucida Buceras, Jucaro (Ala Moana Park, TMK: 2-3-37:1).

*(15) Bumelia buxifolia, Ironwood (Foster Botanic Garden, TMK: 1-7-07:2).

(16) Calophyllum inophyllum, Kamani Tree, True Kamani, Alexandrian Laurel (Kualoa Regional Park--corner near Fishpond, makai of Kamehameha Highway, TMK: 4-9-04:1).

*(17) Canarium commune, Pili Nut, Java almond (Foster Botanic Garden, TMK: 1-7-07:2).

(18) Caryota cumingii Loddiges ex Martius, Fishtail Palm (Harold L. Lyon Arboretum, TMK: 2-9-55:6).

*(19) Caryota urens, Wine Palm, Toddy Palm (Wahiawa Botanic Garden, 1396 California Street, TMK: 7-4-17:1).

(20) Casuarina equisetifolia, Ironwood, Australian Pine (along Kalakaua Avenue from Kapahulu Avenue to Poni Moi Road, TMK: 3-1-43:1).

*(21) Catalpa longissima, Yoke Wood, Haiti catalpa (Foster Botanic Garden, TMK: 1-7-07:2).

*(22) Cavanillesia platanifolia, Quipo (Foster Botanic Garden, TMK: 1-7-07:2).

*(23) Cecropia obtusifolia, Trumpet Tree, Guarumo (Paradise Park, 3737 Manoa Road, TMK: 2-9-54:18).

(24) Ceiba pentandra, Kapok Tree (ground of State Department of Agriculture, 1428 South King Street, TMK: 2-4-5:18).

(25) Ceiba pentandra, Kapok Tree, Silk Cotton Tree (2 trees) (Foster Botanic Garden, TMK: 1-7-07:2).

*(26) Couroupita guianensis, Cannonball Tree (Foster Botanic Garden, TMK: 1-7-07:2).

(27) Couroupita guianensis Aubl., Cannonball Tree (University of Hawaii/Manoa Campus, next to parking lot, makai side of Sinclair Library, TMK: 2-8-23:3).

(28) Cyrtostachys lakka Beccari, Sealing Wax Palm (Harold L. Lyon Arboretum, TMK: 2-9-55:6).

*(29) Delonix regia, Royal Poinciana (Castle Ranch, 1385 Maunawili Road, TMK: 4-2-09).

(30) Elaedodendron orientale, False Olive (Foster Botanic Garden, TMK: 1-7-07:2).

(31) Enterolobium cyclocarpum, Earpod (Honolulu Zoo, 151 Kapahulu Avenue, TMK: 3-1-43:1).

(32) Enterolobium cyclocarpum, Earpod Tree (Board of Water Supply--Makiki Pumping Station, TMK: 2-5-20:1).

*(33) Enterolobium cyclocarpum, Earpod, Elephant's Ear (Foster Botanic Garden, TMK: 1-7-07:2).

(34) Enterolobium cyclocarpum, Earpod, Elephant's Ear (Grounds of State Department of Agriculture, 1428 S. King Street, TMK: 2-4-5:18).

(35) Enterolobium cyclocarpum, Earpod Tree (Waialua, TMK: 6-7-01: -).

(36) Erythrina sandwicensis, Wili-wili (Foster Botanic Garden at Koko Head Crater, TMK: 3-9-12:1).

*(37) Eucalyptus deglupta, Mindanao Gum, Bagras Eucalyptus (Wahiawa Botanic Garden, 1396 California Avenue, TMK: 7-4-17:1).

(38) Eugenia malaccensis, Mountain Apple (Castle Ranch, 1385 Maunawili Road, TMK: 4-2-09:1).

(39) Ficus, Banyan (Ala Moana Park, TMK: 2-3-37:1).

(40) Ficus benghalensis, Indian Banyan, Vada Tree (Iolani Palace Grounds, TMK: 2-1-25:2).

(41) Ficus benghalensis, Indian Banyan (Moana Hotel Courtyard, 2365 Kalakaua Avenue, TMK: 2-6-1:12).

(42) Ficus benghalensis, Indian Banyan (two beside the Judiciary Building, TMK: 2-1-25:3).

(43) Ficus benghalensis, Indian Banyan (Parking lot Walina Street, The Food Pantry Ltd., 2370 Kuhio Avenue, TMK: 2-6-21:100).

(44) Ficus elastica Roxb. ex Hornem., Indian rubber tree (University of Hawaii/Manoa campus, next to Campus Way, mauka side of Sinclair Library, TMK: 2-8-23:3).

(45) Ficus macrophylla, Moreton Bay Fig (Waikiki end of Queen Emma Square by St. Andrew's Priory School, 224 Queen Emma Square, TMK: 2-1-18:02).

*(46) Ficus religiosa, Bo Tree, Peepul Tree (Moanalua Gardens Foundation Inc., 1352 Pineapple Place, TMK: 1-1-9:4).

(47) Ficus religiosa, Bo Tree, Peepul Tree, Sacred Tree (2616 Pali Highway, TMK: 1-8-08:1).

(48) Ficus religiosa L., Bo Tree, Peepul Tree, Sacred Tree (University of Hawaii/Manoa campus, mauka end of Hawaii Hall, TMK: 2-8-23:3).

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(49) Ficus religiosa, Bo Tree (Foster Botanic Garden, TMK: 1-7-07:2).

(50) Garcinia mangostana, Mangosteen (3 in grove) (Castle Ranch, 1385 Maunawili Road, TMK: 4-2-09:1).

*(51) Guazuma Tomentosa, Guacima (South King Street).

(52) Hernandia ovigera Slickm., Jack-in-a-box fruit tree (University of Hawaii/Manoa campus, mauka-ewa side of Sinclair Library, TMK: 2-8-23:3).

*(53) Hyphaena thebaica, Doumpalm Gingerbread Palm (Foster Botanic Garden, TMK: 1-7-07:2).

(54) Kigelia pinnata, Sausage Tree (1071 Young Street, TMK: 2-4-02:27, 3).

(55) Kigelia Pinnata, Sausage Tree (James W. Tharp, 115 Kuukama Street, Kailua, TMK: 4-3-14:07).

*(56) Lagerstroemia speciosa, Queen Flower, Crepe Myrtle (Foster Botanic Garden, TMK: 1-7-07:2).

(57) Litchi chinensis, Litchi, Lychee (2616 Pali Highway, TMK: 1-8-08:1).

(58) Litchi chinensis, Litchi Nut, Lychee (Castle Ranch, 1385 Maunawili Rd., TMK: 4-2-09:1).

*(59) Lonchocarpus domingensis, Guama, Genogeno (Foster Botanic Garden, TMK: 1-7-07:2).

(60) Macadamia integrifolia, Macadamia Nut Tree, Queensland Nut (2616 Pali Highway, TMK: 1-8-08:1).

*(61) Mammea americana, Mammee apple (Department of Agriculture, 1428 S. King Street, TMK: 2-4-5:18).

(62) Mangifera indica, Mango (pirie) (2616 Pali Highway, TMK: 1-8-08:1).

(63) Manilkara zapota syn. Achras zapota, Chicle Tree (2616 Pali Highway, TMK: 1-8-08:1).

(64) Manilkara zapota syn. Achras zapota (two trees) (1071 Young Street, TMK: 2-4-02:27, 3).

*(65) Manilkara zapota syn. Achras zapota, Chicle (Foster Botanic Garden, TMK: 1-7-07:2).

(66) Manilkara zapota syn. Achras zapota, Chicle Tree (Judiciary Building Ewa Courtyard, TMK: 2-1-25:3).

(67) Metroxylon carolinensis, Ivory Nut Palm (grove of five) (Castle Ranch, 1385 Maunawili Road, TMK: 4-2-09:1).

*(68) Mimusops elengi, Pogada, Elengi Madras Gum Tree (Foster Botanic Garden, TMK: 1-7-07:2).

(69) Pandanus odoratissimus, Red Hala Pandanus (Swanzy Beach Park, TMK: 5-1-12:11).

*(70) Peltophorum inerme, Yellow Poinciana (Queen's Medical Center, TMK: 2-1-35:3).

(71) Phyllanthus emblica, Indian Gooseberry, Emblic, Myrobalan (2616 Pali Highway, TMK: 1-8-08:1).

(72) Pithecellobium dulce, Opiuma, Madras Thorn, Manila Tamarind (Fernhurst YWCA--1566 Wilder Avenue, TMK: 2-4-23:87).

(73) Pritchardia macrocarpa, Dwarf Loulu Palm (Foster Botanic Garden, TMK: 1-7-07:2).

(74) Prosopis pallida, Kiawe, Algaroba, Mesquite (1071 Young Street, TMK: 2-4-02:27, 3).

(75) Psidium cattleianum f. lucidium, Waiawi, Yellow Guava, Yellow Cattley (2616 Pali Highway, TMK: 1-8-08:1).

(76) Pterocarpus indicus, Narra (Tantalus Drive--on curve near #3665, TMK: 2-5-12:06)..

(77) Roystonea aleracea (Jacq.) O. F. Cook, South American Royal Palm (Harold L. Lyon Arboretum, TMK: 2-9-55:6).

*(78) Roystonea oleracea, Cabbage Palm (Foster Botanic Garden, TMK: 1-7-07:2).

(79) Roystonea regia, Royal Palm (Both sides of Royal Palm Drive, Wahiawa, TMK: 7-5-6:17, 18, 19, 20).

(80) Roystonea regia, Royal Palm (30 line old carriage road) (Castle Ranch, 1385 Maunawili Road, TMK: 4-2-09:1).

(81) Samanea saman, Monkeypod Tree, Rain Tree, Ohai (Borthwick, 420 Wyllie Street, TMK: 1-8-6:07).

(82) Samanea saman, Monkeypod Tree (Central Union Church--courtyard Atherton Chapel, 1660 South Beretania St., TMK: 2-8-11:02).

(83) Samanea saman, Monkeypod Tree (Along Paki Avenue, Kapahulu to Monsarrat, TMK: 3-1-43: ___).

(84) Samanea saman, Monkeypod Trees (Moanalua Gardens Foundation, Inc., 1352 Pineapple Place, TMK: 1-1-9:4).

(85) Sapindus saponaria, Soapberry (Ala Moana Park, TMK: 2-3-37:1).

*(86) Spondias mombin, Hog Plum (Foster Botanic Garden, TMK: 1-7-07:2).

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(87) Sterculia apetala, Panama (Ala Moana Park, TMK: 2-3-37:1).

(88) Sterculia foetida L., Skunk tree, Java olives, kelumpang, bangar (University of Hawaii/Manoa campus, ewa-makai corner of George Hall, TMK: 2-8-23:3).

*(89) Sterculia urens, Nawa (Queen's Medical Center, TMK: 2-1-35:3).

(90) Swietenia mahagoni, Mahogany Tree (Along Kalakaua between Beretania and Kapiolani Sts.).

(91) Swietenia mahagoni, Mahogany Tree (2616 Pali Highway, TMK: 1-8-08:1).

(92) Tamarindus indica, Tamarind (two trees) (1071 Young St., TMK: 2-4-02:27, 3).

(93) Tamarindus indica, Tamarind (Judiciary Building Ewa Courtyard, TMK: 2-1-25:3).

(94) Terminalia catappa, False Kamani, Tropical Almond (Foster Botanic Garden, TMK: 1-7-07:2).

(95) Thespesia populnea, Milo, Portia Tree (2616 Pali Highway, TMK: 1-8-08:1).

_____.8. Violation and Penalty.

It shall be unlawful for any person, corporation, public agency or other entity to remove or otherwise destroy any tree in the City and County of Honolulu which has been designated "exceptional" without approval from the City Council. Any person who violates this section shall be fined not more than $1,000.or ~~imprisoned not more than ninety (90) days, or both.~~ (Am. 10/26/78)

_____.9. Injunctive Enforcement.

Any threatened violation of the provisions of this ordinance is hereby declared to be a public nuisance and may be abated through proceedings for injunctive relief or similar relief in Circuit Court or other court of competent jurisdiction.

_____.10. Severability.

If any section, paragraph, subsection, clause or phrase of this ordinance is for any reason held to be unconstitutional or invalid, such decision shall not affect the validity of the remaining portions of this ordinance.

_____.11. Appeals.

Any person or persons aggrieved by an action of the City Council may within thirty (30) days of such action file an appeal to the Circuit Court.

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SECTION 2. Effective Date. This ordinance shall take effect upon its approval.

INTRODUCED BY:

Councilmembers

DATE OF INTRODUCTION:

August 9, 1978
Honolulu, Hawaii

APPROVED AS TO FORM AND LEGALITY:

Deputy Corporation Counsel

APPROVED this 9th day of November, 1978.

~~FRANK F. FASI~~ Mayor Acting Mayor
City and County of Honolulu

APPENDIX C
Terrestrial Fauna Report

INTRODUCTION

The purpose of this report is to present the findings of a bird and mammal field survey of property associated with the Ala Wai Canal Dredging Project, Oahu. References to pertinent literature are also included to provide a more comprehensive view of the project site.

The objectives of the field survey were to:

1- Document which birds occur on or around the site.

2- Gather data sufficient to suggest a relative abundance estimate for each bird.

3- Focus attention primarily on native seabirds, waterbirds, and migratory shorebirds.

4- Note which feral mammals occur in the area.

5- Identify any areas where native seabirds, waterbirds, and migratory shorebirds are most often found.

METHODS

The field survey was conducted between 11 February and 18 September 1997. Parts of nine different days were devoted to searching the area. These days were scattered over winter, spring, summer, and early fall. This was done in order to adequately evaluate the use of this area at different seasons, both when migrants were present and when they were absent. Observations were obtained at various times from dawn

to just after dusk.

Figure One shows the location of the field survey. Count stations were established in areas that afforded a clear view of the shoreline, or in areas where emergent and overhanging vegetation provided cover for birds. Any observations of waterbirds, seabirds, or migratory shorebirds seen between count stations were also noted. More detailed records were kept of native seabird, waterbird, and migratory shorebird activity. Introduced species were simply tallied and a relative abundance estimate for each species was determined from the count data.

Mammal observations were limited to visual sightings and evidence of their presence in the form of tracks and/or fecal remains. No trapping was conducted. This time-consuming activity was not considered justified, either economically or for purposes of this study.

Scientific names used in this report follow the most recent Check List of the Birds of Hawaii - 1997 (Pyle in press) and Mammal Species of the World (Honacki et al. 1982).

Weather during the course of the survey included both clear and stormy conditions. Most observations were taken during early morning or late afternoon/evening. Human disturbance was frequently a limiting factor on bird activity and/or presence. Most data were obtained on week days and where possible at times when human activity was less pronounced.

RESULTS

Data for this section are divided into categories relating to the species occurrence status. Endemic refers to species or subspecies unique to Hawaii. Indigenous includes those that occur naturally (not the result of man's interventions) but also can be found in other areas outside Hawaii. Migratory species spend the non-breeding season in Hawaii. Introduced birds were established in Hawaii by man.

Endemic Birds:

The only endemic bird recorded on the survey was the endangered Common Moorhen (Gallinula chloropus sandvicensis). This bird is endemic at the subspecies level. That means the species occurs in areas other then just Hawaii. The local Hawaii population of this species is, however, geographically and also morphologically distinct (physically different in appearance from other populations elsewhere within the range of this species). A pair of Common Moorhens were seen on three of the nine days of the survey. They were observed along Manoa-Palolo Drainage Canal on either side of the Date Street bridge. On each occasion they were foraging in the shoreline vegetation. Common Moorhen are members of the Rail family (Rallidae) and are usually shy retiring waterbirds that typically retreat into the vegetation when approached. This subspecies is listed by both the State of Hawaii and the United States Fish and Wildlife Service (USFWS) as endangered.

The primary reason they are presently endangered stems from a decline of their suitable habitat. They are waterbirds that generally prefer fresh to slightly brackish water with emergent vegetation and adequate shoreline cover for nesting and refuge. The majority of the area proposed for dredging is not typical Common Moorhen habitat. The area around Date Street Bridge along Manoa-Palolo Drainage Canal apparently is suitable, at least for this one pair. Two other endemic and endangered waterbirds that might on rare occasion occur in this area are the Hawaiian Duck (Anas wyvilliana) and Black-necked Stilt (Himantopus mexicanus).

Indigenous Birds:

The Black-crowned Night Heron (Nycticorax nycticorax) was the only indigenous waterbird tallied. This species is not at present listed as threatened or endangered by either the State of Hawaii or the USWFS. The Hawaii population is not considered morphologically distinct and hence is not designated as a separate subspecies. Night Herons are opportunistic feeders which take a wide variety of terrestrial and aquatic prey (Pratt et al. 1987, Hawaii Audubon Society 1993).

A total of six Black-crowned Night Heron were recorded on the survey. No more than two were noted on any one day. It is possible that the six birds tallied may not represent six different individuals but instead were two of three birds seen on repeated surveys. This species utilizes other wetlands near this site such as the Honolulu Zoo and other artificial ponds around Honolulu (pers. observations). The six sightings were all made in the early evening along Manoa-

Palolo Drainage Canal adjoining the Ala Wai Golf Course. Two birds were seen catching small fish. All of the birds were adults. In this species adults and juveniles are distinctly different in appearance (Hawaii Audubon Society 1993).

Three species of indigenous seabirds were observed during the course of the survey. They include the Great Frigatebird (Fregata minor), White-tailed Tropicbird (Phaethon lepturus) and White Tern (Gygis alba). None of these species are endangered or threatened. They were seen on four of the nine days. The White Tern nests in trees in Kapiolani Park and at several other locations around Honolulu. White-tailed Tropicbird nest on cliffs in the interior of the island. They can frequently be seen flying high overhead on their way to sea or inland to their nests. Great Frigatebirds are large black birds with long wings that are held bent at the wrist as they soar. This species will come to freshwater ponds and other open bodies of water like Ala Wai Canal to drink. They swoop low over the water surface and dip their bills to scoop up water. I saw this behavior twice during the survey. Both observations (on different days) were at the confluence of Ala Wai Canal and Manoa-Palolo Drainage Canal.

No other indigenous species were recorded. The Brown Booby (Sula leucogaster) can occasionally be seen near shore at the mouth of the Ala Wai Canal. Boobies are large seabirds with pointed bills and tails. They dive for fish along the coast and offshore but they do not use Ala Wai Canal for foraging.

Migratory Birds:

Three species of migratory shorebirds were noted. They include the Pacific Golden-Plover (Pluvialis fulva), Wandering Tattler (Heteroscelus incanus), and Ruddy Turnstone (Arenaria interpres). None of these species are listed as endangered or threatened. Breeding takes place in the arctic during May through July. They "winter" in Hawaii and on other Pacific Islands between August and late April.

An average of twelve Pacific Golden-Plovers were tallied during survey days that coincided with their normal period of occurrence (Aug-April). These birds were seen on lawns that adjoin the canal. This species has been intensely studied in Hawaii (Johnson et al. 1981, 1989). Their territorial behavior and faithfulness to a site permit the acquisition of fairly accurate census data.

Two Wandering Tattler were seen on three different days at the Kapahulu end of the Ala Wai Canal in the area used to launch canoes. In addition one tattler was seen along the Manoa-Palolo Drainage Canal mauka of Date Street. Wandering Tattler are not known to be territorial. This species typically forages in rocky intertidal habitats and along streams, sometimes far from the coast.

Ruddy Turnstone will utilize mud flats, intertidal reef flats and even lawns while on their wintering grounds. They usually stay in small flocks of five to ten individuals. A total of nine turnstones were seen during the survey. They were recorded on lawns and along a few sections of Ala Wai Canal near Kapahulu.

Introduced Birds:

Table One lists the introduced species recorded on the survey. These birds are the ones commonly seen in urban Honolulu. No unusual or unexpected species were found. Relative abundance estimates in Table One are provided for each species. Some species which were not observed such as the Barn Owl (Tyto alba) may occur infrequently at this location.

Feral Mammals:

Small Indian Mongoose (Herpestes auropunctatus), Roof Rats (Rattus rattus), Norway Rats (Rattus norvegicus), House Mouse (Mus musculus) and feral cats were all seen at various locations scattered along the length of Ala Wai Canal and Manoa-Palolo Drainage Canal. These species are all introduced (non-native). They were most noticeable at dawn and in the early evening. No population estimates were obtained for any of these mammals due to time constraints. To conduct such a survey would be both costly and time consuming and was not judged necessary given the scope of this faunal survey.

CONCLUSIONS

The Ala Wai Canal and adjoining areas effected by the proposed dredging project were surveyed for birds and mammals between February and September 1997. Native, migratory and introduced species were observed. Humans activity within and around the site is intense and

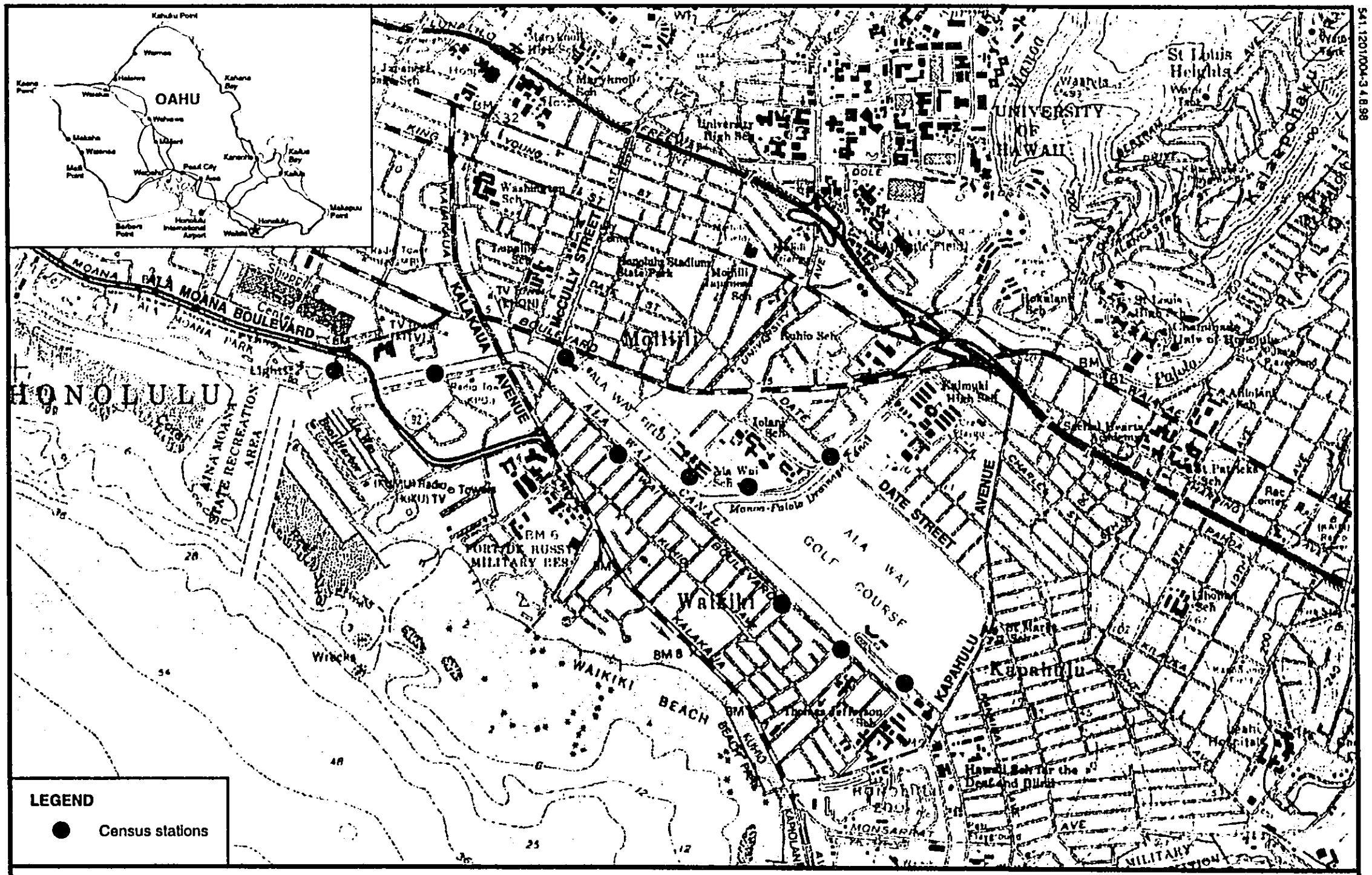
may limit the abundance of some species. Only one endangered species (Common Moorhen) was discovered. Indigenous seabirds and a waterbird (Black-crowned Night Heron) were also present. Migratory shorebirds utilize this area and nearby sites from August to late April. The array of introduced birds were consistent with published accounts and previous personal observations.

Relatively few native and migratory birds were found within the project area. This was undoubtedly due to limited suitable habitat, human disturbance and predator pressure from cats, dogs, mongooses and rats.

SUMMARY

Habitats usable by native waterbirds and migratory shorebirds are primarily concentrated along the area fronting the Ala Wai Golf Course and a small section of Manoa-Palolo Drainage Canal near the Date Street Bridge. This latter site was the only place an endangered species (Common Moorhen) was recorded. The pair of moorhen were seen foraging along the edge of emergent grass makai and Diamond Head of the bridge as well as just above the bridge. A subsquent search of this area in February 1998 failed to find these birds. Either they use the site only occasionally or have abandoned the area. The habitat suitable for these birds at this location is small and accessible to predators and human disturbance, which likely explains their disappearance. Emergent vegetation and trees along the Manoa-Palolo Drainage Canal makai of the Date Street Bridge are presently stablizing the shoreline against erosion.

Since few waterbirds and migrants were noted on the survey the proposed dredging of the Ala Wai Canal and adjoining drainages examined in this survey should have no significant impacts on the populations of these birds on Oahu. Given these results no mitigation measures for birds would seem warranted.



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Source of base map: USGS 1983 Honolulu Quadrangle

NORTH

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SCALE IN FEET

Figure 1
LOCATION OF THE FAUNAL SURVEY

Ala Wai Canal Dredging Environmental Assessment
Belt Collins Hawaii

TABLE 1

Introduced birds recorded at the Ala Wai Canal dredging project site, Honolulu. Relative abundance (R.A.) estimates are based on data from count stations. The following scale was used to indicate R.A. Abundant = A (average 10+ per count station in appropriate habitat), Common = C (average 5-10), Uncommon = U (average less than 5), Rare = R (total number recorded).

COMMON NAME	SCIENTIFIC NAME	RELATIVE ABUNDANCE (RA)
Spotted Dove	Streptopelia chinensis	C
Zebra Dove	Geopelia striata	A
Rock Dove	Columba livia	C
Red-vented Bulbul	Pycnonotus cafer	A
Red-whiskered Bulbul	Pycnonotus jocosus	U
Common Myna	Acridotheres tristis	A
Northern Mockingbird	Mimus polyglottus	R = 3
Northern Cardinal	Cardinalis cardinalis	U
Red-crested Cardinal	Paroaria coronata	5
Japanese White-eye	Zosterops japonicus	C
House Sparrow	Passer domesticus	A
Nutmeg Mannikin	Lonchura malacca	R = 10
House Finch	Carpodacus mexicanus	A
Java Sparrow	Padda oryzivora	R = 15

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APPENDIX D
Recreation Report

1.0 ALA WAI CANAL RECREATIONAL ACTIVITIES SURVEY

1.1 Purpose.

This survey of the recreational activities that take place in the waters of the Ala Wai Canal was conducted to provide baseline information for an environmental assessment (EA) of the Ala Wai Dredging Project. The information is intended to assist Belt Collins Hawaii in addressing environmental and social concerns regarding the dredging of the canal from the Ala Moana Boulevard Bridge to the Kapahulu Avenue end, and in the intersecting Manoa-Palolo Stream Drainage Canal to the Date Street Bridge.

1.2 Scope of Work.

1. Observing and identifying the recreational activities in the project area, including fishing, crabbing and other consumptive activities.
2. Interviewing the recreational user groups in the project area, including businesses and yacht clubs in the Ala Wai Boat Harbor.
3. Identifying the potential impacts of the project on the recreational user groups in the project area and making recommendations to mitigate the impacts.
4. Assisting other consultants with environmental and social concerns related to the recreational activities.

1.3 Survey Methodology.

Information for this survey was gathered from site visits and from interviews with people familiar with the Ala Wai Canal and the Ala Wai Boat Harbor areas. Site visits and interviews were conducted from January to December 1997. Additional information was gathered from the references that are listed in the References section.

During 1997, Eugene Dashiell of Environmental Plans & Assessments conducted two user surveys in regard to the Ala Wai Canal: one of outrigger canoe paddlers and one of fishers. Dashiell, coordinator of the Ala Wai Canal Watershed Water Quality Improvement Program, was assisted by two university student surveyors, Lisa Chau (fishers) and Kerri Cummings (paddlers), both of whom were consulted for this report.

2.0 PHYSICAL CONDITIONS.

2.1 Survey Area.

The survey area lies within East Mamala Bay, which is defined by the shoreline from Diamond Head to the Honolulu International Airport Reef Runway. Most of this shoreline is artificial, the result of extensive dredging of reef areas, the construction of artificial structures, and the filling of former wetlands, mudflats, fishponds, and shallow reefs. The Ala Wai Canal is one of the artificial structures, a product of the Waikiki Reclamation Project of the 1920s. The canal defines the north and west boundaries of Waikiki with Diamond Head the east boundary and Waikiki Beach the south boundary. The Ala Wai Boat Harbor and Channel at the mouth of the canal were also constructed by dredging, and Magic Island, which borders the west edge of the channel, is the result of a massive landfill project.

The survey area includes the canal, the boat harbor and the channel. Although the dredging will take place only within the canal, support operations for the dredging will take place in the harbor and channel seaward of the canal. An equipment barge will be moored next to Magic Island, adjacent to the Waikiki Yacht Club, and a second barge will be moored in the same area to transport sediment dredged from the canal out of the harbor. The barges will be about 100 to 150-feet long and will be towed in and out of the Ala Wai Channel. Dredged sediment will be transported to the sediment barge on small scows that can clear the bridges or will be pumped through a floating hydraulic pipeline that will extend from the dredge to the barge. All of

these support activities will occur in the harbor and the channel, so the survey area was extended seaward of the canal to include these sites.

The Ala Wai Canal, the Ala Wai Boat Harbor and the Ala Wai Channel lie within an ocean waters restricted area. Activities in this zone are regulated by the Division of Boating and Ocean Recreation, Department of Land and Natural Resources, State of Hawaii. Rules regarding the area are found in Hawaii Administrative Rules, Part III, Ocean Waters, Navigable Streams and Beaches (effective February 24, 1994) in Subchapter 6, South Shore Ocean Recreation Management Areas, Paragraph 13-256-91, Waikiki Ocean Waters Restricted Zones. The rules state that no person shall operate a vessel or watercraft at a speed in excess of slow-no-wake, and that commercial thrill craft are restricted to two zones, both of which are outside of the survey area. Other rules for boaters using this area may be found in Hawaii Administrative Rules Part II, Boating (effective February 24, 1994) in Chapter 244, Rules of the Road; Local and Special Rules, Paragraph 13-244-28, Waikiki Ocean Waters Restricted Areas.

2.2 Ala Wai Canal.

The Ala Wai Canal is an inland waterway 9,700 feet long (approximately 1.8 miles) and 250 feet wide. It begins behind the Waikiki-Kapahulu Library and ends at the Ala Moana Boulevard Bridge. Its banks are lined with concrete, except on its north side near the library where the banks are exposed soil. Three bridges span the canal, one at McCully Street, one at Kalakaua Avenue and one at Ala Moana Boulevard. Completed originally in 1929, the bridges were not designed to permit large boats to pass under them. Each bridge has undersides of low arches with a clearance of approximately 6 to 8 feet, depending on the height of the tide. These clearances permit smaller power boats that do not have cabins to pass below, but nothing larger. Outrigger canoes, kayaks, surf skis, rowing shells and other small craft pass easily under the bridges.

The inland location of the Ala Wai Canal makes it one of the largest and longest bodies of calm water in the Hawaiian Islands. Although Hawaii is surrounded by water, there are few sites along our shorelines that offer calm, protected conditions for flat water boating activities, and the majority of these sites are in use as harbors or marinas. With the seaward end of the Ala Wai Canal (at the Ala Moana Bridge) approximately 0.5 mile from the open ocean at the tip of Magic Island, the canal's waters experience the same tidal variations as the ocean, but are not impacted by ocean currents or seasonal surf. This makes the Ala Wai Canal one of the only sheltered public waterways in Hawaii that is not in use as a small boat harbor, a deep draft harbor, a marina or as a power boat transit corridor. It is, therefore, an ideal site for paddling and rowing activities all year.

The opportunities the canal affords for ocean recreation activities were recognized immediately after its completion, and it was soon in use by outrigger canoe paddlers for training and racing. Pau Street, immediately south of the McCully Bridge, means "finished" in Hawaiian. It was named by Bruce Cartwright, the original developer of the area, to commemorate the site of the finish line of one of the original canoe race courses in the canal. Today, training and racing by members of Oahu's paddling communities continues to be one of the major uses of the waterway.

Other Positive Features of the Canal. One of the features that makes the canal attractive to paddlers and rowers, in addition to its sheltered waters, is its safety. It is current-free, surf-free, power boat-free and lighted at night. Night lighting from the street lights and buildings bordering the canal are especially important for those paddlers and rowers who train after dark or before dawn. Canoes, kayaks and shells do not have running lights, so working out in the canal is much safer than in the open ocean. The boating and shipping lanes offshore Waikiki and Honolulu are heavily used at all times, and unlighted small crafts such as canoes pose a danger to larger vessels and endanger the paddlers themselves after dark.

Another feature that makes the canal attractive to paddlers and rowers is its dimensions. From its east end at the library to the McCully Bridge it measures a straight 5,800 feet (approximately 1.1 mile), providing an ideal point-to-point, no-turns race venue for any number of distances. Although the canal narrows at its

ends, its typical width of 250 feet allows for approximately 4 lanes for outrigger canoes and rowing shells and 8 lanes for kayaks. The design of the three bridges over the canal, with their wide based supports and low arches, does not permit racing beneath them. For this reason, race courses on the canal have traditionally been confined to the upper half of the canal between the library and the McCully Bridge. In addition, the canal banks between the McCully Bridge and the Ala Moana Bridges have high concrete retaining walls, which are too high to permit the launching of any boat, including small paddling crafts.

In contrast, the upper half of the canal, on its north side, has lower banks and three public parks: Ala Wai Neighborhood Park A at University Avenue and Ala Wai Community Parks 1 and 2 at McCully Street and Kapiolani Boulevard. The parks offer facilities, including floating docks, storage and staging areas for practices, scrimmages and smaller races. These parks do not have the space or the facilities, especially parking, to accommodate major regattas that draw thousands of participants and spectators. Two additional launching and landing sites are located outside of the public parks: one at the rear of Iolani School and the other at the east end of the canal behind the library. Both of these sites are well-used.

One final feature of the canal that makes it popular for ocean recreation is its central location within Honolulu. The city of Honolulu extends from Hawaii Kai to Salt Lake and is the most highly populated city in the state. The Ala Wai Canal is near the center of the city and, therefore, easily accessible to the paddlers and rowers who live and work in Honolulu.

Negative Features of the Canal. One of the negative features for paddlers and rowers is that siltation in the canal has accumulated to form several shallow deposits of soil and debris. These deposits have reduced the normal depths of the canal from the typical 10-12 feet to several feet or less, depending on the tide. These shallows are impassable for all paddlers and rowers, and, thereby, eliminate over half the width of canal for paddling or rowing in some places. The main deposits are at the confluence of the Manoa-Palolo Stream Canal and the Ala Wai Canal and at the Ala Wai Neighborhood Park A.

West of the McCully Bridge, the canal turns seaward and heads toward the Ala Wai Boat Harbor. This lower half of the canal is crossed by the Kalakaua Bridge, bisecting the second mile of the waterway and considerably reducing its value as a race venue. In addition, as previously noted, the lower half of the canal does not have park facilities or the ease of physical entry and exit that the upper half has. For this reason, it is used primarily as a transit zone from the upper half of canal to and from the harbor and open ocean.

The Ala Wai Canal was originally dredged to trap the fresh water runoff from the Manoa, Palolo and Makiki Streams and channel it out to sea at the west end of Waikiki. It still serves that function today, and additionally collects storm drain runoff from parts of Waikiki, Kaimuki, Diamond Head, Kapahulu and Moiliili. The runoff flows through the canal, through the Ala Wai Boat Harbor and finally, through the Ala Wai Channel into the open ocean where it is dispersed by ocean currents. Given its urban sources, the waters in the canal are among the most polluted in the State and are characterized by high turbidity, litter and debris. These conditions pose health risks for those who use the canal waters for recreation and consumptive activities. Anecdotal information suggests that paddlers and rowers are prone to severe infections from exposure to the canal waters. In addition, analyses of fish and crab tissues have shown residues of pesticides, including termiticides and lead. For all of these reasons, the canal is rarely used for in-water activities such as swimming, but rather for on-water activities such as paddling and rowing. Surveys of people fishing and crabbing have determined that almost half of them do not consume their catches because of their concerns about potential health risks.

2.3 Ala Wai Boat Harbor.

Ala Wai Boat Harbor is a public small boat harbor that lies at the west end of Waikiki. It is the only boat harbor in Waikiki. Situated between the mouth of the Ala Wai Canal and the open ocean, it consists of 663 berthing spaces, 39 mooring spaces and a two-lane launch ramp. Two businesses operate within the harbor, Ala Wai Marine, a boat supply and service center, and Ala Wai Harbor Fuel Services, a fueling service

center. Two private yacht clubs are situated within the harbor: Hawaii Yacht Club and Waikiki Yacht Club. Hawaii Yacht Club has 25 berthing spaces, and Waikiki Yacht Club has 135 berthing spaces.

2.4 Ala Wai Channel.

Ala Wai Channel connects the Ala Wai Boat Harbor with the open ocean and drains stream runoff from the Ala Wai Canal into the ocean. It is bordered on the east by a shallow fringing reef and on the west by Magic Island, a massive landfill project that consisted of filling in approximately 30 acres of shallow reef. Magic Island was completed in 1964 and is now part of Ala Moana Beach Park. A surfing site is located on the reef on the east side of the channel.

2.5 Canal Access Sites.

As one of Hawaii's most important inland waterways for ocean recreation, the Ala Wai Canal is accessed primarily from seven public sites: Waikiki-Kapahulu Library, Manoa-Palolo Stream Canal, Ala Wai Neighborhood Park A, Ala Wai Community Park 1, Magic Island, Ala Wai Boat Harbor, and Ala Wai Channel.

1. The Waikiki-Kapahulu Library access site, located behind the library complex at the east end of the canal, is accessed from the road leading to the Ala Wai Golf Course. It is used primarily by outrigger canoe paddlers, kayakers, and one-person canoe paddlers. The banks of the canal here are soil and not concrete walls, making it the only site on the Ala Wai Canal where the boats are walked into the water. The canoe clubs that train here have put down discarded carpet to protect the bare feet of the paddlers walking in and out of the canal.
2. The Manoa-Palolo Stream Canal access site is located at the rear of the Iolani School athletic field and is accessed from Laau Street where it intersects Date Street at the canal bridge. The banks of the canal here are soil and low enough to walk the boats in and out of the water. This site is used primarily by high school canoes clubs and by Waikiki Canoe Club during the summer paddling season.
3. The Ala Wai Neighborhood Park A access site is located in the park at the end of University Avenue. The banks of the canal here are concrete, so the canoe clubs that train here have constructed floating docks that move with the tide and provide a boat launching platform. It is used primarily by outrigger canoe paddlers, kayakers, and one-person canoe paddlers.
4. The Ala Wai Community Park 1 is located next to the McCully Bridge at the corner of McCully Street and Kapiolani Boulevard. It is the original access site on the canal for canoe paddlers and still the most heavily used. It is also the primary storage, training and racing site for shell rowers. Two floating docks have been constructed to facilitate launching and landing and the exposed concrete wall between the docks and the bridge has been covered with carpet to protect bare feet.
5. The Magic Island access site is outside of the canal at the eastern corner of Ala Moana Beach Park. Several canoe clubs have their headquarters here and occasionally make training runs up the canal.
6. The Ala Wai Boat Harbor access site is the public boat ramp in the harbor. Boaters with boats small enough to clear the undersides of the bridges launch here to access the canal. This is also the ramp that the Honolulu Fire Department uses to launch its rescue boats for emergencies in the canal.
7. The Ala Wai Channel access site to the canal is the channel itself. Power boats, sail boats, canoes and kayaks launched from outside of the Ala Wai Canal and Boat Harbor use the channel to access the canal.

3.0 RECREATIONAL ACTIVITIES.

Although the Ala Wai Canal is approximately 1.8 miles long and lined with bikeways, promenades and parks, its banks are vertical concrete walls and it, therefore, has no beaches. In addition, its waters are turbid, polluted and pose possible health risks. These factors have combined to deter many of the traditional activities such as swimming and sunbathing that are commonly associated with beaches and

other bodies of water such as ponds, streams, rivers and lakes. Even so, the canal is heavily-used for recreation, primarily for on-water as opposed to in-water activities. The on-water activities include use of paddling crafts such as outrigger canoes, surf ski kayaks, other kayaks, and one-person (solo) outrigger canoes. Secondary activities include fishing and crabbing from the banks, and boating. While these activities occur from one end of the canal to the other, they are concentrated primarily in the upper half between the library and the McCully Bridge. In addition to the recreational activities, several special events are held annually in the canal waters.

3.1 Outrigger Canoe Paddling.

Outrigger canoe paddling is Hawaii's official ocean team sport, annually attracting approximately 10,000 paddlers statewide. Canoe clubs are usually members of one of two associations: Na Ohana o Na Hui Waa (usually called Hui Waa) or Oahu Hawaiian Canoe Racing Association (OHCRA). The two associations meet annually to discuss scheduling and other administrative concerns and are jointly known as the Hawaiian Canoe Racing Association (HCRA). Both associations begin their short course regatta season in April and end with their state championships in August. Their long distance racing seasons begin in August immediately after the state championships and end on the second Sunday in October with the Molokai-to-Oahu race. In addition to the short and long distance seasons, there is also preseason activity with races from March to May.

The Ala Wai Canal has the single largest concentration of canoe clubs in the State. Hui Waa clubs on the canal include Kalihi Kai, Kamehameha, Lokahi, Waikiki Beach Boys, and Keala. Anuenue, Waikiki Yacht Club and Koa Kai also train in the canal, coming in from the harbor. Anuenue trains from Kahanamoku Beach fronting the Hilton Hawaiian Village, Waikiki Yacht Club trains from their facility, and Koa Kai trains from Ala Moana Beach Park on the Diamond Head side. OHCRA canoe clubs on the canal include Outrigger, Hui Lanakila and Healani.

In addition to the HCRA racing season from April to October, a high school racing season follows it from November to February. The Interscholastic League of Honolulu (ILH) includes Kamehameha, Punahou, Iolani, Mid Pacific and Pac 5. They practice at Ala Wai Neighborhood Park A and race at Magic Island. In summary, between the HCRA and ILH racing seasons, outrigger canoe training takes place every month of the year on the canal.

The six-person canoes are used during the canoe racing seasons, and the canal is also used daily by individual canoe paddlers. One-person or solo canoes are popular in the paddling community and have proved to be an efficient method of individual as opposed to group training. They are commonly seen in the canal.

Practice times for most clubs on weekdays is either early morning or late afternoon (before and after school and work); late afternoon is the more popular time. Practice times on Saturdays, Sundays and holidays vary depending on demands of the coaches and racing schedules. The highest intensity of use occurs during the height of the racing season, from May to August. The majority of this period is summer vacation for many of the younger paddlers, so they may also train during the day. One-person canoe paddlers practice at all times of the day throughout the year.

3.2 Kayaking.

Three types of kayaks are commonly seen on the Ala Wai Canal: ocean racing, flat water, and ocean touring . The first, ocean racing kayaks, were developed in Australia for competition in the ocean and are designed for straight ahead speed. Known as surf skis, they are narrow, 20-foot-long boats with an upturned bow like a water ski. Surf ski kayakers have their own racing season from January to May. This includes the Poai Puni Oahu Kayak Race Series. All races in the series are held in the open ocean. While most of the surf ski paddlers train in the ocean, some train in the canal. The ILH has a kayak training and racing program that utilizes the canal during October. They operate out of the Ala Wai Neighborhood Park

A and race on Saturday mornings or afternoons, depending on the Scholastic Achievement Test (SAT) schedules.

The second, flat water kayaks, are the traditional kayaks designed to be paddled sitting inside the boats rather than on top, like surf skis. They are paddled from November to June by members of the Hawaii Canoe Kayak Team, a group of junior paddlers in an Olympic development program. They operate out of the Ala Wai Neighborhood Park A.
The third, ocean touring kayaks, are stable kayaks made of polyurethane and designed for recreation rather than racing. They are paddled by occasional users.

3.3 Rowing Shells.

Competitive rowing was introduced to Hawaii in the late 1800s by King Kalakaua after he viewed it during a trip to England. Training and regattas were originally held in Honolulu Harbor, but some of this activity moved to the Ala Wai Canal after its completion. Rowing in the canal, however, was an irregular activity until 1995 when the Royal Hawaiian Rowing Challenge was established. This event is now an annual international rowing competition with crews coming from around the world. In 1998, collegiate teams came from Harvard, Stanford, Washington State, Kyoto, and University of Southern California, and open teams from Princeton, Westminster in England, Oregon, Honolulu and Kyoto. Practices were held during December and the races were in January. The four-day event included a one-day rowing clinic and three days of racing. It was staged at the Ala Wai Community Park 1.

International rowing competitions are staged with eight-person shells (boats) approximately 65-feet long and weighing 250 pounds. Rowing takes place on 2,000 meter, six-lane courses. However, the Ala Wai in its present condition can accommodate only four lanes for a distance of 1,000 meters between the end of the canal behind the library to the Manoa-Palolo Stream Canal. This is because the shallow sediment deposits between the Manoa-Palolo Stream Canal and the McCully Bridge preclude the use of almost half the width of the Ala Wai Canal, especially at low tide.

3.4 Power Boating.

Power boats are permitted in all areas of the canal, but must observe a slow-no-wake speed at all times. Thrill craft such as jet skis are prohibited in the canal. Power boats are normally in the canal to support training or racing activities by the paddlers and rowers or to assist with special events. Power boat operators occasionally motor up and down the canal for day and evening pleasure trips. In recent years this has become infrequent because of the danger posed to propellers by the shallow deposits in the upper half of the canal.

3.5 Fishing.

Fishing is a popular activity that takes several forms in the survey area, including pole fishing, throw netting, lay netting and crabbing. The majority of these activities take place from the banks of the canal, the harbor or Magic Island, and less frequently from boats. Popular free swimming species at all sites include papio, mullet, tilapia and barracuda. Some reef species such as manini are caught along Magic Island.

Pole fishing, especially whipping, is the most popular form of fishing along the Ala Wai Canal. Many of these fishers are older individuals who fish for pleasure rather than food gathering. Some throw their catches back, some use them for bait and some use them for cat food. Fewer than half of them consume their catches. Outside of the canal, in the harbor and on Magic Island, more than half of the fishers consume their catches. The perception among these fishers is that the harbor and channel waters are cleaner than those in the canal and that the catches from these waters pose a lesser health hazard. Ethnic populations that consume their fish include Caucasians, Chinese, Filipinos, Hawaiians, Japanese, Laotians, Samoans and others of mixed ancestry.

The most popular place for fishing outside of the Ala Wai Canal is in Ala Moana Beach Park on the Diamond Head side of Magic Island. In addition to whipping, fishers also shorecast into the harbor and the channel for papio and ulua. During the months of August and September, fishing for oama (juvenile goatfish) in the shallows is popular here. During the months of December and January, fishing for halalu, juvenile akule, also takes place.

Gill net fishing takes place infrequently in the Manoa-Palolo Stream Canal for mullet and other fish. The nets are normally set at night and retrieved in the early morning. Throw net fishing takes place infrequently along the edge of the Ala Wai Channel from the banks of Magic Island.
Crab netting takes place infrequently in the Ala Wai Canal and more frequently in the Manoa-Palolo Stream Canal up to the Date Street Bridge and in the smaller canal at the Ala Wai Golf Course Driving Range. Samoan crabs are the most popular catch because of their large size. Crab fishermen normally consume their catches. Often they will place the crabs in a tub of fresh water for several days, believing that this will "flush out" any hazardous substances the crabs may have acquired living in polluted water. Aama crabs, a popular luau dish, are found along the banks of the Ala Wai and the Manoa-Palolo Stream Canals, but they are not harvested as they are in other areas. The crab populations are too small to warrant the effort to catch them. No edible shellfish such as opihi are found along the banks of the canals.

3.6 Sailing.

Although two yacht clubs and many sailboats are located in the Ala Wai Boat Harbor, no sailing takes place on the Ala Wai Canal. The masts of even the smallest sailboats cannot clear the undersides of the bridges, so sailing takes place only in the harbor and the channel. In addition to boats simply transiting the harbor and the channel, both the Hawaii Yacht Club and the Waikiki Yacht Club have junior sailing programs that offer classes on water safety, knots, rigging and basic boat handling for students from 8 to 18 years old. The boat handling classes are held in the harbor between Hawaii Yacht Club and Magic Island.

Each summer, the Ala Wai Boat Harbor becomes the home port of two international yacht racing competitions: the Kenwood Cup Hawaii International Offshore Series, which is held on even-numbered years, and the Trans Pacific Yacht Race (Trans Pac), which is held on odd-numbered years. The Kenwood Cup includes a series of races around the Hawaiian Islands, and the Trans Pac is a 2,000 mile race from California to Hawaii with the finishing line at Diamond Head. Both of these events involve large, deep-draft racing yachts that are temporarily berthed in the harbor.

Following the completion of the Trans Pac, visiting boats are berthed in the 500 and 700 rows of the harbor. The slips in these rows are controlled by the Division of Boating and Ocean Recreation, Department of Land and Natural Resources, State of Hawaii. Following the completion of the Kenwood Cup, visiting boats are berthed in slips at both of the yacht clubs. The Kenwood Cup Committee gets the boats' sizes prior to their arrival in Hawaii and makes appropriate slips assignments. Members temporarily vacate their slips to accommodate the visiting boats. The state controlled slips that are used by the Trans Pac boats are not usually available during July and August when the Kenwood Cup is held. The area of the harbor designated for mooring the sediment barge is not used as a mooring site for boats from either race or as an overnight moorage.

The yacht clubs also conduct some local races that start and finish in the harbor. A traditional evening sail is held every Friday at 5:30 pm that begins at an imaginary line between the Hawaii Yacht Club flagpole and a palm tree on Magic Island. The boats race out of the harbor, turn on the entrance buoy to Honolulu Harbor and return to the start line.

3.7 Scuba diving.

No scuba diving occurs in the Ala Wai Canal. However, the Ala Wai Channel at the end of Magic Island is an intensely-used dive site for commercial introductory scuba diving tours. It is the only moderately deep

(over 25 feet) site in Waikiki that can be accessed on foot. Tour operators shuttle their customers, primarily Japanese tourists, to the Magic Island parking lot and then walk them out to the end of Magic Island. There they dive to the bottom of the channel and then circle around the tip of Magic Island to several patch reefs. Dive tour operators that use this site include: Sunshine Scuba, Hawaii Pro Dive, Breeze Hawaii, Ocean Concepts, Fantasea Island Divers, and Aaron's Dive Shop. The site is less frequently used by several independent instructors and by other independent divers.

3.8 Surfing.

No surfing occurs in the Ala Wai Canal. However, the fringing reef on the east side of the Ala Wai Channel is the home of one of the best surfing sites on Oahu's south shore, the Ala Moana Bowl. This site is heavily used every day of the year, no matter what the size of the surf, and is a popular competition site. The best and biggest waves normally occur here during the summer months from May to August. This is also when it is the most crowded and when most of the contests are held.

3.9 Special Events.

The Ala Wai Canal is used annually for several special events, including cultural events, corporate challenges, and fund raisers. They normally only take one-day to complete.

1. Honolulu Waterfront Canoe Challenge. This one-day event is sponsored by McCabe, Hamilton and Renny Co. Ltd. and is held every even-numbered year in March. It is a corporate challenge-type event in which teams from various businesses race each other in the canal. The race course is 8 lanes over ¼ mile from the McCully Bridge to the Ala Wai Neighborhood Park A, the staging area for the event.

2. Annual Ala Wai Challenge. This one-day event is an annual fund raiser for the Waikiki Community Center. It has been held in January for 13 years and includes ancient Hawaiian Makahiki games and outrigger canoe races. The canoe race course is 4 lanes over ¼ mile in the canal, using the Ala Wai Community Center and Community Park 1 as a staging area. Entry fees for the games and races are used to benefit the center.

3. Great Hawaiian Rubber Duckie Race. This one-day event is the United Cerebral Palsy Association's (UCPA) largest fund raiser, generating between $50,000 to $75,000 each year. It has been held annually since 1987 on the 3rd or 4th Saturday of March. UCPA has approximately 20,000 rubber ducks that are purchased with a suggested donation of $5 or more. The race consists of dumping the ducks over the side of the McCully Bridge and letting them drift with the currents and wind under the Kalakaua Bridge to the finish line fronting the Hawaii Convention Center. The finish line is an oil spill boom placed across the width of the canal. Prizes go to the first 50 ducks to reach the finish line. The rest of the ducks are then recovered using small power boats, usually inflatables.

4. Honolulu Toro Nagashi. This one-day event is an annual floating lantern ceremony that is part of the annual obon activities. It is held in the canal every year in August by the Tendai Mission. Participants donate $10 for a lantern 10 inches high to honor the memory of someone who has died. The lanterns are then lighted and stapled on wooden rafts approximately 3 feet by 12 feet. The Tendai Mission also provides several larger lanterns about 9 feet in circumference by 4 feet high and one large one 15 feet in circumference by 8 feet high. At the conclusion of the ceremony, outrigger canoes from Healani Canoe Club form a procession and tow the wooden rafts with the lighted lanterns from the end of the canal behind the library to McCully Bridge. The rafts and the canoes are recovered at Ala Wai Community Park 1. The mission does not consider the event to be a fund raiser, but does use the donations to defray its expenses.

4.0 IMPACTS ON REACREATIONAL ACTIVITIES.

Short Term Impacts. The Ala Wai Canal is the most heavily used inland waterway in the State for recreational activities, the majority of which are paddling activities using six-person outrigger canoes. Other paddling activities involve one person-outrigger canoes, surf ski kayaks, flat water kayaks, and recreational kayaks. With the paddling activities alone, the canal is in constant use every day of the year. The most intense period of use occurs during the short course canoe racing season from May to August. In addition to the paddling activities, rowing and to a lesser extent boating also occur on the canal, while fishing and crabbing take place from its banks. Finally, in addition to the daily and seasonal uses of the canal, several annual special events occur that are important cultural, social or fund raising activities for the sponsoring organizations. In summary, the Ala Wai Canal is a popular site that is heavily-used daily by a variety of recreational user groups.

Short term displacement impacts on almost all of the activities in the canal seem inevitable, given the 9 to 12 month estimate of the duration of the dredging. The barge and pipeline will impede access in areas where active dredging is taking place, but should not eliminate use of the canal for the majority of users. If the dredged sediment is pumped to a sediment barge in the Ala Wai Boat Harbor through a floating pipeline, the location of the pipeline may also limit access to other portions of the canal for users.

Ala Wai Neighborhood Park A has been identified as a possible location for a work support site. This park is used by paddlers and rowers, children who use the play apparatus, and seniors who play organized baseball. The field is in use almost every afternoon, and all day throughout the year on Saturdays and Sundays for softball and soccer. The bike path also has users at all times of the day with the heaviest traffic occurring in the mornings and late afternoons. Short term impacts to the park may be the loss of certain sections of the park for use as work support areas. These sections may include a portion of the makai parking lot and some of the shore area of the park along the canal. The remainder of the park should be left intact and accessible to park and canal users.

Short term impacts in the Ala Wai Boat Harbor may come from several sources. One might be the floating pipeline, if that is the method selected to transport the dredged sediment to the sediment barge moored in the harbor. The pipeline would have to be submerged to an adequate depth from the Ala Moana Bridge to the barge or it would prohibit boats from entering and exiting their slips, especially those at the Waikiki Yacht Club. This would be especially critical during the Kenwood Cup races when visiting boats with drafts of up to 14 feet will be moored at the Waikiki Yacht Club's slips.

Another source of a short term impact might be the location of the equipment and sediment barges. The proposed mooring site for both barges is adjacent to Ala Moana Beach Park on the Diamond Head side of Magic Island. This is an important canoe and kayak training and racing site, in addition to being the most heavily used fishing site in the project area. Their position may obstruct the activities in this area.

Short term impacts in the Ala Wai Channel may come from the dredging operations in the canal. Although the dredging contractor will take steps to prevent mud and other suspended sediment from flowing seaward, there is a possibility that mud plumes similar to those after heavy rains will flow into the open ocean. If this occurs, it will have a direct impact on the water clarity in the outer channel where commercial scuba diving tour operations take place almost daily from the end of Magic Island. For surfers across the channel at the popular Ala Moana Bowls site, water clarity will not affect the waves, but muddy water may increase their anxiety level as many surfers associate muddy water with possible shark attacks.

Long Term Impacts. No negative long term impacts are anticipated on the recreational activities occurring anywhere in the survey area. If anything, all activities in the canal should be enhanced once the project is completed.

5.0 RECOMMENDATIONS.

5.1 The dredging contractor should be required to provide a canal activities liaison who would be available daily for inquires regarding the interaction of the dredging operations and the canal activities. The liaison would preferably be the same person for the duration of the dredging. He/she should not only be available for daily inquiries, but should be pro-active and contact all of the users identified in this report to address their individual needs and concerns and keep them abreast of progress in the dredging schedule and operations.

5.2 There should also be a liaison from the State to assist with the communication between the canal users and the dredging contractor. The liaison should be a person who is familiar with the planning, organization and supervision of the recreational programs in the city parks on the canal, and the process for issuing permits for all of the fields, canoe areas and special events on the canal.

5.3 If a floating pipeline is used to transport the dredged sediment from the dredge to the sediment barge moored in the Ala Wai Boat Harbor, the contractor may want to consider the following:

1. Secure the pipeline as much as possible against the Ala Wai Boulevard canal bank. This will keep the pipeline away from the opposite bank where all of the parks and canoe/kayak practice sites are located, minimizing the impacts on their use of the waterway.
2. Sink the pipeline beyond the Ala Moana Bridge, otherwise boaters in the harbor will be prevented from entering or exiting their slips. The pipeline also needs to be sunk as deep as possible, especially during the summer when as many as 50 deep-draft Kenwood Cup racing yachts are in the harbor. Some of these boats draft up to 14 feet.
3. One possibility in the Waikiki Yacht Club area would be to run the pipeline under the club's docks and between their pilings nearshore. The slips in these areas are used primarily by shallow draft boats. Deep draft boats are moored in the outermost seaward slips.
4. If the pipeline is submerged in the harbor and may still pose a hazard to boats passing over it, then it should be clearly identified by buoys or some other similar means.

5.4 The equipment and sediment barges will probably be secured in the harbor with heavy mooring cables from each of the barges' four corners. The mooring cables should be clearly marked by buoys or some other similar means. The barges should also be moored to allow continued access to the ocean for the canoes and kayaks that utilize this area of Ala Moana Beach Park. In addition, high surf during the late spring and summer months periodically creates dangerous conditions for boaters in the Ala Wai Channel. Some consideration by the tug and barge operators should be given in regard to negotiating the channel during periods of high surf.

5.5 There is concern among some of the boaters in the harbor that the tug and barge operations may pose a hazard to navigation while transiting the Ala Wai Channel. Advance notice of the tug and barge movements to the Ala Wai Boat Harbor office and yacht clubs would help mitigate this concern.

5.6 If scows are used to transport sediment to the sediment barge, they will probably be towed by power boats. This will increase the boat traffic on the canal and in the harbor, but probably not to the extent that it would negatively impact the existing traffic. Given the limitations of the bridges over the canal, the scows and the tow boats will not be large vessels. They will also be required to travel at slow-no-wake speeds. During normal operations, they should not pose a safety or traffic problem. In the event that a scow overturns, sinks or spills its load, it would probably be advisable to have a contingency plan if a hazard to navigation or an environmental hazard is created.

5.7 All of the Ala Wai Canal user groups understand that their activities will be disrupted to some degree by the dredging activities, and they are receptive to the temporary inconveniences, realizing that the short term negative impacts will give way to long term positive impacts. However, they would like the inconveniences minimized as much as possible. Paddlers in particular would still like to be able to practice in the early mornings and in the afternoons after 4:00 pm. They would also like to suggest that

no dredging take place in the upper half of the canal from the library to the McCully Bridge from May to August, the height of canoe racing season.

5.8 While some of the races and special events held in the canal may be able to temporarily relocate elsewhere, some cannot. If the dredging contractor is working in the areas used by the Royal Hawaiian Rowing Challenge, the Great Hawaiian Rubber Duckie Race or the Honolulu Toro Nagashi, for example, when these events are scheduled, special consideration may have to be given to temporarily suspending or relocating dredging operations.

5.9 The dredging contractor should use equipment, such as silt curtains, to contain the mud and other sediment suspended by the dredging and prevent it from going out to sea.

5.10 The banks of the Manoa-Palolo Stream Drainage Canal from the Ala Wai Canal to the Date Street Bridge are partially protected by rock walls and several large stands of mangrove and kiawe. In several places the banks consist only of exposed soil sloping into the canal. There is concern among some of the user groups in this area that trimming or removing the mangrove and kiawe during dredging operations or dredging too close to the banks may threaten their stability and lead to erosion. This situation should be evaluated.

5.11 The dredging contractor should delineate the work areas from public recreation areas- water and land. In the water this might be buoy lines, and on land it might be fencing. Delineation will identify the areas that are not open for public access.

5.12 The dredging contractor should include signage at the delineated work areas stating that the areas are off limits to the public, including fishers and crabbers. Specific signage to discourage fishing and crabbing in areas of the canal where dredging may create high turbidity should also be considered.

APPENDIX E
Historic Sites Report

SURVEY AND EVALUATION OF THE EXISTING BUILT ENVIRONMENT AND ASSESSMENT OF IMPACTS OF THE PROPOSED ALA WAI CANAL DREDGING PROJECT ON HISTORIC ARCHITECTURAL RESOURCES

Prepared by
Mason Architects, Inc.

for
Belt Collins Hawaii

March 1998

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Mason Architects, Inc. prepared this historic architectural survey and assessment of impacts of the proposed Ala Wai Canal Dredging project under contract to Belt Collins Hawaii. Field work for the survey was completed by Barbara Shideler, AIA of Mason Architects in November 1997. Ms. Shideler is a trained professional in architectural history and historic preservation, and is a licensed architect in the State of Hawai'i. She has a Bachelor's Degree in Architecture and a Graduate Certificate in Historic Preservation, both from the University of Hawai'i at Manoa. She has had course work in American architectural history, as well as ten years of professional research experience in the field, and thus meets the professional qualification standards under Historic Architecture and Architectural History outlined in 36 CFR 61, Appendix A.

SURVEY METHODS-ARCHITECTURAL HISTORIANS

The field checks included a visual survey of the canal and the collection of data on historic resources associated with the Ala Wai Canal. Dates for architectural elements were confirmed by the National Register of Historic Places Registration Form for "The Ala Wai Canal" prepared by Erica Steele in May 1992. The National Register form was particularly informative, and provided most of the information in the history section of this report.

The files of the Hawai'i State Historic Preservation Office were checked to see if there were any buildings or structures, other than the Ala Wai Canal, which were already listed on the National Register of Historic Places or which had been declared eligible for the Register. These additional historic resources include the Kalākaua Avenue Bridge, the Ala Wai Park Clubhouse, and Ala Moana Park.

RESULTS-ARCHITECTURAL SURVEY

The Ala Wai Canal (State site number 80-14-9757) and Kalākaua Avenue Bridge (State site number 80-14-9994) were declared eligible for the National Register of Historic Places on October 28, 1985. The Ala Wai Park Clubhouse and Ala Moana Beach Park (State site number 80-14-1388) were listed on the Hawai'i Register as part of the "City and County of Honolulu Art Deco Parks and Playgrounds" thematic grouping on June 9, 1988. Other adjacent potential historic resources include the Date Street, McCully Street and Ala Moana Boulevard Bridges. The McCully Street and Ala Moana Boulevard Bridges do not meet the 50-year age criterion of the National Register of Historic Places, and do not appear to possess "exceptional importance" required for properties less than 50 years of age. The Date Street Bridge was identified as a potential National Register-eligible resource in the *Draft–State of Hawaii, Historic Bridge Inventory and Evaluation* prepared by Spencer Mason Architects in 1996.

Buildings and structures in areas adjacent to the project site were also briefly examined and evaluated against the National Register criteria. Other than the historic resources identified above, none of these properties appear to meet the National Register of Historic Places criteria.

DESCRIPTIONS OF HISTORIC RESOURCES

The existing resources within the proposed project area are discussed in three major groupings, each with its own subheadings: the Ala Wai Canal itself, the bridges across the canal, and adjacent buildings and structures.

Ala Wai Canal

The Ala Wai Canal is a two-mile long man-made waterway of variable depth and width located in the Waikīkī district of Honolulu (figures 2 and 3). The canal is fed by the Mānoa-Pālolo Drainage Canal which drains from the Mānoa and Pālolo valleys (figure 4), as well as a number of smaller streams, drainage ditches and storm sewers which also drain into the canal. It forms the boundary of the Waikīkī district, separating Waikīkī from the Makiki, Mō'ili'ili and Ala Moana areas of the city. Since its construction in the 1920s the canal has been used for recreational purposes which include boating (motoring, rowing and canoe paddling) and fishing.

The canal consists of two straight segments joined at Kalākaua Avenue by a forty-five degree elbow. The first (*makai*) segment of the canal, which opens to the ocean at the Ala Wai Boat Harbor, is 2,460 feet long and 164 feet wide. The second (*mauka*) segment extends about 7,700 feet from Kalākaua Avenue almost to Kapahulu Avenue and is 250 feet wide.

Both sides of the *makai* portion of the canal (between Kalākaua Avenue and Ala Moana Boulevard) are lined with trees. There is a sidewalk adjacent to the stone railing (figure 6) on the Waikiki side of the *makai* section and a larger landscaped area on the opposite side of the canal.

Along the Waikiki side of the *mauka* (mountain) portion of the canal is a public walkway that is a popular jogging path (figure 5). Along that Waikiki side are sixteen regularly spaced stairwells that drop down from the sidewalk to the canal's surface (figure 7). According to the National Register form, these additions to the canal landscape were made after the completion of the canal.

Other than the stairwells, there have been no major changes to the structure of the canal itself since its original construction. The canal is primarily defined by the stone walls that line the canal. The wall on the Waikiki side of the *mauka* portion of the canal is about six feet tall and was constructed first, to act as a dike, steering the water away from Waikiki. The grade level on the Waikiki side of the dike was raised to the top of the dike by fill from the canal dredging operations. On the golf course/park side of the *mauka* portion of the canal, the wall was constructed to just slightly above the level of high tide.

The walls on the *makai* portion of the canal (below Kalakaua) are different from those of the *mauka* portion. On the Waikiki side, the stone walls are about four feet above the water level, and are topped with similarly well fitted lava rock wall railing with regularly spaced small arched openings and a concrete cap. On the opposite side of the *makai* portion of the canal, the walls have all been covered with cement plaster. These walls terminate about 18 inches above the ground with flat plastered tops that are roughly at seat height for most of the length of the wall. Set further back from the canal wall on the same side is another plastered wall that allows for the grade behind it to be about 2 feet higher than the ground level immediately adjacent to the canal. At each end and in the middle of the *makai* length of the canal, steps have been constructed to get between these two levels.

Over the years, the original stone retaining walls have required some repairs. In 1950 work was done to prevent crumbling masonry from falling into the canal on the *mauka* portion of the canal.

Some new mortaring of the wall was done at this time and a low concrete bulkhead was added at the base of the Waikiki side of the canal in this portion to strengthen the base of the wall. At high tide the top of this bulkhead varies between zero and 6 inches above the water level.

While the original depth of the canal at the time of its construction was 10 to 25 feet, in 1990 the average depth of the canal was between 6 and 10 feet. Because of this, the canal has been dredged twice since its original construction, once in 1966 and again in 1978.

General Construction History

Prior to 1921, when construction of the Ala Wai Canal began, Waikīkī (literally, "spouting waters") was a rich and productive agricultural region. For centuries large *loko* (fishponds) and taro *lo'i* (terraces) were fed by the many springs that flowed in Waikīkī and amply supplied the native Hawaiians living in the area with food. By the late 1800s and early 1900s the Hawaiians had been joined by immigrant farmers who grew rice in the Waikīkī area to sell to immigrant workers on the sugar plantations.

In the nineteenth century, Waikīkī was a favored haunt of Hawaiian royalty. The area also became increasingly popular with the growing number of *haole* (foreigners) living in Honolulu at the turn of the century. Tourism and transportation services were established in the early twentieth century. As Waikīkī's popularity began to grow, the value of the area did not go unnoticed and the community began to develop and change. By 1921, the year construction of the Ala Wai Canal began, five major hotels had been constructed in Waikīkī. The wetlands (referred to by many as "swamp lands") could, in the eyes of many in Honolulu, be put to better use than raising ducks and growing rice - but only if the land could be filled or "reclaimed."

The original proposal to build the Ala Wai Canal was put forward in 1906 by Lucius E. Pinkham, then president of the Board of Health of the Territory of Hawaii. Pinkham recommended the reclamation of the Waikīkī district, proclaiming that the lands in Waikīkī were in a deleterious and unsanitary condition. He proposed to fill in the swamp lands to create an "attractive and charming" residential neighborhood.

Increased public concern over the mosquito problem and the potential spread of contagious and infectious diseases in Hawai'i was one of the most important factors leading to the construction of the Ala Wai Canal and the Waikīkī Reclamation Project. With the construction of the Ala Wai

Canal, the wetlands were drained and filled, eliminating what many considered to be a potentially serious health hazard. Another factor that led to the construction of the canal was the concern over the draining of wetlands on to the shores of Waikīkī's beaches, at a time when sunbathing was becoming increasingly popular and the number of visitors to Hawaii's beaches was growing. The proposed drainage canal would carry the runoff away from the Waikīkī beaches.

The reclamation of 625 acres would be accomplished by the construction of a "great lagoon" that would yield the necessary fill material and "create a quite marvelously beautiful, unique district, a Venice in the midst of the Pacific." Pinkham envisaged that the canal would be used for boating, providing an ideal course for racing. Thus while the canal would serve a recreational purpose upon its completion, the project would also provide the necessary fill for adjacent lands and to drain runoff from the Mānoa, Makiki and Pālolo valleys away from Waikīkī's beaches. While the proposal was shelved for a number of years, upon his appointment as governor of the Territory 1913, Pinkham devoted much of the energy of his four-year term to the implementation of his Waikīkī plan.

Under Governor Pinkham, the legislature appropriated $100,000 for the excavation of the canal. Much of the land in Waikīkī was acquired by a process of land condemnation. Under a 1896 law, the Board of Health could judge whether any land was unsanitary and require the owners to take the necessary steps to improve the land, which usually meant filling the area. While this practice was no great hardship for property owners who were interested in developing their land for residential or commercial purposes, for wetland farmers it essentially meant the eradication of their livelihood. In addition, if the land owners were financially unable (or unwilling) to fill the land, the government could undertake the improvement and cover the cost through a lien placed on the property. Through this process many wetland farmers in Waikīkī lost their land and livelihood.

By June 1920, eighty-five percent of the land required for the building of the canal had been acquired and bids to dredge the canal were solicited. In December 1920, the contract was awarded to the Hawaiian Dredging Company, owned by Walter F. Dillingham–one of only two bids received by the Territory for the project. In the same year, another $600,000 was appropriated for the canal and the boundaries of the reclamation project were confirmed. A commission was established to plan for boulevards, streets and parks within the district.

Two contracts were negotiated between the Territory of Hawai'i and Hawaiian Dredging Company for the construction of the canal. The primary agreement consisted of dredging a canal 60 feet wide

some two miles inland from the "sea beach at Ala Moana Road up to and intercepting the ʻĀpuakēhau Stream" (the outlet of which was near the Moana Hotel) and called for the construction of "a dyke 6 feet high and 10 feet wide at the top along the entire *makai* (south) side of this Canal." The contract for the second phase called for a canal to be dredged "from the sea beach at Ala Moana Road to a point about 500 feet toward the reef."

Construction began in 1921 and by January 1922 Hawaiian Dredging Company had completed the first phase of the project–the partial dredging of the inland canal–and was beginning work on the next phase–the seaward outlet. Due to the size of the hydraulic dredge–the "Kewalo"–used by the Hawaiian Dredging Company, the canal was widened from 60 to approximately 150 feet.

By mid-1923, the "Kewalo" had cut almost 6,500 feet towards Kapahulu Avenue, leaving a channel approximately 135 feet wide and 10-20 feet deep. By mid-1924, the canal was 150 feet wide and had been dredged "its entire length". Due to a lack of funds the channel at the Diamond Head-end of the canal, included in Lucius Pinkham's original proposal, was put on hold until "some later date, when funds are made available." Pinkham had recommended that the canal should exit back out to the ocean at Kapiʻolani Park, with tides gates at the both entrances to be closed at high tide and "the waters thus forced through the lagoon to exit at the Ala Moana bridge." This portion of the canal was in fact never completed, though in 1967 the local Rotary Club and other civic groups brought the idea up again–with no success.

In 1925, the City Planning Commission requested that citizens of Honolulu submit suitable names for the renaming of the Waikīkī drainage canal. Jennie Wilson, wife of Mayor Wilson, suggested the name *Ala Wai*, Hawaiian for "freshwater way" (Pukui, et al, 1974).

In order to provide additional fill for the McCully tract, a vast area of pondfields and fishponds, the canal was widened by 100 feet. By mid-1927 the filling of the McCully tract was completed and the canal was 250 feet wide almost to Kapahulu Avenue.

In 1928, the construction of the Ala Wai was thus completed and the dredge "Kewalo" exited the canal. That same year, the Honolulu Advertiser noted a dramatic increase in the value of land in Waikīkī. With a great increase in available property, numerous residential development projects were undertaken in the area. The number of visitors was also on the rise since the beginning of the reclamation project. Between 1921 and 1927, the number of visitors to Waikīkī doubled from 8,000 to 17,451 according to the Hawaiʻi Visitors Bureau. In addition, in 1927 a total of 19,567

"one-day tourists" visited Hawaii's beaches as they traveled on cruise ships stopping in the islands. This same year the visitor's bureau launched its largest ever campaign to promote Hawai'i and "put Waikiki and other attractions of the islands on the resort map," aggressively promoting Hawaii's "third industry–tourism (after agriculture and the military). Today tourism is the state's number one industry and Waikīkī is its core.

Despite the problem of pollution, the Ala Wai "water sports park" continues to be heavily used by Waikīkī residents and visitors. Throughout its history the canal has been a popular site for boating and fishing, and its banks are frequented by joggers and walkers. The Ala Wai Canal has been considered "one of the best courses for crew races in the U.S." and has been used by visiting crew's for training, including the Yale Olympic crew on their way to the games in Melbourne, Australia in 1956. The canal has been used regularly by local outrigger canoe clubs for many years. Until the 1970s numerous commercial boating operations operated along the Ala Wai. For many years fishing has been a popular activity along the banks of the Ala Wai; archival photos show fishermen's perches lining the sides of the canal. Today the perches are gone, though it is not uncommon to see people fishing in the Ala Wai's murky waters.

The Ala Wai Canal provides an important aesthetic dimension to the Waikīkī neighborhood with its open space and tranquil waters. While the land surrounding the Ala Wai has undergone incredible change in the last 71 years, the environment at the canal has remained relatively constant.

Statement of Significance

The Ala Wai Canal is significant for its pivotal role in the development of the Waikīkī district, first as a residential neighborhood and soon after as a world-renowned resort area. The reclamation project in Waikīkī, made possible by the dredging of the Ala Wai Canal, made a significant contribution to the eventual development of the State's tourism-based economy. Without the reclamation of the wetlands and fishponds used for agriculture and aquaculture farming through 1920, Waikīkī as we know it today would not have been possible. The structure, which the original promoter of the canal, Lucius E. Pinkham envisioned as a great lagoon to be used for boating and recreational purposes, remains in the midst of so much development, relatively unchanged, and continues to be used regularly used by paddlers and fishermen.

The Ala Wai Canal and the Kalākaua Avenue bridge were declared eligible for the National Register of Historic Places in 1985 for their contributions local and state history. The reclamation

project allowed Waikīkī to be transformed from an agriculturally productive region to a tourist mecca, upon which the state's economy has become increasingly dependent. The construction of the Ala Wai Canal has had a momentous impact on the development of the surrounding community and its economy, and on the economy of the entire state. In fact, the Ala Wai Canal remains one of the only reminders of the spirit of Waikīkī as it was in 1921.

Bridges

There are three venues by which one can cross the Ala Wai Canal - the Kalākaua Avenue Bridge (figure 8), the Ala Moana Boulevard Bridge (figure 9) and the McCully Street Bridge (figure 10). The present Date Street Bridge (figure 11) was constructed in 1937 to span the Mānoa-Pālolo Drainage Canal. The Ala Moana Boulevard Bridge was constructed in 1970, the McCully Street Bridge also appears to date from approximately this time. Consequently, they do not meet the 50-year age criteria required for nomination to the National Register of Historic Places, and do not appear to possess "exceptional importance" necessary for properties less than 50 years of age. The other two bridges have been declared eligible, or may be potentially eligible, for the National Register and are described below.

Kalākaua Avenue Bridge

The Kalākaua Avenue Bridge was constructed along the major transportation artery to Waikīkī. This was the first permanent bridge in this location after the dredging of the Canal. The Kalākaua Avenue Bridge is the only historic multiple-span marine reinforced-concrete arch of its kind in the state; and the bridge's neo-classically influenced Art Deco styling makes it one of the most decorative bridges in the island. The Kalākaua Avenue Bridge was determined eligible for the National Register of Historic Places in October 1985.

When the Ala Wai Canal was originally constructed, only temporary bridges crossed it, to allow the dredge "Kewalo" to move freely about the area. The Kalākaua Avenue Bridge was built upon completion of the dredging. The bridge was designed by James O. Yapp of the Territorial Highways Department and constructed by R.E. Woolley in 1929 for a cost of $103,900. The concrete arch bridge has three spans with a maximum span of 50 feet and a total length of 141 feet. The reinforced-concrete parapets feature an embossed diamond pattern and peaked concrete rail

cap; decorative pilasters; scrolled volute end piers. The bridge name and date of construction are incised on end piers.

The bridge's setting has urbanized as a result of the extensive development of Waikīkī area in the 1960s-80s. The original Art Deco-style arch design and reinforced-concrete materials remain intact, with the exception of the removal of the glass globe street lamps on the end piers. The quality of workmanship is high with no evidence of significant additions or repairs. The bridge's historic association, as an important civic structure associated with the development of Waikīkī, is readily apparent to traffic traveling along Kalākaua Avenue and the Ala Wai Canal. Interpretation is aided by the inscription of the bridge name and date of construction on the end piers. The bridge retains its historic feeling due to its decorative design and now uncommon construction type.

The Kalākaua Avenue Bridge is significant for its contributions to the areas of engineering and transportation in Hawai'i. The 1929 bridge is an excellent example of reinforced-concrete solid-spandrel arch construction in the then popular Art Deco style. The Kalākaua Avenue Bridge is associated with public works efforts by the Territory of Hawai'i, and as an important civic structure associated with the development of Waikīkī, the internationally renown beach resort on the Island of O'ahu. Moreover, the bridge contributed to the economic development of Honolulu and Waikīkī by providing reliable vehicular access to the recently established resort area.

Date Street Bridge

The Date Street Bridge carries Date Street over a channelized portion of the Mānoa-Pālolo Stream at the edge of Waikīkī near the Ala Wai Golf Course. The stream drains into the Ala Wai Canal. The bridge is an early (pre-World War II) reinforced-concrete rigid frame structure. The *Art Moderne*-style bridge features a streamlined, geometric construction and curved parapets and end piers. The date "1937" and "WPA" (Work Progress Administration) appear on the parapets.

The Date Street Bridge was constructed in 1937 with a reinforced-concrete rigid-frame for a cost of $63,065.75. The bridge has three spans with a maximum span of 56 feet and a total length of 114 feet. The structure is notable for its decorative solid reinforced-concrete parapets with rounded concrete rail cap.

The Date Street Bridge's original rigid frame design and reinforced-concrete materials remain intact. The quality of workmanship is quite high and the rigid-frame bridge was technologically

innovative for its time. The bridge is obviously the work of skilled workmen, who constructed its decorative *Art Moderne*-style parapets and end piers. The bridge's historic association (as a Works Progress Administration project) is apparent to pedestrian and automobile traffic along Date Street due primarily to the inscription on the parapets. The bridge's historic feeling is primarily evident through its *Art Moderne*-styling which was typical of the 1930s.

The Date Street Bridge is significant for its contributions to the areas of engineering and transportation in Hawai'i. The 1937 bridge is an excellent example of reinforced-concrete rigid-frame construction in the *Art Moderne* style. The Date Street Bridge is associated with public works efforts by the City and County of Honolulu during the Territorial period, and as a Works Progress Administration (WPA) project constructed as part of federal Depression-relief efforts. Moreover, the bridge contributed to the economic development of Honolulu and Waikiki by providing reliable vehicular access to the recently established resort area. It is an innovative example of bridge design utilizing new engineering technology, as well as for its aesthetic merit.

The Date Street area of Honolulu was developed as a new residential community adjacent to Waikīkī after the dredging of the Ala Wai canal in 1921-24. The reclaimed land between Date Street and the new canal was occupied by the Territorial Fair Grounds and, in 1938, developed into the Ala Wai Golf Course. The construction of the bridge is associated with the growth of Waikīkī, the internationally known beach resort on the Island of O'ahu, and the surrounding residential areas.

The Date Street Bridge is one of the first reinforced-concrete rigid-frame bridges constructed in the islands, and one of only five of this type built prior to WW II. Its streamlined *Art Moderne* styling makes it one of the more distinctive bridges on O'ahu. The bridge was designed by Clarence Loo of the City and County Engineer's Office; the builder is unknown. Reinforced-concrete rigid-frame spans are the most sophisticated of the pre-WWII bridges from an engineering perspective. The abutments and deck of rigid-frame bridges are constructed as one solid piece of concrete enabling the slab to double or triple the previous achievable span of twenty feet. The technology was not used in Hawai'i until 1936, when William R. Bartels of the Territorial Highways Department developed the plans for the Wahiawa Bridge on Kaua'i and the Ka'ahumanu-Naniloa Overpass in Wailuku, Maui. These were followed the next year by the construction of the Hi'onomoa and Moa'ula Bridges on the Island of Hawai'i, and the Date Street Bridge on O'ahu.

Buildings and Resources in Areas Adjacent to the Project Site

In addition to the highrises and condominiums that line the banks of the canal, the Ala Wai Park Clubhouse, a municipal golf course, an elementary school, and a small urban park run along the *mauka* side of the canal. At its outlet to the sea, the canal passes under Ala Moana Boulevard and along Ala Moana Park. Only the Ala Wai Park Clubhouse and the Ala Moana Park are recognized as historic resources.

Ala Wai Park Clubhouse

The Ala Wai Park Clubhouse is situated at Kapiolani Boulevard and McCully Street on a 3.5 acre parcel that was the first developed section of Ala Wai Park. The building was constructed in 1937. It was designed by architect Harry Sims Bent, who designed many other Art Deco style parks for the City and County of Honolulu. Bent came to Honolulu to supervise the construction of the Honolulu Academy of Art for the New York firm of Bertram Goodhue and Associates. Bent was one of a group of architects who advocated the development of a regional form of architecture appropriate to Hawai'i.

The main structure is a single story, painted brick clubhouse with a cedar shake hipped roof. The low-pitched roof with its overhanging eaves and exposed rafters, dominates the structure. Other noteworthy features include curved entry walls, iron gates, and stylized canoe paddle ornamentation. The U-shaped building faces the Ala Wai Canal and is dominated by a large central open space which may be used as a ballroom. This area is separated from the *lanai* on the south side by a three foot high iron balustrade. The lanai is partially covered with corrugated iron roofing on the north side and east wing. A scalloped brick wall separates the lanai from the canoe landing area. A rock wall encloses the park on the street sides. The wall dates from 1937; however, the McCully Street side was rebuilt in the 1960s following the widening of the street.

The two wings of the building are enclosed and contain office, storage and kitchen spaces. Originally these were used to store canoes. Hallways bisect the wings and provide access to the central open space from the surrounding paved parking lots. The only addition is the kitchen built by the Navy during World War II on the northwest side. It is in keeping with the scale and style of the original structure.

The Ala Wai Park Clubhouse is significant for its associations with the development of the City and County of Honolulu's parks in the 1930s. It is significant for its Art Deco styling, which reflected national trends in architecture, while relying on local materials such as coral and sandstone, and locally inspired artistic embellishments. The building is also strongly associated with Hawaiian outrigger canoeing.

The main building was constructed in 1937 as a clubhouse for rowing clubs, used the Ala Wai Canal as a practice ground. This building is representative of the Honolulu Parks Board's architecture of the 1930s and was one of the major structures constructed by the Board in the 1930s. During World War II, the building was used as a Navy Officer's Club. In 1951, the Navy turned the structure over to the City and County of Honolulu's Parks Department, which converted the structure into a community clubhouse.

The history of canoeing goes far back into island tradition. During the 1930s the sport was in imminent danger of dying out, but with the construction of the clubhouse an immediate revival of interest in the sport was felt. The building is important to the community as a center for canoeing activities on the Ala Wai Canal, and still remains a focal point for this sport.

Ala Moana Park

Ala Moana Park is a 76 acre beach park located along Ala Moana Boulevard. It features a mile-long, white sand beach, an offshore coral reef and lawns dotted by lagoons and tropical vegetation. The eastern "Oriental" lagoon was designed "in the characteristic Chinese and Japanese manner." The western one was the "Hawaiian" lagoon, "featuring native palms and plants." A canal runs along the *mauka* (toward the mountain) side of the park and diverts water from the mountain streams to the lagoons at either end. A drive loops through the park, running parallel to and near the beach for most of its route. The beach itself was created in 1955.

Ala Moana Park is an entirely man-made development. Its oceanfront bathing area has been carved from the fringing reef. Its beach the creation of hydraulic engineers. The park lands are tidal areas filled by excavating the offshore reef. The land on which it stands was purchased by the City and County of Honolulu in 1928, even though the city had been using the site as a garbage and refuse dump since the turn of the century. The idea of a park on the present site of Ala Moana Park can

be traced to the 1920s, and an interest in civic beautification among socially prominent Honolulu women, especially those involved in the Outdoor Circle.

Louise Dillingham, who was president of the Outdoor Circle from 1929 to 1931 and a member of the City's Shade Tree Commission, the predecessor of the Honolulu Park Board, was an outspoken proponent of the park and fashioned some of the initial ideas for the park's form. In 1931, the Honolulu Park Board hired Catherine Jones Richards and Robert O. Thompson, major landscape architects of the period in Honolulu, to plan the park. Their proposal for the spatial arrangement of the two lagoons and alternating areas of massed foliage and wide open spaces continues to delineate the contours of the park's design today.

Harry Sims Bent was responsible for the design of such structures as the Waikiki entrance portals (completed 1934), the canal bridge (completed 1934), a lawn bowling green (completed 1939), and the sports pavilion with its banyan courtyard (completed 1937). Bent also designed the Ala Wai Park Clubhouse in 1937. In addition, federal relief labor constructed a small boat harbor, tennis courts, dressing rooms and showers. According to the National Register nomination form, the park stands as "the crowning achievement of the golden-age of Honolulu park design during the 1930s."

FEDERAL REGULATIONS PERTAINING TO HISTORIC PROPERTIES

National Register of Historic Places Criteria

The National Register of Historic Places (NRHP), in title 36, part 60 of the Code of Federal Regulations (referred to as 36 CFR 60), defines the criteria for legally evaluating the significance of cultural resources as the following:

> The quality of significance in American history, architecture, archeology, engineering, and culture is present in districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feeling, and association, and:
>
> A) that are associated with events that have made a significant contribution to the broad patterns of our history; or
>
> B) that are associated with the lives of persons significant in our past; or

> C) that embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or
>
> D) that have yielded, or may be likely to yield, information important in prehistory or history (U.S. Dept. of Interior; 1991: p. 37).

The National Register also includes a section called "Criteria Considerations" which explains that ordinarily properties that are less than fifty years old will not "be considered eligible for the National Register" unless they are "of exceptional importance." The Hawai'i State Register of Historic Places utilizes the same criteria as the National Register. Properties listed on the Hawai'i Register are afforded the same protection as those listed on the National Register.

Section 4(f) of the Department of Transportation (DOT) Act of 1966

Section 4(f) of the Department of Transportation (DOT) Act of 1966 was originally set forth in Title 49, United States Code (U.S.C.), Section 1653(f), and applies only to agencies within the DOT. In 1983, as part of the overall codification of the DOT Act, Section 4(f) was amended and codified in 49 U.S.C. 303. However, due to the familiarity with Section 4(f) by Federal and State personnel, the Federal Highway Administration (FHWA) continues to refer to the requirements as Section 4(f). Under the provisions of the law, the DOT is prohibited from using any historic sites (public or private) for Federal or Federally-funded projects unless 1) there is no prudent and feasible alternative to the use of such land, and 2) all possible planning to minimize harm is accomplished.

Section 106 of the National Historic Preservation Act of 1966, as amended:

Section 106 of the National Historic Preservation Act requires Federal agencies to take into account the effects of their undertakings on historic properties, including those actions they assist or license, and to afford the Advisory Council on Historic Preservation a reasonable opportunity to comment on such undertakings. The regulations are spelled out in the U.S. Code of Federal Regulations at 36 CFR Part 800. Instrumental in the Section 106 review process is the State Historic Preservation Officer (SHPO), who is the official appointed or designated pursuant to

Section 101(b)(1) of the National Historic Preservation Act to administer the State historic preservation program. In Hawaii, the SHPO is appointed by the Governor of the state, and is generally the Director of the Department of Land and Natural Resources (DLNR). The SHPO has a staff supporting him in the State Historic Preservation Division (SHPD) of DLNR.

The Section 106 review process involves five basic steps:

Step 1: Identify and evaluate historic properties
The Federal agency responsible for an undertaking begins by identifying the historic properties the undertaking may affect. To do this, the agency first reviews background information and consults with the State Historic Preservation Officer (SHPO) and others who may know about historic properties in the area. Based on this review the agency determines what additional surveys or other field studies may be needed, and conducts such studies.

If properties, that is, districts, sites, buildings, structures, or objects, are found that may be eligible for inclusion in the National Register of Historic Places, but have not yet been included in the Register, the agency evaluates them against criteria published by the National Park Service, which maintains the Register. This evaluation is carried out in consultation with the SHPO, and if questions arise about the eligibility of a given property, the agency may seek a formal determination of eligibility from the Secretary of the Interior. If a property has already been included in the National Register, of course, further evaluation is not ordinarily necessary. Section 106 review process gives equal treatment to properties that have already been included in the Register and those that are eligible for inclusion.

Step 2: Assess effects
If historic properties, that is, properties included in or eligible for inclusion in the National Register, are found, the agency then assesses what effect its undertaking will have on them. Again the agency works with the SHPO, and considers the views of others. The agency makes its assessment based on criteria found in the Council's regulations, and can make one of three determinations:
1) No effect: the undertaking will not affect historic properties;
2) No adverse effect: the undertaking will affect one or more historic properties, but the effect will not be harmful;
3) Adverse effect: the undertaking will harm one or more historic properties.

Step 3: Consultation
If an adverse effect will occur, the agency consults with the SHPO and others in an effort to find ways to make the undertaking less harmful. Others who are consulted, under various circumstances, may include local governments, Indian tribes, property owners, other members of the public, and the Council. Consultation is designed to result in a Memorandum of Agreement (MOA), which outlines measures agreed upon that the

agency will take to reduce, avoid, or mitigate the adverse effect. In some cases the consulting parties may agree that no such measures are available, but that the adverse effects must be accepted in the public interest.

If consultation proves unproductive, the agency or the SHPO, or the Council itself, may terminate consultation. The agency must submit appropriate documentation to the Council and request the Council's written comments.

Step 4: Council comment
The Council may comment during step 3, by participating in consultation and signing the resulting MOA. Otherwise, the agency obtains Council comment by submitting the MOA to the Council for review and acceptance. The Council can accept the MOA, request changes, or opt to issue written comments. If consultation was terminated, the Council issues its written comments directly to the agency head, as the agency had requested.

Step 5: Proceed
If an MOA is executed, the agency proceeds with its undertaking under the terms of the MOA. In the absence of an MOA, the agency head must take into account the Council's written comments in deciding whether and how to proceed. (Advisory Council on Historic Preservation, 1990, p.2)

EFFECTS OF THE PROJECT ON HISTORIC RESOURCES

For a Federal undertaking or an undertaking that involves Federal funds, the official evaluation of effects–adverse or otherwise–is done in consultation between the Agency proposing a project and the State Historic Preservation Division (SHPD) of the Department of Land and Natural Resources. The following are the opinions of the architectural historians who surveyed the architectural resources on the project site, and who are familiar with the history and context of the Canal and its bridges. The consultation between the Department of Transportation Services and the SHPD, if they agree, will ultimately determine the effect of the undertaking on the historic properties in the project area.

Description of the Undertaking(s)

The project involves the dredging of the Ala Wai Canal from Ala Moana Boulevard to Kapahulu Avenue, and the Mānoa-Pālolo Drainage Canal from the Ala Wai Canal to the Date Street Bridge. According to a letter from Belt Collins Hawaii to Spencer Mason Architects, dated November 3, 1997, no disturbance to the canal walls is anticipated.

Bulky items from the canal will be stored on a barge and transferred to trucks at one or all of three locations: a) the parking lot end of University Avenue, and/or b) near the Kapahulu Avenue end of the Ala Wai Golf Course and/or c) on Magic Island in the parking area. Sediment will be transported from the canal via one of two methods: a) on small scows that have adequate clearance under the bridges, or b) via a hydraulic pipeline to Ala Moana Boulevard and submerged to the receiving barge.

An equipment barge will be moored next to Magic Island, opposite the Ala Wai Boat Harbor. Sediment transported out of the canal will be placed on a second barge for direct transport away from the area. There is a possibility that transfer to trucks could occur there. The barges will be approximately 100-150 feet long and 30-40 feet wide. Land will be used for contractor staging and possible mechanical dewatering of the sediment. Possible locations are: a) a portion of Magic Island parking lot and/or Ala Moana Park area in the vicinity of the moored barge; b) at the Ala Wai Canal Neighborhood Park A (field closest to the parking lot at the end of University Avenue); and c) at the vacant lot across the street from the Convention Center. About an acre of land is needed. Locations for bulky items handling, barge holding, and staging are indicated on Figure 1.

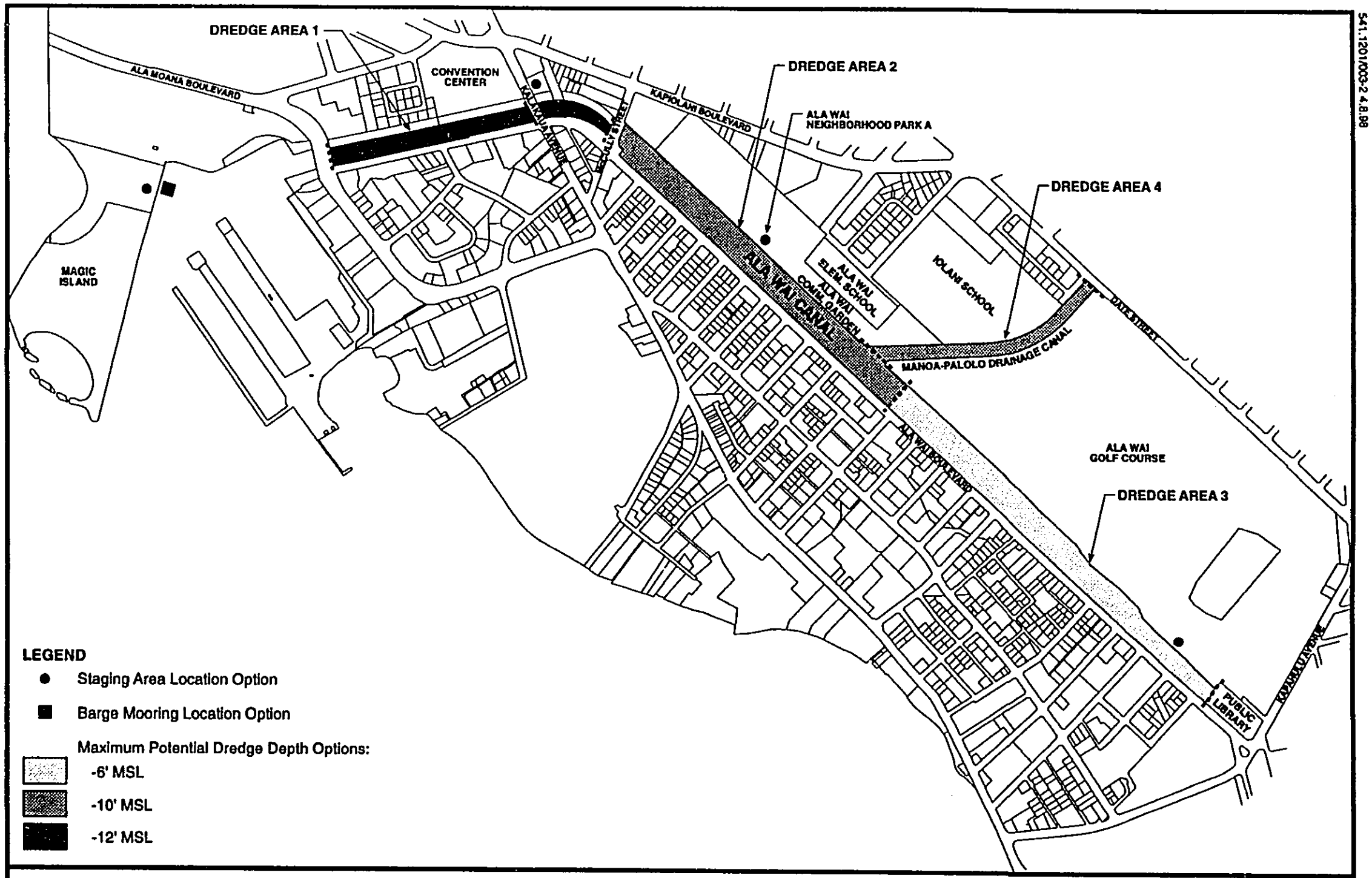

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Figure 1
APPROXIMATE LOCATIONS—
ALA WAI CANAL DREDGING ACTIVITIES

Ala Wai Canal Dredging Environmental Assessment
Belt Collins Hawaii

Potential Effects of the Undertaking(s)

Ala Wai Canal Dredging

The dredging project, as proposed, does not appear to adversely affect any identified historic resources. According to a memorandum from Belt Collins Hawaii to Spencer Mason Architects, dated 3 November 1997, the lava-rock canal walls will not be disturbed. It is impossible to anticipate inadvertent damage; however, precautions must be taken to protect identified historic resources, including the canal walls, and the Kalākaua Avenue and Date Street Bridges.

Bulky Item Handling

Option A: Located at the parking lot at the end of University Avenue.

Option B: Located near the Kapahulu Avenue end of the Ala Wai Canal along the access road to the Ala Wai Golf Course.

Option C: Magic Island Parking Lot.

None of the locations are in the vicinity of any identified historic resources. This activity will not adversely effect any significant historic resource, as long as precautions are taken to protect the canals walls during transfer of debris from the barges to the handling areas.

Sediment Transport

Option A: The dredging project proposes to utilize "small scows that have adequate clearance" under the bridges.

Option B: A hydraulic pipeline floating to Ala Moana Boulevard and submerged to the receiving barge.

This activity will not adversely effect any historic resource as long as precautions are taken to protect the Kalākaua Avenue and Date Street Bridges and the canals walls during dredging activities.

Barge Holding

The equipment barge will be moored next to Magic Island, opposite the Ala Wai Boat Harbor.

The equipment barge will not be located in the vicinity of any identified historic resources. This activity will not adversely effect any significant historic resource.

Staging Area

Option A: Located in a portion of the Magic Island parking lot and/or Ala Moana Park area in the vicinity of the moored barge.

Option B: Located at the Ala Wai Canal Neighborhood Park A (field closest to the parking lot at the end of University Avenue).

Option C: Located at the vacant lot across the street from the Convention Center.

Ala Moana Park, the location of Staging Area "Option A", is included in the *City and County of Honolulu Art Deco Parks and Playgrounds* thematic nomination to the Hawai'i Register of Historic Places. Precautions must be taken to protect identified historic resources, which may include lagoons and landscaping designed as part of the original park by Catherine Jones Richards and Robert O. Tompson, as well as canal bridges, entrance portals, pavilions, comfort stations, and pergolas designed by architect Harry Sims Bent or constructed by federal relief efforts in the 1930s. Staging Area "Options B and C" are not in the vicinity of any identified historic resources and it appears that this activity in these locations will not adversely effect any significant historic resource.

SUMMARY CONCLUSIONS

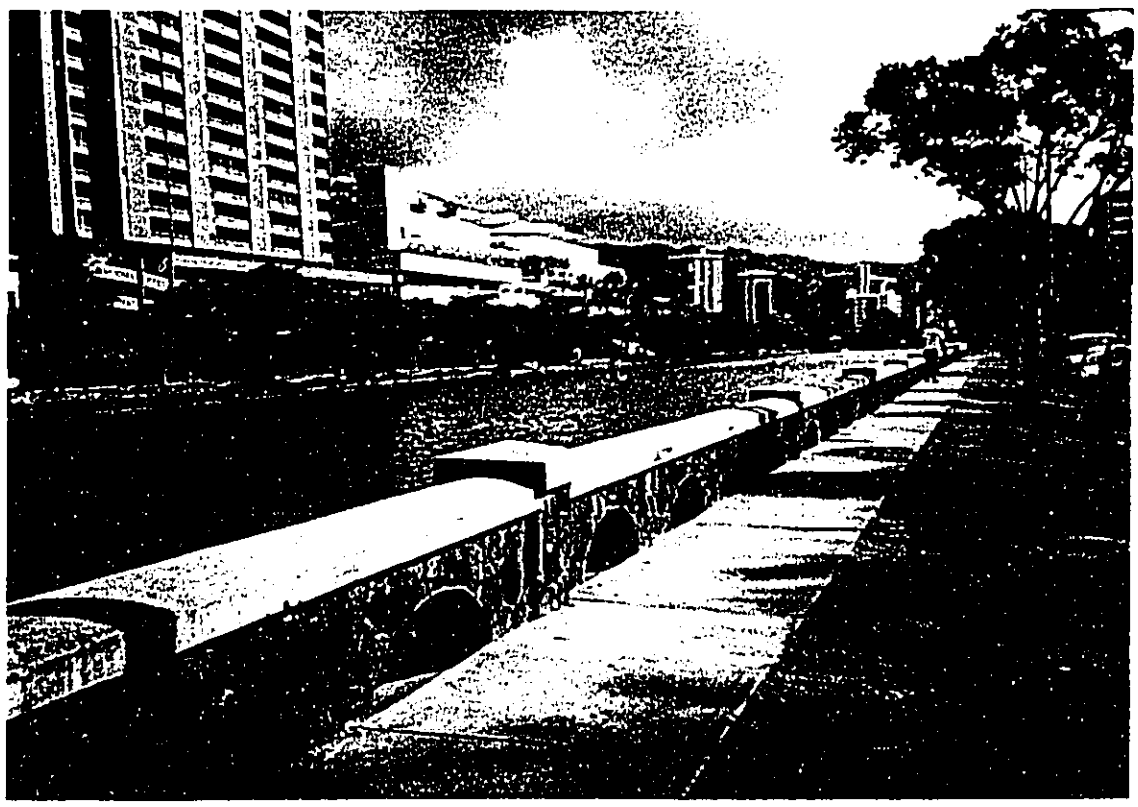
The Ala Wai Canal Dredging project, as proposed, does not appear to directly adversely effect any of the historic resources identified in this report. However, precautions must be taken to protect adjacent historic resources from inadvertent damage–these include the Ala Wai Canal walls, the Kalākaua Avenue and Date Street Bridges, the Ala Wai Park Clubhouse, and Ala Moana Park features–during dredging and sediment transport, and staging operations.

With the concurrence of the SHPO, the protection mechanisms outlined in Section 4(f) of the Department of Transportation Act or Section 106 of the National Historic Preservation Act will not need to be instigated for this undertaking.

Figure 2: (top) Ala Wai Canal, looking NW from *makai* (SW) embankment.
Figure 3: (bottom) Ala Wai Canal, looking NW from *mauka* (NE) embankment.

Figure 6: (top) Ala Wai Canal, ornamental rail between Kālakaua Avenue and Ala Moana Boulevard.

Figure 7: (bottom) Ala Wai Canal, stairs, looking SW.



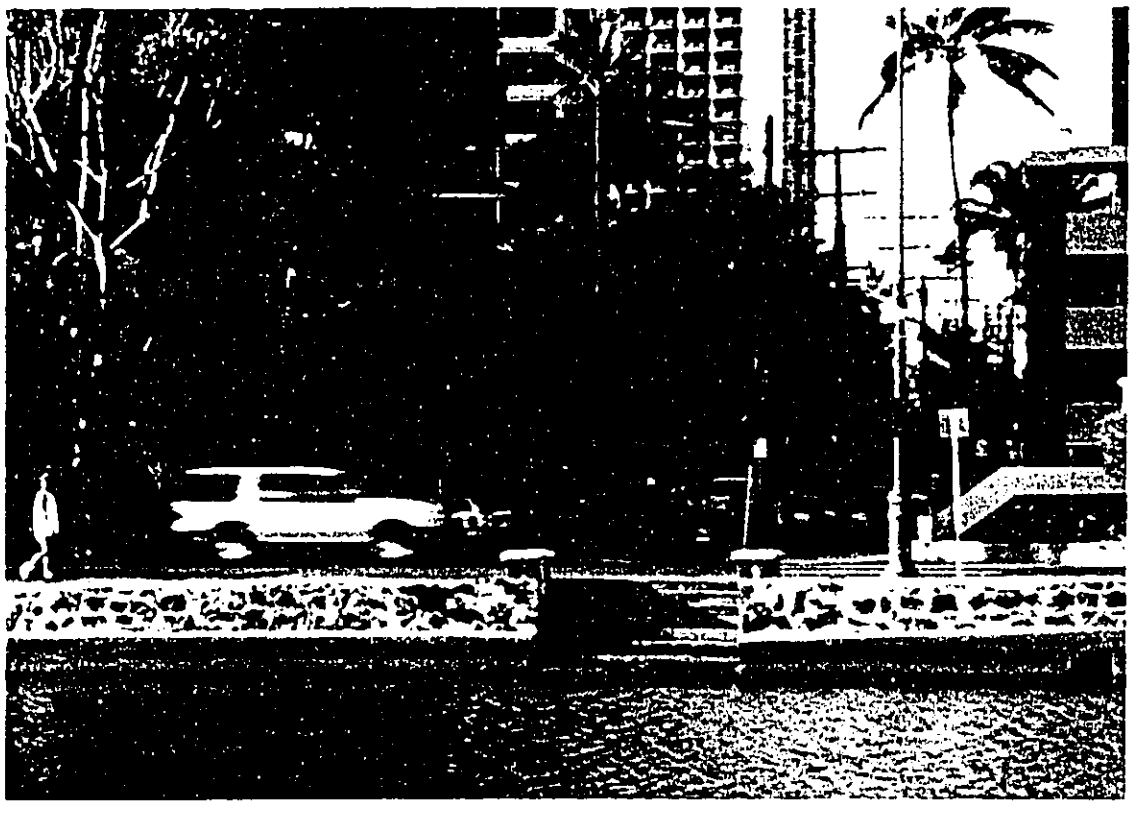
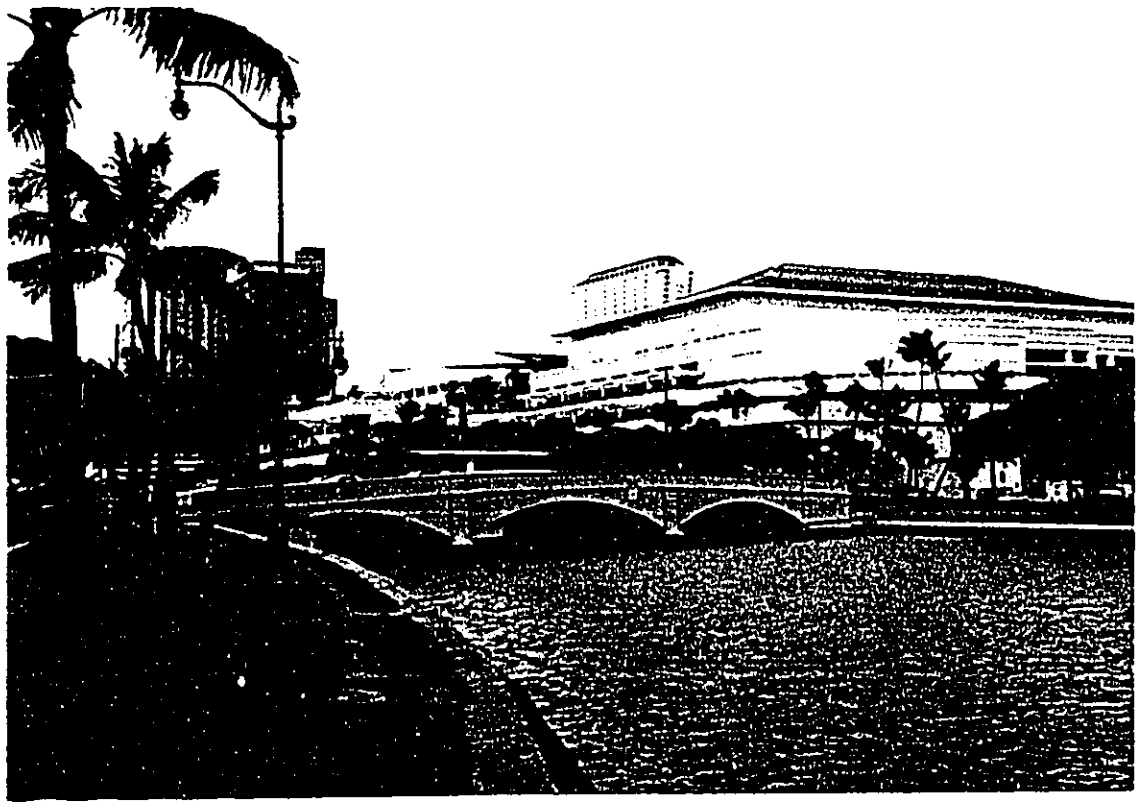


Figure 8: (top) Kālakaua Avenue Bridge, looking NW.
Figure 9: (bottom) Ala Moana Boulevard Bridge, looking W.



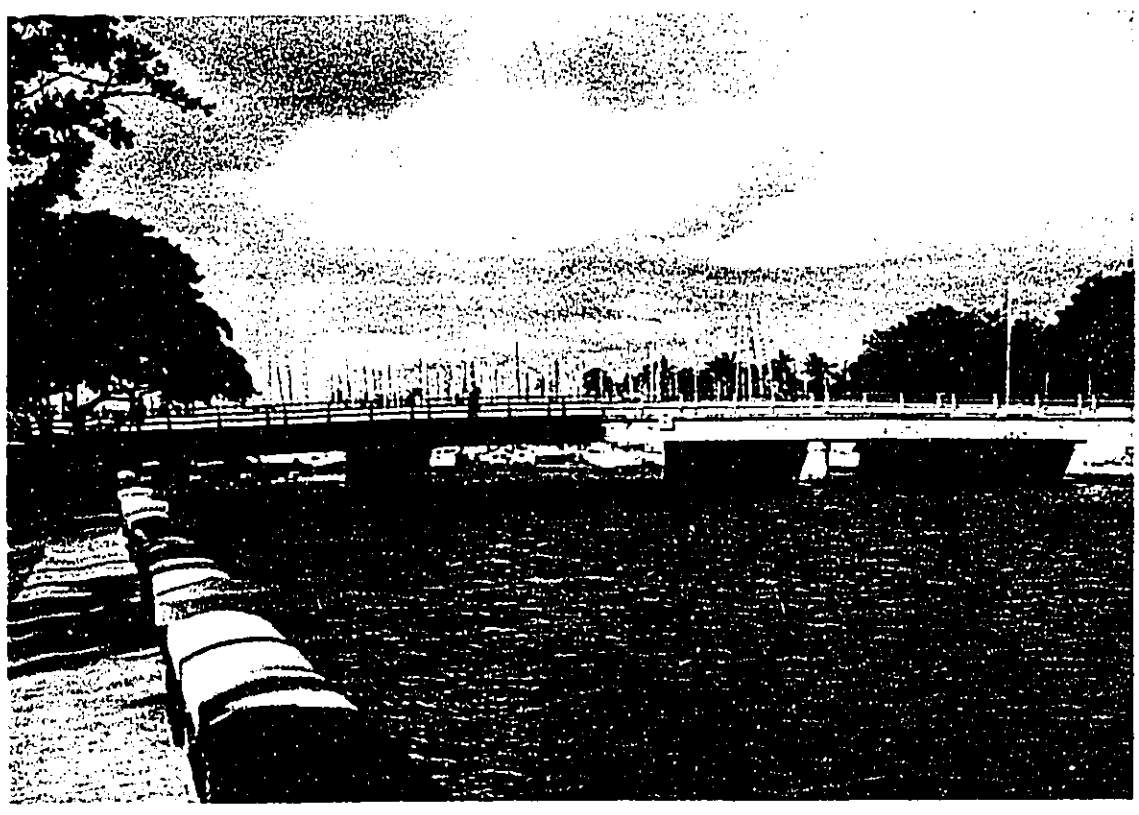
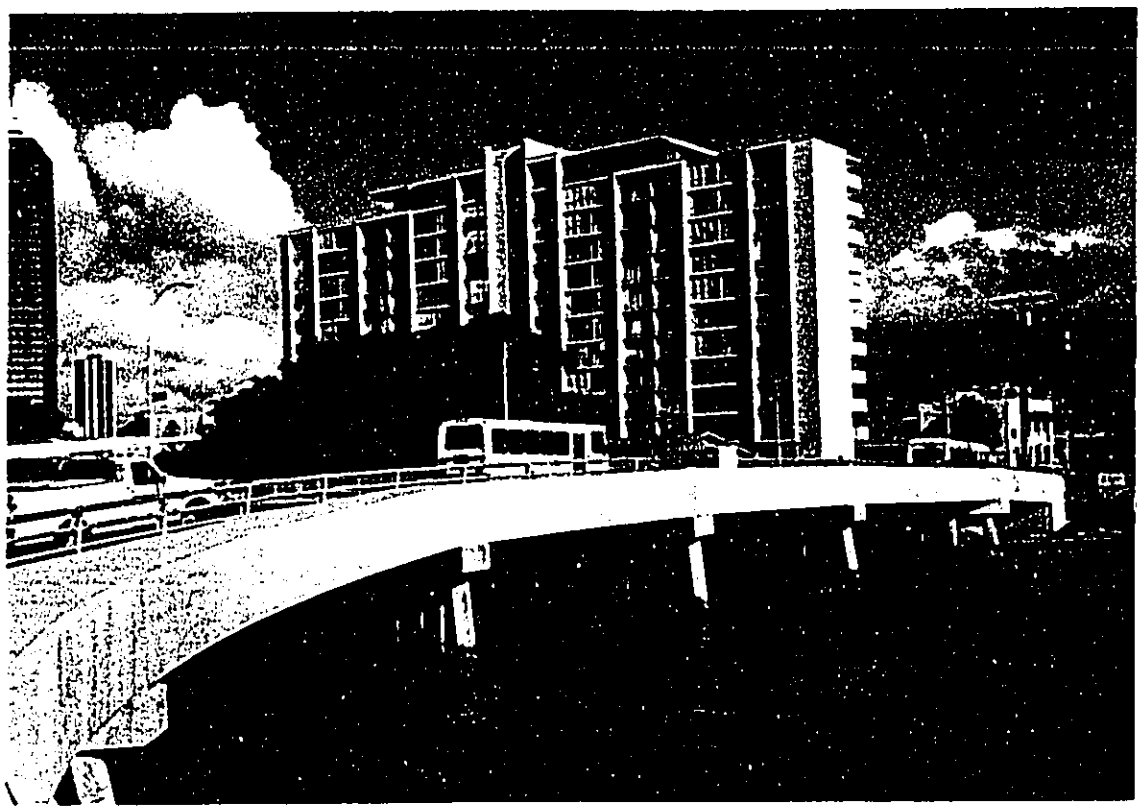
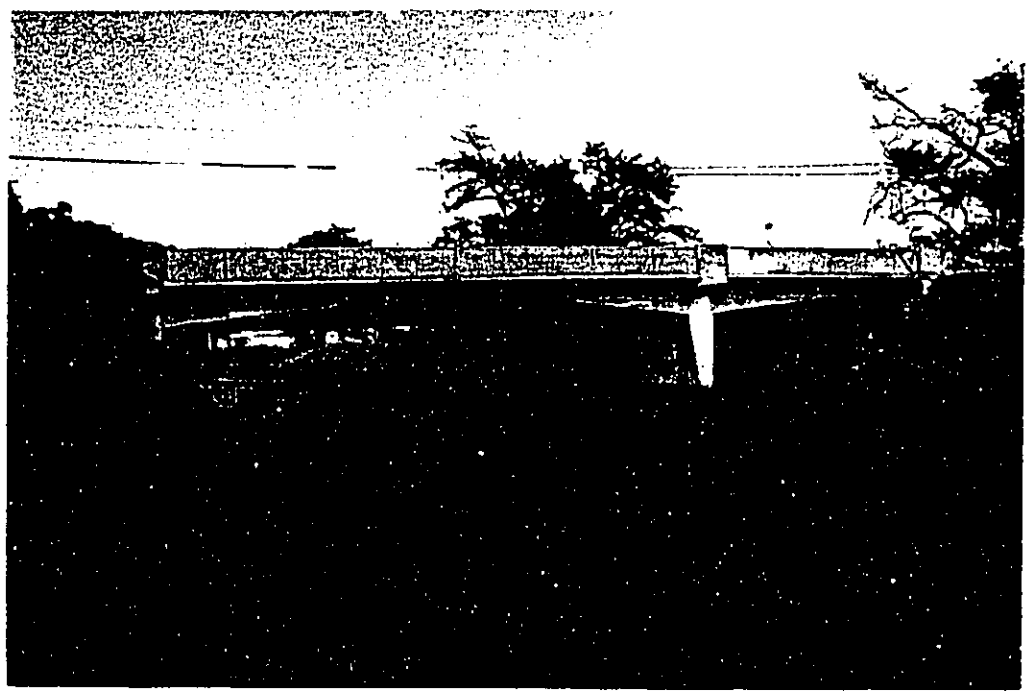


Figure 10: (top) McCully Street Bridge, looking NW.
Figure 11: (bottom) Date Street Bridge, looking SW.





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APPENDIX F
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Honolulu, HI 96822

Roger S. Fujioka, Ph.D., Director
Water Resources Research Center
University of Hawaii at Manoa
2540 Dole Street, Holmes 283
Honolulu, Hawaii 96822

Waikiki-Kapahulu Public Library
400 Kapahulu Avenue
Honolulu, Hawaii 96815

Zachary Labez
Office of Community Services
830 Punchbowl Street, Suite 420
Honolulu, Hawaii 96813

CITY COUNCIL (9)

Councilmember Rene Mansho
District 1
Honolulu City Council
530 S. King Street, 2nd Floor
Honolulu, Hawaii 96813

Councilmember Steve Holmes
District 2
Honolulu City Council
530 S. King Street, 2nd Floor
Honolulu, Hawaii 96813

Councilmember John Henry Felix
District 3
Honolulu City Council
530 S. King Street, 2nd Floor
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Councilmember Andy Mirikitani
District 5
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Councilmember Mufi Hannemann
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530 S. King Street, 2nd Floor
Honolulu, Hawaii 96813

Councilmember John DeSoto
District 9
Honolulu City Council
530 S. King Street, 2nd Floor
Honolulu, Hawaii 96813

Ms. Genny Wong, City Clerk
Honolulu City Council
530 S. King Street, 2nd Floor
Honolulu, Hawaii 96813

NEIGHBORHOOD BOARDS (12)

Mr. John Breinich
Chairperson
Ala Moana/Kakaako N.B. No. 11
1330 Ala Moana Blvd., #1102
Honolulu, Hawaii 96814

Ms. Karen Ahmai
Chairperson
Diamond Head/Kapahulu/St. Louis N.B. No. 5
2146 St. Louis Drive
Honolulu, Hawaii 96816

Mr. Vernon Tam
Chairperson
Kaimuki N.B. No. 4
3504 Alohea Avenue
Honolulu, Hawaii 96816

Mr. John Steelquist
Chairperson
Makiki/Lower Punchbowl/Tantalus N.B. No. 10
4054 Tantalus Drive
Honolulu, Hawaii 96822

Mr. Brian Baron
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2207 Mohala Way
Honolulu, Hawaii 96822

Mr. John Kato
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McCully-Moiliili N.B. No. 8
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Honolulu, Hawaii 96826

Ms. Carolyn Tsukayama-Walther
Chairperson
Palolo N.B. No. 6
1521 Pukele Avenue
Honolulu, Hawaii 96816

Mr. Sam Bren
Chairperson
Waikiki N.B. No. 9
1717 Ala Wai Blvd., #504
Honolulu, Hawaii 96815

Mr. Burton White
Chairperson
Downtown N.B. No. 13
c/o Neighborhood Commission Office
City Hall, Room 400
Honolulu, Hawaii 96813

Bernadette Young
Chairperson
Kalihi-Palama N.B. No. 15
1512 Iao Lane
Honolulu, Hawaii 96817

Mark Taylor
Chairperson
Aliamanu/Salt Lake/Foster Village N.B. No. 18
5333 Likini Street, Apt. 1503
Honolulu, Hawaii 96813

Annette Yamaguchi
Chairperson
Waipahu N.B. No. 22
94-450 Lianu Place
Waipahu, Hawaii 96797

0000 0001 0309

CITY AND COUNTY AGENCIES (6)

Mayor Jeremy Harris
Mayor's Office
City and County of Honolulu
530 South King Street, Room 300
Honolulu, Hawaii 96813

Dr. Kenneth Sprague, Director
Department. of Environmental Services
City and County of Honolulu
650 South King Street, 3rd Floor
Honolulu, Hawaii 96813

Ms. Jan Naoe Sullivan, Director
Department of Planning and Permitting
City and County of Honolulu
650 So. King Street, 7th Floor
Honolulu, Hawaii 96813

Mr. Patrick T. Onishi, Chief Planning Officer
Planning Department
City and County of Honolulu
650 So. King Street, 8th Floor
Honolulu, Hawaii 96813

Ms. Cheryl D. Soon, Director
Department of Transportation Services
711 Kapiolani Boulevard, 12th Floor
Honolulu, Hawaii 96813

Mr. Clifford S. Jamile
Manager & Chief Engineer
Board of Water Supply
City and County of Honolulu
630 So. Beretania Street
Honolulu, Hawaii 96813

ON AWG LIST (8)

Mr. Clyde Morita, Outreach Coordinator
Ala Wai Canal Watershed Improvement Project
c/o Department of Health
919 Ala Moana Blvd., Room 304
Honolulu, Hawaii 96814

Mr. Rodger Snow, President
Ala Wai Gateway Tenants Association
1819 Lipeepee Street, #M
Honolulu, Hawaii 96815

Mr. David E. Parsons, Administrator
Division of Boating and Ocean Recreation
Dept. of Land and Natural Resources
1151 Punchbowl Street
Honolulu, Hawaii 96813

Councilmember Duke Bainum
District 4
Honolulu City Council
530 So. King Street, 2nd Floor
Honolulu, Hawaii 96813

The Honorable Galen Fox
District 21 – Waikiki-Ala Wai
State of Hawaii
415 So. Beretania,, Room 319
Honolulu, Hawaii 96813

The Honorable Les Ihara, Jr.
District 10 – Kaimuki-Kapahulu-Waikiki
State of Hawaii
415 So. Beretania Street,, Room 214
Honolulu, Hawaii 96813

The Honorable Brian T. Taniguchi
District 11 – Manoa-Moiliili-McCully-Pawaa
State of Hawaii
415 So. Beretania Street, Room 219
Honolulu, Hawaii 96813

0000 0001 0310

The Honorable Brian Y. Yamane
District 19 – Diamond Head-Kaimuki-
Kapahulu
State of Hawaii
415 So. Beretania Street, Room 331
Honolulu, Hawaii 96813

APPENDIX G
Consultation Letters

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DEPARTMENT OF THE ARMY
U.S. ARMY ENGINEER DISTRICT, HONOLULU
FORT SHAFTER, HAWAII 96858-5440

REPLY TO ATTENTION OF

March 5, 1997

Operations Branch

Mr. Pat V. Phung, P.E.
U.S. Department of Transportation
Federal Highway Administration
300 Ala Moana Boulevard, Room 3202
Honolulu, Hawaii 96850

Dear Mr. Phung:

This is in response to your February 19, 1997 request that the Corps participate as a cooperating agency in preparation of the environmental documents for the proposed dredging of the Ala Wai Canal, Waikiki, Oahu, Hawaii. Our understanding is that the Federal Highway Administration will serve as the lead Federal agency.

The Corps has jurisdiction over work in navigable waters of the U.S., including the Ala Wai Canal and Manoa-Palolo Drainage Canal. In addition, the Corps regulates transporation of dredged material for the purposes of ocean disposal, a potential element of the proposed project. Therefore, the Corps will participate as a cooperating agency as provided by 40 CFR 1501.6.

As you are aware, based on discussions at the Agency Working Group kick-off meeting held February 3, 1997, the Corps is very concerned with the possible "piece-mealing" of the proposed work, i.e., evaluating dredging above and below McCully Street separately. We further urge you to ensure that, as required by the National Environmental Policy Act, the Environmental Assessment for the proposed project adddress *all* aspects.

If you have further questions regarding this matter, please feel free to call Ms. Kathleen Dadey of my Operations Branch staff at 438-9258, extension 15.

Sincerely,

Ralph H. Graves
Lieutenant Colonel, U.S. Army
District Engineer

Copy Furnished:
City and County of Honolulu, Department of Transportation Services

0000 0001 0313

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
Hawaii Division
300 Ala Moan Blvd., Room 3202
Honolulu, HI 96850
February 19, 1997

IN REPLY REFER TO
HEC-HI

LTC Ralph H. Graves
U.S. Army Corps of Engineers
District Engineer
Honolulu Engineer District
Building 230
Fort Shafter, HI 96858

Dear Colonel Graves:

Subject: Ala Wai Canal Dredging Environmental Assessment
Request to be a Cooperating Agency

The Federal Highway Administration (FHWA) in cooperation with the City and County of Honolulu, Department of Transportation Services and the State of Hawaii, Department of Land and Natural Resources is initiating an environmental assessment (EA) for dredging of the Ala Wai Canal in Honolulu, Hawaii. Because of the ACOE's legal jurisdiction over the Section 10 permit and since the project may require a Section 404 permit, we are requesting the ACOE to be a cooperating agency.

The Ala Wai Canal is a 2-mile long, 200 to 250-feet wide, 3 to 8-feet deep man-made waterway constructed in 1928 that separates the predominantly tourist-oriented Waikiki area from the rest of Oahu. It is the major drainage system for the Waikiki district of Honolulu and also conveys surface runoff from the watersheds directly mauka of the canal. The canal also serves as a sediment deposition basin to minimize discharge of sediments into near shore coastal waters through the Ala Wai Boat Harbor entrance channel.

Since the last dredging in 1978, runoff from the adjacent watershed areas has deposited much sediment in the canal and the bottom of the canal has risen. Silt accumulation has become so severe in certain areas resulting in increased hazards to public health and safety, limiting recreational activities and increasing the danger of flooding in Waikiki and other surrounding areas.

The dredging being considered would be between the McCully Street bridge and the Kapahulu Avenue end of the canal, including a portion of the Manoa-Palolo Stream. The dredged depths would be approximately to the same depth previously dredged. Ocean disposal of the material at the EPA designated site will be one of our disposal alternatives.

The ACOE's involvement should entail those areas under its jurisdiction and no direct writing or analysis will be necessary for the document's preparation. The following are activities we will take to maximize interagency cooperation:

1) Invite you to coordination meetings;
2) Consult with you on any relevant technical studies that will be required for the project;
3) Organize joint field reviews with you;
4) Provide you with project information, including study results;
5) Encourage your agency to use the above documents to express your views on subjects within your jurisdiction or expertise; and
6) Include information in the project environmental documents that cooperating agencies need to discharge their National Environmental Policy Act (NEPA) responsibilities and any other requirements regarding jurisdictional approvals, permits, licenses, and/or clearances.

The ACOE has the right to expect that the EA will enable the ACOE to discharge their jurisdictional responsibilities. Likewise, the ACOE will have the obligation to tell us if the ACOE's needs are not being met. We expect that at the end of the process the EA will satisfy the NEPA requirements including those related to project alternatives, environmental consequences and mitigation. Further, we intend to utilize the EA as decision making documents and as the basis for the permit application. We expect the permit application to proceed concurrently with the EA process.

We look forward to your response to this request and the ACOE's role as a cooperating agency on this project. We have enclosed a copy of our guideline on cooperating agency responsibilities for the ACOE's information. Please contact me at (808) 541-2536 or Ms. Lois Chong of the City and County of Honolulu at (808) 527-6981 if there are any questions.

Sincerely yours,

Pat V. Phung

Pat V. Phung, P.E.
Transportation Engineer

Enclosure
cc: Mr. Felipe Cabana, HWY-PS
Ms. Lois Chong, DTS

- Permit cooperating agencies to use the environmental document to express their views on subjects within their jurisdiction or expertise.

- Select preferred alternative.

- Include in the final environmental document the information needed by the cooperating agency to fulfill its responsibilities to discharge NEPA and other requirements on its approvals, permits, licenses and/or clearances for the proposed action. Draft documents should demonstrate that the scope and content of both the alternatives and impacts analyses are acceptable to the cooperating agency.

Cooperating Agency Responsibilities

- Respond to the invitation to be a cooperating agency. (The response letter should indicate agreement/disagreement with the lead agency's concept of the cooperating agency's involvement, and should describe any constraints on the cooperating agency's participation.)

- Assist in identifying interest groups.

- Attend scoping and coordination meetings and joint field reviews.

- Provide meaningful and early input on issues of concern.

- Participate in joint public involvement activities.

- Review pre-draft and pre-final environmental documents, making sure that the lead agency is informed of any changes needed to reflect the views and concerns of the cooperating agency.

- If needed, perform analyses or write a portion of the environmental document, if requested by the lead agency (This would occur only rarely).

- Adopt the final environmental document if, after an independent review, the cooperating agency concludes that the document satisfies NEPA and other requirements for its approvals, permits, licenses and/or clearances on the proposed action (appropriate only for those agencies with jurisdiction by law).

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Additional Agency Responsibilities with the CLEAN WATER ACT Section 404 Permit

In addition to the normal cooperating agency responsibilities listed above, these agencies would be expected to:

- Provide assistance to the lead agency during development of the project purpose and need.
- Provide information on alternatives. This includes the "no practicable alternative" finding.
- Assist the lead agency in determining appropriate and practicable mitigation, including "all practicable measures to minimize harm." These measures should reflect avoidance, minimization, and compensation.
- Cooperate in the application of principles for integration of NEPA and Section 404 Permits contained in Chapter II of Applying the Section 404 Permit Process to Federal-aid Highway Projects.

The lead agency should make every effort to identify and attempt to resolve cooperating agency concerns during early coordination and scoping activities. Deferring such concerns to later stages of project development will only delay or possibly jeopardize the project. Although some concerns may not be completely resolvable despite concerted efforts to reach agreement, there are certain aspects of the project that require concurrence before moving ahead. For example, on projects requiring a permit under Section 404 of the Clean Water Act it is essential to obtain resource and permitting agency concurrence that there is no practicable alternative to locating the alignment in waters of the United States. Furthermore, the Final EIS must adequately support this determination. A cooperating agency does have a right to expect that the highway project's NEPA document will meet its needs, and an obligation to tell the lead agency if, at any point in the process, its needs are not being met. Thus it must be reiterated, that it is in the best interests of all concerned for issues to be resolved as early as possible during project planning. Nevertheless while a cooperating agency has a greater role and a greater interest in the project than other "commenting" agencies, control of the project always rests ultimately with the lead agency.

Appendix B contains an example letter that is suggested for use in initiating the final coordination with the Environmental Protection Agency (EPA) and the Corps. Similar letters should be prepared for the final coordination with other cooperating agencies.

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STP 3001.0328-f

BENJAMIN J. CAYETANO
GOVERNOR OF HAWAII

RECEIVED
JUN 10 1998
HAWAII DIVISION

MICHAEL D. WILSON, CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES

DEPUTIES

GILBERT COLOMA-AGARAN

AQUACULTURE DEVELOPMENT PROGRAM
AQUATIC RESOURCES
CONSERVATION AND RESOURCES ENFORCEMENT
CONVEYANCES
FORESTRY AND WILDLIFE
HISTORIC PRESERVATION DIVISION
LAND DIVISION
STATE PARKS
WATER AND LAND DEVELOPMENT

STATE OF HAWAII

DEPARTMENT OF LAND AND NATURAL RESOURCES

STATE HISTORIC PRESERVATION DIVISION
33 SOUTH KING STREET, 6TH FLOOR
HONOLULU, HAWAII 96813

REF:HP-CO

JUN 17 1998

LOG NO.: 21579
DOC NO.: 9805co14
ARCHITECTURE

Mr. Pat Phung, P.E.
Transportation Engineer
U.S. Department of Transportation
Federal Highway Administration
Hawaii Division
300 Ala Moana Blvd., Room 3202
Honolulu, Hawaii 96850

Dear Mr. Phung:

SUBJECT: **Section 106 Compliance (NHPA)**
Ala Wai Dredging Project
TMK 2-6, Waikiki, Honolulu, Oahu

Thank you for the letter dated May 13, 1998, regarding the Ala Wai Dredging Project. We concur that with the protection measures as outlined in your letter the project should have 'no effect' on the historic character of the Ala Wai Canal or any other known historic resources.

Thank you for the opportunity to comment. Should you have any questions please contact Carol Ogata at 587-0004.

Aloha,

Gilbert Coloma-Agaran

for MICHAEL D. WILSON, Chairperson and
State Historic Preservation Officer

CO:jk

0000 0001 0318

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
Hawaii Division
300 Ala Moana Blvd., Room 3202
Honolulu, HI 96850
May 13, 1998

IN REPLY REFER TO
HEC-HI

Mr. Don Hibbard, Administrator
Historic Preservation Division
State of Hawaii
Department of Land and Natural Resources
33 South King Street, Sixth Floor
Honolulu, Hawaii 96813

Dear Mr. Hibbard:

Subject: Consultation for the Ala Wai Canal Dredging Project Regarding Section 106, National Historic Preservation Act

The U.S. Department of Transportation, Federal Highway Administration (FHWA) in association with the State of Hawaii Department of Land and Natural Resources (DLNR) and Department of Transportation (DOT), and City and County of Honolulu, Department of Transportation Services (DTS), has prepared an environmental assessment (EA) for the proposed dredging of the Ala Wai Canal (document enclosed). The purpose of the EA is to identify alternatives, analyze the potential environmental impacts, and identify operating constraints for the proposed dredging and final disposition of dredged sediments. In compliance with Section 106 of the National Historic Preservation Act, the EA includes identification and consideration of potential effects of the proposed action on historical, archaeological, and architectural resources.

The Ala Wai Canal, its walls, and certain adjacent structures and bridges, as documented in Appendix E and Section 4.11 of the EA, are listed in the National Register of Historic Places. The proposed dredging activity within the Ala Wai Canal, use of shore-side areas for support (Ala Wai Neighborhood Park A and Magic Island are the preferred sites), and transport of sediment from dredge areas within the canal to a barge moored off Magic Island, are activities that have the potential to impact historic features of the canal.

Potential impacts will be avoided by requiring the following measures:

- Dredging - a setback from the canal walls of at least five feet will be established. The contractor will not be allowed to dredge within this area. In addition, canal walls will be covered to protect them during material transfer between shore-side areas and dredging the barge.
- Transport - temporary fendering on bridges and walls will be used to prevent accidental damage from scows or boats used to support dredging equipment or to transport dredged sediments.

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Sites under consideration for upland placement of a portion of the sediment dredged from the Ala Wai Canal include the Reef Runway at Honolulu International Airport, DLNR lands at Sand Island, and the City and County's Waipahu Ash Landfill on Waipio Peninsula. The Reef Runway and Sand Island sites are fill lands and have no associated historic or cultural resources. The site of the Waipahu Ash Landfill has been used as a landfill since 1958, and upland placement of sediment would take place only in this area. Based on the above information, no adverse impacts to cultural resources will occur because of the proposed action.

Your concurrence with this determination is requested. Please contact me at 541-2536 to schedule a meeting or if you have any questions.

Sincerely yours,

Pat V. Phung, P.E.
Transportation Engineer

cc: Marvin Char, DTS

0000 0001 0320

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Pacific Islands Ecoregion
300 Ala Moana Boulevard, Room 3-122
Box 50088
Honolulu, Hawaii 96850

In Reply Refer To: KBF

JUN 16 1998

Mr. Pat Phung
Transportation Engineer
U.S. Department of Transportation
Federal Highway Administration
Hawaii Division
300 Ala Moana Blvd., Room 3202
Honolulu, HI 96850

Re: Consultation for the Ala Wai Canal Dredging Project Regarding Section 7 concurrence under the Endangered Species Act (Federal Aid Project Nov. STP-0300(038)

The U.S. Fish and Wildlife Service (Service) has received your letter dated May 13, 1998 requesting our concurrence under section 7 of the Endangered Species Act (Act) that the above referenced project is not likely to adversely affect endangered and threatened species. The Service has reviewed the draft environmental assessment (DEA) for the proposed dredging of the Ala Wai Canal, Oahu, Hawaii. The DEA was prepared by Belt Collins Hawaii for the City and County of Honolulu, Department of Transportation Services.

The purpose of the proposed project is to conduct dredging activities in the Ala Wai Canal and dispose of them at a designated upland site. According to John Goody, Belt Collins Hawaii, the prefered disposal site for spoils dredged from the Ala Wai Canal is an area of the Reef Runway (Honolulu International Airport). About 200,000 cubic yards of sediment could be used for structural fill purposes at this site. Another possible location for spoil disposal is land owned and managed by the State of Hawaii, Department of Land and Natural Resources (DLNR) on Sand Island. Approximately 32 acres of land is available for dewatering purposes, while about 140 acres could accommodate spoil processing and disposal.

We concur that there are no known endangered, threatened, or candidate species within the project vicinity. Therefore, we concur that the proposed project is not likely to adversely affect any listed species under the jurisdiction of the Service.

The requirements of section 7 have been satisfied. However, obligations under section 7 of the Act must be reconsidered, if 1) new information reveals impacts of this defined action that may affect listed species or critical habitat in a manner that was not previously considered in this assessment; 2) this action is subsequently modified in a manner not previously considered in this assessment; or 3) a new species is listed or critical habitat determined that may be affected by the identified action.

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If you have any questions or concerns about this consultation please contact Fish and Wildlife Biologist Kevin Foster at 808/541-3441.

Sincerely,

Harry W Rose

/s/ Brooks Harper
Field Supervisor
Ecological Services

cc: M. Char, DTS

0000 0001 0322

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
Hawaii Division
300 Ala Moana Blvd., Room 3202
Honolulu, HI 96850
May 13, 1998

IN REPLY REFER TO
HEC-HI

Mr. Kevin Foster
Fish and Wildlife Service
U.S. Department of the Interior
300 Ala Moana Boulevard, Room 3-122
Honolulu, Hawaii 96850

Dear Mr. Foster:

Subject: Consultation for the Ala Wai Canal Dredging Project Regarding Section 7, Endangered Species Act

The U.S. Department of Transportation, Federal Highway Administration (FHWA) in association with the State of Hawaii Department of Land and Natural Resources (DLNR) and Department of Transportation (DOT), and City and County of Honolulu, Department of Transportation Services (DTS), has prepared a draft environmental assessment (EA) for the proposed dredging of the Ala Wai Canal (document enclosed). The purpose of the EA is to identify alternatives, analyze the potential environmental impacts, and identify operating constraints for the proposed dredging and final disposition of dredged sediments. In compliance with Section 7 of the Endangered Species Act, the draft EA includes identification of any endangered or threatened species in the project area, and assessment of whether there would be impacts (i.e., harassment, take, loss of habitat) on these species due to the proposed action. During a March 1998 conversation with Ms. Margo Stahl, it was indicated that no impacts on endangered species were anticipated because the Ala Wai Canal does not provide unique habitat for endangered species.

A terrestrial fauna survey was conducted for the EA (contained in Appendix C, and further described in Section 4.1 of the EA). During the survey, the common moorhen, an endangered species endemic to Hawaii, was observed in the vicinity of the Manoa-Palolo Drainage Canal (MPDC) and Ala Wai Golf Course. The common moorhen sightings occurred during three of nine survey days between February and September 1997. No signs of nesting were found. When the area was visited again in February 1998, no sign of the common moorhen was found. Suitable habitat for the common moorhen includes a small, disturbed area of emergent vegetation along the banks of the MPDC approximately 100 feet below the Date Street Bridge. This suitable habitat is small and vulnerable to predators and human disturbance. The dredge limits for the MPDC, which extend up to the Date Street Bridge, could be altered to avoid this area. However, since this habitat is not considered essential for the common moorhen, protection is not merited.

An additional component of the Ala Wai Canal dredging project is the disposal of dredged sediments. There are four potential disposal and placement locations. One location is the South

Oahu Ocean Dredged Material Disposal Site. In addition, one or more upland placement sites might be used for sediment not suitable for ocean disposal. The three sites are as follows: the Reef Runway at Honolulu International Airport, DLNR lands at Sand Island, and the City and County's Waipahu Ash Landfill on Waipio Peninsula. The Reef Runway and Sand Island sites do not support endangered terrestrial fauna. The Waipio Peninsula site is adjacent to Pouhala Marsh, a wetland that supports three endangered species of bird (Hawaiian stilt, Hawaiian duck, and common moorhen). Use of this site for upland placement of sediment may contribute to noise in the vicinity of the marsh that may disturb the birds. However, the Pearl Harbor National Wildlife Refuge Honouliuli and Waiawa Units are located close to this site, and would provide suitable habitat in case of temporary, short-term disturbance of endangered birds.

Based on the above information, it is concluded that no adverse impacts to endangered species will occur because of the proposed action.

Your concurrence with this determination is requested. Please contact me at 541-2536 to schedule a meeting or if you have any questions.

Sincerely yours,

Pat V. Phung

Pat V. Phung, P.E.
Transportation Engineer

cc: Marvin Char, DTS

0000 0001 0324

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE

Southwest Region
501 West Ocean Boulevard, Suite 4200
Long Beach, California 90802-4213

September 21, 1998

Pat V. Phung
Transportation Engineer
Hawaii Division
Federal Highway Administration
U.S. Department of Transportation
300 Ala Moana Blvd., Room 3202
Honolulu, Hawaii 96850

Dear Mr. Phung:

Thank you for your letter to Dr. Laurs regarding the proposed dredging of the Ala Wai Canal and the Manoa-Palolo Drainage Canal and subsequent disposal of the dredge spoil. The project is intended to remove sediments that have collected in the Canals over the past two decades and improve the water quality of these drainages. We understand that the Reef Runway at the Honolulu International Airport has been selected as the treatment and disposal site for the dredge spoil.

Based on a review of the Draft Environmental Assessment for the Ala Wai Canal Dredging, and other available information I concur with your determination that the proposed project is not likely to affect any listed species or designated critical habitat under the jurisdiction of the National Marine Fisheries Service, provided that the best construction practices as described in the EA are followed. We are especially concerned that leachate does not enter the ocean environment during and after treatment of the dredge spoil at the Reef Runway disposal site, which may affect green turtle foraging habitat. So that adverse effects are not likely to occur we recommend that the Federal Highway Administration and/or its cooperating agencies implement the following:

1. Monitor the dredge spoil disposal site to insure that runoff or sediments do not enter the marine environment during dewatering and treatment.

2. Provide a summary report at the end of the project to the National Marine Fisheries Service, Pacific Islands Protected Species Program, 2570 Dole Street, Honolulu, Hawaii 96822, documenting the total dredged material deposited, actions taken to insure that

leachate will not enter the marine environment, and the content of any runoff that may have entered the marine environment.

This concludes the informal Section 7 consultation process for this project. Consultation must be reinitiated if new species are listed that may be affected by the proposed activity or the activity affects listed species or critical habitat in a manner or to an extent not previously considered. No incidental takes of listed species are authorized for this project. Please contact Mr. Eugene Nitta at (808)973-2987 should there be any further questions.

Sincerely,

William T. Hogarth, Ph.D.
Regional Administrator

cc: F/SWRx1 - Nitta, Naughton
USFWS - Karen Rosa
COE/Ops. Branch - G. Young
Belt Collins - Jane Douell

0000 0001 0326

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
Hawaii Division
300 Ala Moana Blvd., Room 3202
Honolulu, HI 96850
May 13, 1998

IN REPLY REFER TO
HEC-HI

Dr. Michael Laurs, Director
U.S. Department of Commerce
National Marine Fisheries Service
Pacific Islands Area Office
2570 Dole Street
Honolulu, Hawaii 96822-2396

Dear Dr. Laurs,

Subject: Consultation for the Ala Wai Canal Dredging Project Regarding Section 7, Endangered Species Act

The U.S. Department of Transportation, Federal Highway Administration (FHWA) in association with the State of Hawaii Department of Land and Natural Resources (DLNR) and Department of Transportation (DOT), and City and County of Honolulu, Department of Transportation Services (DTS), has prepared a draft environmental assessment (EA) for the proposed dredging of the Ala Wai Canal (document enclosed). The purpose of the EA is to identify alternatives, analyze the potential environmental impacts, and identify operating constraints for the proposed dredging and final disposition of dredged sediments. In compliance with Section 7 of the Endangered Species Act, the draft EA includes identification of any endangered or threatened species in the project area, and assessment of whether there would be impacts (i.e., harassment, take, loss of habitat) on these species due to the proposed action.

The Ala Wai Canal dredging project involves dredging of the Ala Wai Canal and the Manoa-Palolo Drainage Canal (MPDC) up to the Date Street Bridge, and transport of dredged sediment to four acceptable disposal and placement locations. One location is the South Oahu Ocean Dredged Material Disposal Site. In addition, one or more upland placement sites might be used for sediment not suitable for ocean disposal. The three sites are as follows: the Reef Runway at Honolulu International Airport, DLNR lands at Sand Island, and the City and County's Waipahu Ash Landfill on Waipio Peninsula.

The threatened green sea turtle has been known to frequent the area near the Reef Runway and Sand Island. Barge traffic from transporting dredged sediment to disposal or placement sites would consist of possibly two barge trips a day, and this is not likely to disturb the green sea turtle.

In addition, four species of endemic gobies and one indigenous goby, none of which are listed as threatened or endangered, occur in Hawaiian streams. The endemic `o`opu naniha and `o`opu

akupa occur in the lower reaches of the Manoa-Palolo Stream near Kaimuki High School. The indigenous `o`opu nakea occurs in the middle reaches of Manoa Stream near Manoa Elementary School. The endemic `o`opu nopili may occur in the middle reaches of Manoa Stream. None of these areas are within the Ala Wai Canal dredging limits. However, because of the diadromous life cycle of the goby that involves eggs being washed downstream where they hatch and young develop, one recruitment class of juvenile gobies may be impacted by the dredging project. The dredging period will last approximately one year. Overall, the dredging will improve the Ala Wai Canal as a habitat.

Based on the above information, it is concluded that no adverse impacts to threatened or endangered species will occur because of the proposed action.

Your concurrence with this determination is requested. Please contact me at 541-2536 to schedule a meeting or if you have any questions.

Sincerely yours,

Pat V. Phung, P.E.
Transportation Engineer

cc: Marvin Char, DTS

0000 0001 0328

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
Hawaii Division
300 Ala Moana Blvd., Room 3202
Honolulu, HI 96850

May 13, 1998

IN REPLY REFER TO
HEC-HI

Mr. Ralston Nagata, Administrator
Division of State Parks
State of Hawaii
Department of Land and Natural Resources
1151 Punchbowl Street, Room 310
Honolulu, Hawaii 96813

Dear Mr. Nagata:

Subject: Coordination of the Ala Wai Canal Dredging Project and Use of Sand Island State Recreation Area

The U.S. Department of Transportation, Federal Highway Administration (FHWA) in association with the State of Hawaii Department of Land and Natural Resources (DLNR) and Department of Transportation (DOT), and the City and County of Honolulu, Department of Transportation Services (DTS), has prepared a draft environmental assessment (EA) for the proposed dredging of the Ala Wai Canal (document enclosed). The purpose of the EA is to identify alternatives, analyze the potential environmental impacts, and identify operating constraints for the proposed dredging and final disposition of dredged sediments.

Upland placement of dredged sediment is one aspect of the Ala Wai Canal dredging project. Potential upland placement sites include the Reef Runway at Honolulu International Airport, the City and County's Waipahu Ash Landfill on Waipio Peninsula, and DLNR lands at Sand Island. As discussed previously with you, a plot of land on Sand Island has been identified as a possible location for dewatering and processing of sediment prior to final placement as landscape cover in the adjacent Sand Island State Recreation Area. Activities that would occur at this site include grading related to creating bermed gravity/evaporation dewatering ponds for dredged sediments, simple processing of materials, and transfer of sediment by truck or front-end loader to the final placement site adjacent to the dewatering site. Further details on these activities are contained in the EA in Chapter 3, Alternatives.

Impacts to the State Park will be temporary, and avoidance of associated impacts, along with operational constraints are outlined in the draft EA. The draft EA indicates that no significant impacts on parklands will occur as a result of this temporary use of land. Appropriate protective measures are delineated in the EA and will be implemented by use agreement between FHWA and DLNR prior to implementation of the project.

0000 0001 0329

Your concurrence that upland placement of sediment at the Sand Island State Recreation Area does not constitute 'use' as defined for Section 4(f), because the land will be temporarily occupied without substantially affecting recreational uses, and will be restored after construction is complete. Please contact me at 541-2436 if you have any questions.

Sincerely yours,

Pat V Phung

Pat V. Phung, P.E.
Transportation Engineer

cc: Marvin Char, DTS

0000 000 1 0330

Adm 7/98 - 408

DEPARTMENT OF PARKS AND RECREATION

CITY AND COUNTY OF HONOLULU

650 SOUTH KING STREET, 10TH FLOOR • HONOLULU, HAWAII 96813
PHONE: (808) 523-4525 • FAX (808) 523-4054

RECEIVED
98 JUL 7
98 JUL 7
DIRECTOR
TRANSPORTATION SERVICES

JEREMY HARRIS
MAYOR

WILLIAM D. BALFOUR JR.
DIRECTOR

MICHAEL T. AMII
DEPUTY DIRECTOR

June 30, 1998

TO: CHERYL D. SOON, DIRECTOR
DEPARTMENT OF TRANSPORTATION SERVICES

FROM: WILLIAM D. BALFOUR, JR., DIRECTOR

SUBJECT: SECTION 4(f) DETERMINATION FOR USE OF CITY PARK LANDS DURING THE ALA WAI CANAL DREDGING PROJECT

This supersedes our memorandum of June 3, 1998, and is to establish a determination under Section 4(f) of the Department of Transportation's Act (recodified as 49 USC 303) for the Ala Wai Canal dredging project.

It is the department's understanding that areas along the Ala Wai Canal will be needed for construction support during the dredging project and that these areas are essential to ensure that dredging can be accomplished in the least amount of time with minimum disruption to recreational activities and affecting only a minimum amount of area. This temporary occupancy will not change the ownership or result in the retention of long-term or indefinite interests in the land for transportation purposes.

We also understand that the preferred locations for work support sites along the Ala Wai Canal are the Ala Wai Neighborhood Park A and the Magic Island parking lot. An environmental assessment (EA) for the proposed project is being prepared and that all potential impacts affecting park property will be assessed and mitigation measures proposed.

We do not anticipate any long-term, adverse impact on historic or recreational resources in these parks as a result of the temporary use of the land. However, we anticipate that there will be short-term impacts that will result in the disruption and inconveniences to recreational facilities, programs, and maintenance activities.

If these sites are selected, we expect the contractor and the responsible department in charge to develop mitigation measures that will:

1. Define the legal limits of liability to those areas indicated on the attached "Figures." All areas within the indicated boundaries will become the legal responsibility of the contractor and the responsible department in charge until full completion of the project. This legal responsibility shall absolve the Department of Parks and Recreation from any maintenance of the areas and any litigation resulting from damages, negligence, etc., resulting from any actions related to the proposed project.

2. Assure the department that construction activities and operations for the temporary use of the proposed park areas be limited to week days only, exclusive of holidays unless otherwise authorized by the Director of the Department of Parks and Recreation.

3. Assure the department that all park facilities including infrastructure, landscaping, parking lot areas, shoreline areas, and other impacted park areas will be restored to its original preconstruction condition.

In addition, we would require that the contractor submit applicable plans to the department for review prior to the use of the park lands in accordance with the contractor's application for a right-of-entry permit.

The department concurs that the use of park lands for support activities for the Ala Wai Canal dredging project does not constitute a "use" as defined in Section 4(f), because the land will be temporarily occupied without substantially affecting recreational uses and will be restored after construction is completed.

The department, based on the satisfaction of the above mitigation measures, concurs with a "no-effect" determination for the use of park lands as outlined in the draft EA.

A Use Agreement between the City's Department of Parks and Recreation and the State's Department of Land and Natural Resources is required prior to implementation of the project.

Please have your staff contact Mr. Brian Suzuki, Planner, of our Advance Planning Branch, at extension 6316 if you have any questions.

WILLIAM D. BALFOUR, JR.
Director

WDB:js

Attachments

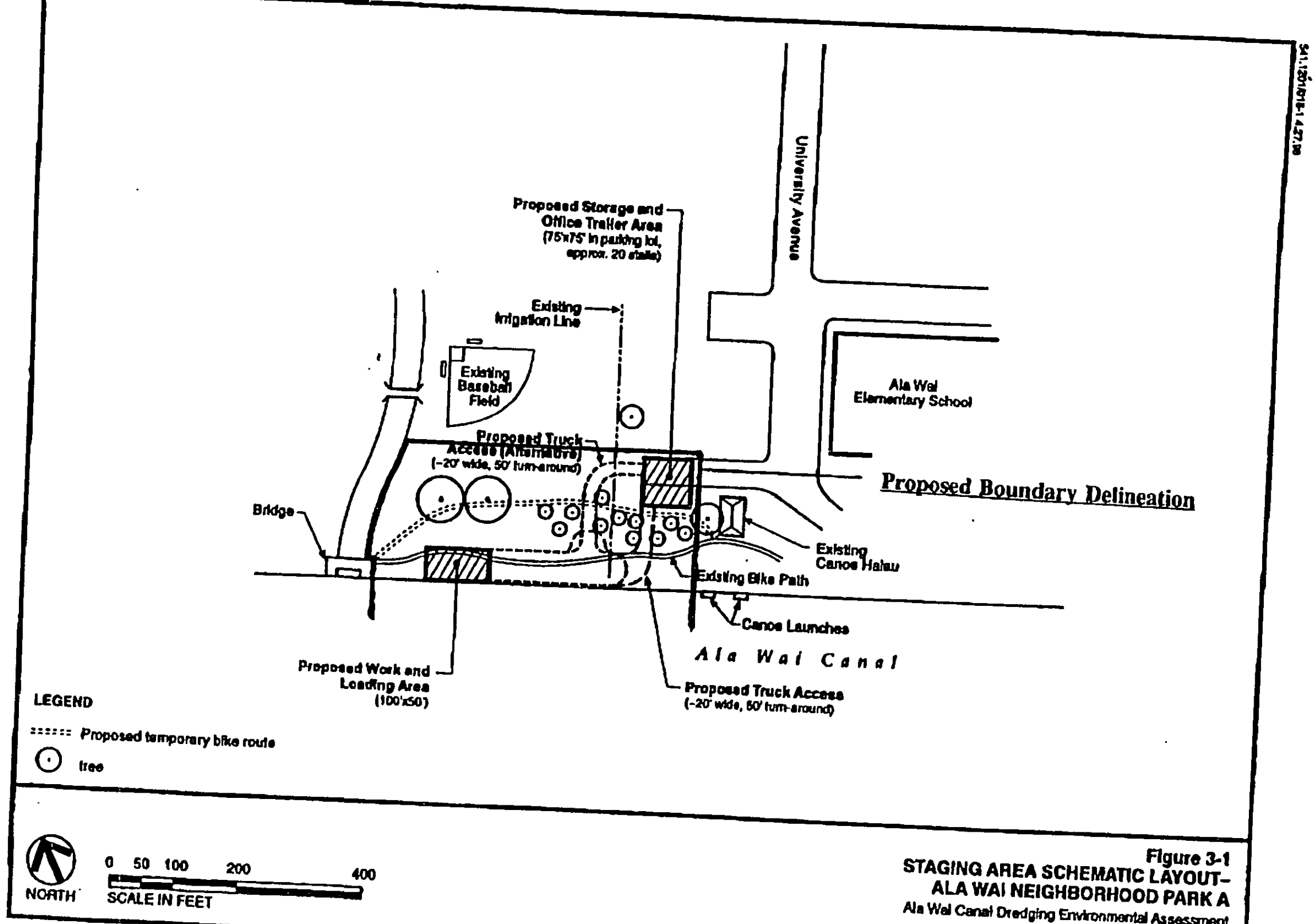

Figure 3-1
STAGING AREA SCHEMATIC LAYOUT–
ALA WAI NEIGHBORHOOD PARK A
Ala Wai Canal Dredging Environmental Assessment
Belt Collins Hawaii
May 1998

541.1201/019-1 4.27.98

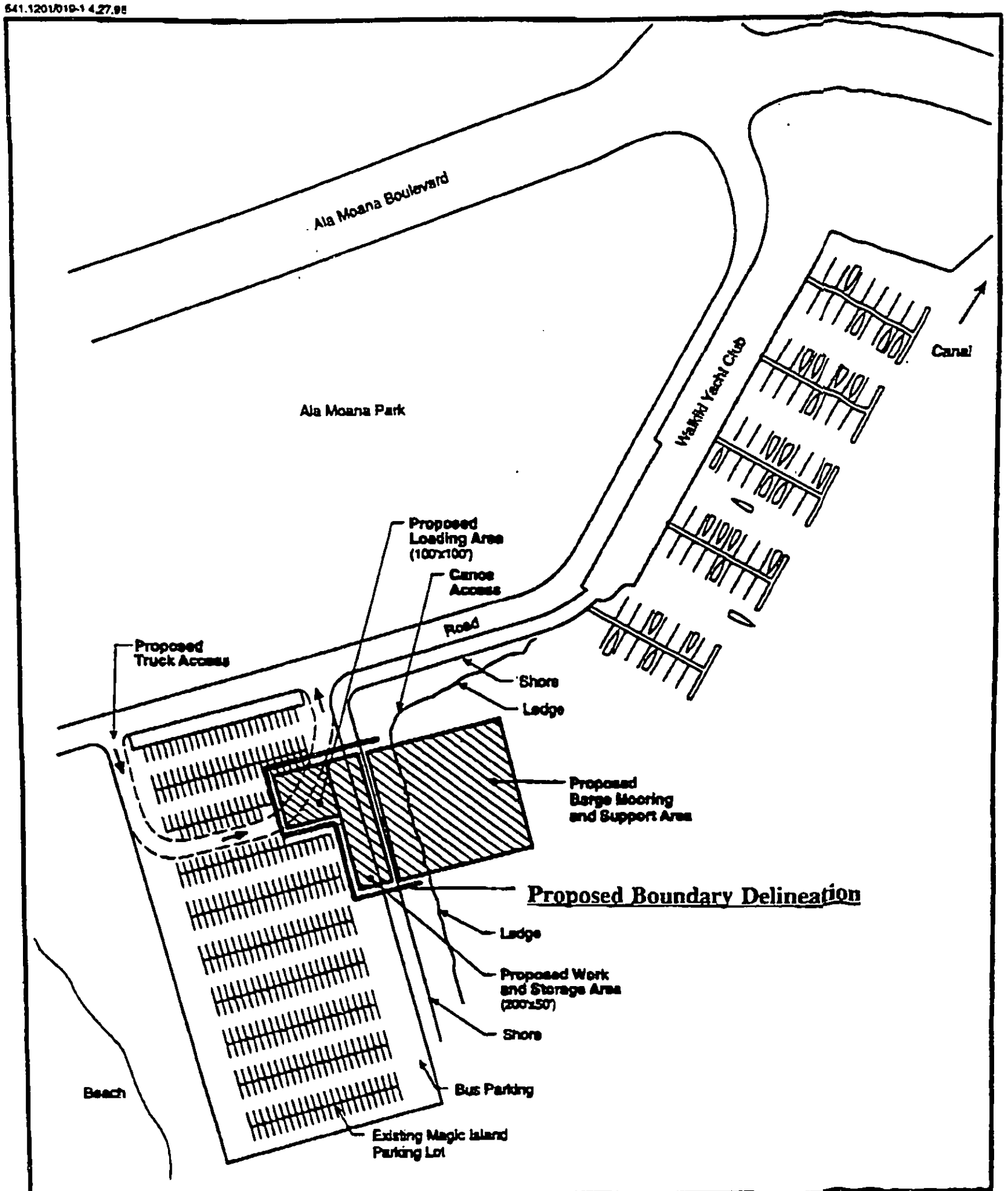

Figure 3-2
STAGING AREA SCHEMATIC LAYOUT–MAGIC ISLAND

Ala Wai Canal Dredging Environmental Assessment
Belt Collins Hawaii
May 1998

APPENDIX H
Comment Letters and Responses

PLANNING DEPARTMENT
CITY AND COUNTY OF HONOLULU
650 SOUTH KING STREET, 8TH FLOOR • HONOLULU, HAWAII 96813-3017
PHONE (808) 523-4533 • FAX (808) 523-4950

JEREMY HARRIS
MAYOR

PATRICK T. ONISHI
CHIEF PLANNING OFFICER

DONA L. HANAIKE
DEPUTY CHIEF PLANNING OFFICER

RR 5/98-0981

RECEIVED
MAY 21 1998 (2)

BELT COLLINS HAWAII LTD.

May 19, 1998

Belt Collins Hawaii, Ltd.
680 Ala Moana Boulevard, First Floor
Honolulu, Hawaii 96813-5406

Attention: Ms. Molly M. Kihara

Gentlemen:

Draft Environmental Assessment (DEA) for the
Ala Wai Canal Dredging, Honolulu, Oahu, Hawaii

In response to your company's request of May 7, 1998, on behalf of the Department of Land and Natural Resources, State of Hawaii, we have reviewed the above DEA with regard to the proposed project's impacts on the City and County of Honolulu's General Plan and the Primary Urban Center Development Plan and find the proposed project consistent with these Plans' objectives and provisions. The project is especially supportive of the proposed visions of the draft revisions to the Primary Urban Center's Development Plans for enhancing the Ala Wai Canal for recreational use.

Should you have any questions, please contact Robert Reed of our staff at 523-4402.

Yours very truly,

PATRICK T. ONISHI
Chief Planning Officer

PTO:ft

BENJAMIN J. CAYETANO
GOVERNOR OF HAWAII

REF:LD/WL-EK

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
P.O. BOX 621
HONOLULU, HAWAII 96809

SEP 23 1998

MICHAEL D. WILSON, CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES

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GILBERT COLOMA-AGARAN

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LAND DIVISION
ENGINEERING BRANCH
PLANNING BRANCH
TECHNICAL & SUPPORT BRANCH
STATE PARKS
WATER RESOURCE MANAGEMENT

Mr. Patrick T. Onishi, Chief Planning Officer
Planning Department
City and County of Honolulu
650 South King Street, 8th Floor
Honolulu, Hawaii 96813-3017

Dear Mr. Onishi:

Ala Wai Canal Dredging Draft Environmental Assessment

Thank you for your letter of May 19, 1998 on the Ala Wai Canal Dredging Draft Environmental Assessment (EA). Based on your comments, a statement regarding consistency with City plans and draft revisions to the Primary Urban Center's Development Plans have been added to Section 1.5 of the Final EA. We appreciate your taking the time to review the draft EA.

Should you have any questions or comments, please contact Mr. Andrew Monden, Chief Engineer, at 587-0230.

Aloha,

MICHAEL D. WILSON

United States
Department of
Agriculture

Natural
Resources
Conservation
Service

P.O. Box 50004
Honolulu, HI
96850

USDA

Our People...Our Islands...In Harmony

May 22, 1998

Ms. Molly M. Kihara
Belt Collins Hawaii Ltd.
680 Ala Moana Boulevard, First Floor
Honolulu, Hawaii 96813-5406

Dear Ms. Kihara:

Subject: Ala Wai Canal Dredging Draft Environmental Assessment and Public Meeting

We have reviewed the above mentioned document and have no comments to offer at this time.

Sincerely,

KENNETH M. KANESHIRO
State Conservationist

BENJAMIN J. CAYETANO
GOVERNOR OF HAWAII

MICHAEL D. WILSON, CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES

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BANK REDRIVING BRANCH
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STATE PARKS
WATER RESOURCE MANAGEMENT

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
P. O BOX 621
HONOLULU, HAWAII 96809

REF:LD/WL-EK

SEP 23 1998

Mr. Kenneth M. Kaneshiro
U.S. Department of Agriculture
Natural Resources Conservation Service
P.O. Box 50004
Honolulu, Hawaii 96850

Dear Mr. Kaneshiro:

Ala Wai Canal Dredging Draft Enviromental Assessment

Thank you for your letter of May 22, 1998 on the Ala Wai Canal Dredging Draft Environmental Assessment (EA). A copy of all comment letters received and our responses thereto will be included in the final EA. We appreciate your taking the time to review the draft EA.

Should you have any questions or comments, please contact Mr. Andrew Monden, Chief Engineer, at 587-0230.

Aloha,

MICHAEL D. WLSON

DEPARTMENT OF PUBLIC WORKS
CITY AND COUNTY OF HONOLULU
650 SOUTH KING STREET, 11TH FLOOR • HONOLULU, HAWAII 96813
PHONE (808) 523-4341 • FAX (808) 527-5857

JEREMY HARRIS
MAYOR

JONATHAN K. SHIMADA, PhD
DIRECTOR AND CHIEF ENGINEER
ROLAND D. LIBBY, JR.
DEPUTY DIRECTOR

ENV 98-119

May 27, 1998

RECEIVED (5)
MAY 29 1998
BELT COLLINS HAWAII LTD.

Ms. Molly Kihara
Belt Collins Hawaii
680 Ala Moana Blvd., 1/F
Honolulu, HI 96813-5406

Dear Ms. Kihara:

Subject: Draft Environmental Assessment (DEA)
Ala Wai Canal Dredging
TMK: 2-3-6 & 7

We have reviewed the subject DEA and have the following comments:

1. The DEA should address the structural stability of the three affected bridges: Kalakaua Avenue Bridge, McCully Street Bridge, and Date Street Bridge as a result of the proposed dredging project, i.e. the relationship between the bridge invert elevations and the proposed dredged depth of the canal.

2. The DEA should provide a canal profile after dredging is completed.

3. The DEA should provide mitigation measures for potential bank erosion and degradation resulting from the Manoa-Palolo Drainage Canal dredging.

Should you have any questions, please contact Mr. Alex Ho, Environmental Engineer, at 523-4150.

Very truly yours,

JONATHAN K. SHIMADA, PhD
Director and Chief Engineer

BENJAMIN J. CAYETANO
GOVERNOR OF HAWAII

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
P. O. BOX 621
HONOLULU, HAWAII 96809

MICHAEL D. WILSON, CHAIRPERSON
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TECHNICAL & SUPPORT BRANCH
STATE PARKS
WATER RESOURCE MANAGEMENT

REF:LD/WL-EK

SEP 23 1998

Mr. Jonathan K. Shimada, Director
Department of Facility Maintenance
City and County of Honolulu
650 South King Street, 11th Floor
Honolulu, Hawaii 96813

Dear Mr. Shimada:

Ala Wai Canal Dredging Draft Environmental Assessment

Thank you for your letter of May 27, 1998, commenting on the Ala Wai Canal Dredging Draft Environmental Assessment (EA). We offer the following response:

A statement regarding testing of the structural stability of the Kalakaua Avenue Bridge, McCully Street Bridge, and Date Street Bridge has been added to the EA (Section 3.1.1). Please note that these tests will be performed during the final design phase of the dredging project.

A profile that represents the Ala Wai Canal after dredging has been completed, has been added to Section 1.2 (see Figure 1-3).

Dredging of the Manoa-Palolo Drainage Canal (MPDC) will allow for a 5-foot setback from the banks, so bank erosion due to dredging is not anticipated. This is discussed in Section 4.11 and in Appendix A of the EA.

Again, thank you for reviewing the draft EA and providing your comments. If you have any questions or comments, please contact Mr. Andrew Monden, Chief Engineer, at 587-0230.

Aloha,

MICHAEL D. WILSON

(Your Name) Alan S. Hayashi- Exec. Director
(Street and Unit) Convention Center Authority (6)
(City, State and ZIP code) 1833 Kalakaua Av., #800, Hono. 96815

Belt Collins Hawaii
680 Ala Moana Boulevard, First Floor
Honolulu, Hawaii 96813
ATTN: Ms. Molly Kihara

Dear Ms. Kihara:

I attended the meeting on January 22, 1998 at Ala Wai Elementary School concerning the Ala Wai Canal Dredging environmental assessment and offer the following comments:

●

The Convention Center Authority is looking forward to a renewed, dredged Ala Wai Canal. We know that the process is currently in the early conceptual design and environmental assessment phase. However, as a comment for your continued consideration, we are hopeful that the actual dredging will be carried out in a manner that will not leave a negative impression on conventioneers. We are especially concerned with the proposed use of the old VFW site as a construction staging area. We would strongly encourage the use of another site for this purpose.

(Include additional sheets if necessary)

(Signed)

February 18, 1998

(Date)

Please fold bottom up to center dot (●), fold top down and seal with tape

BENJAMIN J. CAYETANO
GOVERNOR OF HAWAII

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
P. O. BOX 621
HONOLULU, HAWAII 96809

MICHAEL D. WILSON, CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES

DEPUTY
GILBERT COLOMA-AGARAN

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BOATING AND OCEAN RECREATION
CONSERVATION AND RESOURCES ENFORCEMENT
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LAND DIVISION
ENGINEERING BRANCH
PLANNING BRANCH
TECHNICAL & SUPPORT BRANCH
STATE PARKS
WATER RESOURCE MANAGEMENT

REF:LD/WL-EK

SEP 23 1998

Mr. Alan Hayashi
Hawaii Convention Center Authority
1833 Kalakaua Avenue, Suite 800
Honolulu, Hawaii 96815

Dear Mr. Hayashi:

Ala Wai Canal Dredging Draft Environmental Assessment

Thank you for your letter of May 13, 1998 (originally dated February 18, 1998), commenting on the Ala Wai Canal Dredging Draft Environmental Assessment (EA). We offer the following response:

> The Kalakaua Avenue site is not the selected site for work support in the lower portion of the Ala Wai Canal; the Magic Island site is preferred. The final EA includes discussion of preferred options, and selection of the Magic Island site is stated in Section 3.4.

Again, thank you for reviewing the draft EA and providing your comments. If you have any questions or comments, please contact Mr. Andrew Monden, Chief Engineer, at 587-0230.

Aloha,

MICHAEL D. WILSON

BOARD OF WATER SUPPLY

CITY AND COUNTY OF HONOLULU
630 SOUTH BERETANIA STREET
HONOLULU, HAWAII 96843
PHONE (808) 527-6180
FAX (808) 533-2714

May 29, 1998

Ms. Molly M. Kihara
Belt, Collins Hawaii
680 Ala Moana Boulevard, First Floor
Honolulu, Hawaii 96813-5406

Dear Ms. Kihara:

Subject: Your Transmittal of May 7, 1998 on the Draft Environmental Assessment for the Proposed Ala Wai Canal Dredging Project, Honolulu, Oahu

Thank you for the opportunity to review and comment on the Draft Environmental Assessment (EA) for the proposed Ala Wai Canal Dredging project.

We provide the following comments to the Draft EA:

1. The map scales for the Bathymetric Maps Figures 2-1A to D should be reevaluated.

2. We note there is potentially increased leakage of caprock water into the canal. This event could occur as a result of the removal of low permeability sediments that fill the canal or from the removal of the opposing pressure created by these sediments.

3. The existing 30-inch waterline that crosses the McCully Street Bridge should be included in the EA. We confirm that the waterlines serving Waikiki are suspended along the bridges of Ala Moana Boulevard, Kalakaua Avenue and McCully Street.

If you have any questions, please contact Barry Usagawa at 527-5235.

Very truly yours,

BROOKS H. M. YUEN
Acting Manager and Chief Engineer

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
P. O. BOX 621
HONOLULU, HAWAII 96809

REF:LD/WL-EK

SEP 23 1998

Mr. Clifford S. Jamile
Manager and Chief Engineer
Board of Water Supply
City and County of Honolulu
630 South King Street
Honolulu, Hawaii 96843

Dear Mr. Jamile:

Ala Wai Canal Dredging Draft Environmental Assessment

Thank you for your letter of May 29, 1998, commenting on the Ala Wai Canal Dredging Draft Environmental Assessment (EA). We offer the following response:

The map scale on the bathymetric maps (Figures 2-1A to D) has been corrected.
Reference to leakage of caprock water into the canal has been included as a potential impact of dredging the Ala Wai Canal and is discussed in Section 4.2.2.

The existing 30-inch waterline that crosses the McCully Street Bridge has been added to Section 4.10.1 and Figure 4-6.

Again, thank you for reviewing the draft EA and providing your comments. If you have any questions or comments contact Mr. Andrew Monden, Chief Engineer, at 587-0230.

Aloha,

for MICHAEL D. WILSON

May 29, '98

(6)

Dear Ms. Kihara,

My few comments on the dredging of the Ala Wai Canal.

Residing at the Marco Polo and an avid walker I pass by the water ways in at the side of Kaimuki High School, Iolani School, next to Hard Rock Cafe and across the street at the bus stop on Kapiolani and Isenberg. The garbage on the banks and in the water at these places is environmentaly disgusting.

When I returned home last Oct. the screen was broken across the street which is suppose to prevent debris from going under the street. It took many phone calls and a few months before it was fixed. The C & C is scheduled to clean this water way four times a year and I have yet to see them do it.

I phoned the Principals at Kaimuki High and Iolani to see if the students on detention or volunteers could take this project on. The answer was no due to, possible, law suits if they fell or contacted an infection from the water.

Another lack of common sense on the Mayor's part was the planting of the twenty-two Plumeria trees in which they shed their leaves and flowers into the canal; Ala Wai side.

For every step Hawaii takes; it takes ten backwards in case you never heard it said. Let's fix the cake first before we frost it.

With Respect As a Tax Payer,

Barbara Hudman

P.S. Lived here since 1/2/'40

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
P. O BOX 621
HONOLULU, HAWAII 96809

REF:LD/WL-EK

SEP 23 1998

Ms. Barbara Hudman
2333 Kapiolani Boulevard
Apartment 2903
Honolulu, Hawaii 96826

Dear Ms. Hudman:

Ala Wai Canal Dredging Draft Environmental Assessment

Thank you for your letter of May 29, 1998, commenting on the Ala Wai Canal Dredging Draft Environmental Assessment (EA). A copy of all comment letters received and our responses thereto will be included in the final EA. We appreciate your taking the time to review the draft EA.

Your comments regarding litter and plumeria trees along the Ala Wai Canal, and maintenance cleaning of drainage systems into the canal, have been noted. Reference to other projects involving such watershed issues for the Ala Wai Canal has been added to the EA (Section 2.2.2).

If you have any questions or comments, please contact Mr. Andrew Monden, Chief Engineer, at 587-0230.

Aloha,

MICHAEL D. WILSON

DEPARTMENT OF LAND UTILIZATION
CITY AND COUNTY OF HONOLULU
650 SOUTH KING STREET, 7TH FLOOR • HONOLULU, HAWAII 96813
PHONE (808) 523-4414 • FAX (808) 527-6743

JEREMY HARRIS
MAYOR

RECEIVED (4)
JUN 4 1998
BELT COLLINS HAWAII LTD. 98-03385 (DT)

JAN NAOE SULLIVAN
DIRECTOR

LORETTA K.C. CHEE
DEPUTY DIRECTOR

June 3, 1998

Ms. Molly M. Kihara
Belt Collins Hawaii Ltd.
680 Ala Moana Boulevard, First Floor
Honolulu, Hawaii 96813-5406

Dear Ms. Kihara:

Draft Environmental Assessment (EA)
Ala Wai Canal Dredging Project

We have reviewed the above Draft EA. Three of the proposed sediment disposal sites are within the Special Management Area (SMA) and will require Special Management Area Use Permits (SMPs). The sites within the SMA are the Sand Island Site, Reef Runway Site, and Waipio Peninsula Site. The proposed barge mooring and support area will also require an SMP.

We reviewed the soil remediation site at the reef runway. Although it was constructed in 1976, no SMP was approved for this site. We are in the process of notifying the State Department of Transportation that a major SMP is required for this site.

Should you have any questions regarding this letter, please contact Ms. Dana Teramoto of our staff at 523-4648.

Very truly yours,

JAN NAOE SULLIVAN
Director of Land Utilization

JNS:am

cc: Department of Transportation Services

g:ppd\9803385.djt

BENJAMIN J. CAYETANO
GOVERNOR OF HAWAII

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
P. O. BOX 621
HONOLULU, HAWAII 96809

REF:LD/WL-EK

SEP 23 1998

MICHAEL D. WILSON, CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES

DEPUTY
GILBERT COLOMA-AGARAN

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LAND DIVISION
ENGINEERING BRANCH
PLANNING BRANCH
TECHNICAL & SUPPORT BRANCH
STATE PARKS
WATER RESOURCE MANAGEMENT

Ms. Jan Naoe Sullivan, Director
Department of Planning and Permitting
City and County of Honolulu
650 South King Street, 7th Floor
Honolulu, Hawaii 96813

Dear Ms. Sullivan:

Ala Wai Canal Dredging Draft Environmental Assessment

Thank you for your letter of June 3, 1998 under letterhead of the former Department of Land Utilization, commenting on the Ala Wai Canal Dredging Draft Environmental Assessment (EA). We offer the following response:

> We have included your assessment of the need for Special Management Area Use permits (SMPs) for support work and upland placement of sediment for the Ala Wai Canal dredging project (Section 5.2.16). This discussion focuses on the preferred options, which are to have work support at Magic Island and upland placement at the Airport Reef Runway.

Again, thank you for reviewing the draft EA and providing your comments. If you have any questions or comments, please contact Mr. Andrew Monden, Chief Engineer, at 587-0230.

Aloha,

for MICHAEL D. WILSON

Held at 6298 mtg - none
(10)

(Your Name) Susan B. Morgenweck
(Street and Unit) 2211 Ala Wai Blvd. 2704
(City, State and ZIP code) Honolulu, HI 96815

Belt Collins Hawaii
680 Ala Moana Boulevard, First Floor
Honolulu, Hawaii 96813
ATTN: Ms. Molly Kihara

Dear Ms. Kihara:

I offer the following comments concerning the Ala Wai Canal Dredging draft environmental assessment:

First of all, again, I would like to thank you and wish you all the best for your bravery to publish your name & number. We are a crazy group.

Secondly, I would like to know, how long, if ever, the fish + other creatures will be toxic? One generation, two? Forever?

Third + finally, if dumping were not an option (would mixing the Gunk) sediment w/ cement + create building material be a safe, long-term option?

Sincerely,

(Include additional sheets if necessary)

Susan B. Morgenweck
(Signed)

6/2/98
(Date)

Please submit on or before June 8, 1998

Please fold bottom up to center dot (●), fold top down and seal with tape

BENJAMIN J. CAYETANO
GOVERNOR OF HAWAII

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
P. O. BOX 621
HONOLULU, HAWAII 96809

REF:LD/WL-EK

SEP 23 1998

MICHAEL D. WILSON, CHAIRPERSON
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WATER RESOURCE MANAGEMENT

Ms. Susan Morgenweck
2211 Ala Wai Boulevard
Apartment 2704
Honolulu, Hawaii 96815

Dear Ms. Morgenweck:

Ala Wai Canal Dredging Draft Environmental Assessment

Thank you for your letter of June 2, 1998, commenting on the Ala Wai Canal Dredging Draft Environmental Assessment (EA). We offer the following response:

Regarding your question on how long fish in the canal will have levels of contaminants of concern, it is likely that concentrations will remain at high levels for generations. This is due to existing contaminants in the watershed (discussion of watershed projects is included in Section 2.2.2).

Regarding your question on using dredged sediments to make building materials, it is unlikely that this would be cost effective. Upland placement at the preferred site, the Airport Reef Runway, will involve mixing sediments with binding agents, possibly including cement, to make fill material for the Reef Runway (see Section 3.1.1).

Again, thank you for reviewing the draft EA and providing your comments. If you have any questions or comments, please contact Mr. Andrew Monden, Chief Engineer, at 587-0230.

Aloha,

MICHAEL D. WILSON

Hand at 6.2.98 mtg - mine
(11)

(Your Name) Stephen T. Kubota
(Street and Unit) 44-281 Mikiola Dr.
(City, State and ZIP code) Kaneohe, Hi 96744

Belt Collins Hawaii
680 Ala Moana Boulevard, First Floor
Honolulu, Hawaii 96813
ATTN: Ms. Molly Kihara

Dear Ms. Kihara:

I offer the following comments concerning the Ala Wai Canal Dredging draft environmental assessment:

Phytoremediation = use of plants to recover nutrients and isolate pollutants = use plants for alternative energy or non-edible agriculture such as ornamental plants, landscape plants for shoreline vegetated buffers.

Agricultural use would keep soil covered and moist to reduce fugitive dust.

i.e. the sediment in the canal would normally be the fertile soil of the Nile, Mississippi, Ganges/delta, etc. If we can deal with the pollutants, the sediment would be valuable, fertile soil.

- impact on ʻoʻopu native species - depend on fresh water signal to find their way upstream.
- fugitive material along overland route.

(Include additional sheets if necessary)

Stephen T. Kubota
(Signed)
June 2, 1998
(Date)

Please submit on or before June 8, 1998

Please fold bottom up to center dot (●), fold top down and seal with tape

BENJAMIN J. CAYETANO
GOVERNOR OF HAWAII

MICHAEL D. WILSON, CHAIRPERSON
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P. O. BOX 621
HONOLULU, HAWAII 96809

REF:LD/WL-EK

SEP 23 1998

Mr. Stephen T. Kubota
44-281 Mikiola Drive
Kaneohe, Hawaii 96744

Dear Mr. Kubota:

Ala Wai Canal Dredging Draft Environmental Assessment

Thank you for your letter received June 2, 1998, commenting on the Ala Wai Canal Dredging Draft Environmental Assessment (EA). We offer the following response:

Your points regarding use of Ala Wai Canal dredged sediment as soil for agricultural use, and the use of plants to recover nutrients and isolate pollutants are well taken. The preferred upland placement site requires fill material, which could be covered by vegetation. As you noted, there is the need to deal with the pollutants in the sediment, and this limits the usability of the material.

- The ʻoʻopu and potential impacts on them are discussed in the EA in Sections 4.1.1 and 4.1.2.
- The option of trucking the dredged sediment was eliminated from consideration and therefore not evaluated in the EA. Overland transport of bulky items from the staging areas to an appropriate disposal site would follow trucking rules, including prevention of the escape of fugitive material.

Again, thank you for reviewing the draft EA and providing your comments. If you have any questions or comments, please contact Mr. Andrew Monden, Chief Engineer, at 587-0230.

Aloha,

for MICHAEL D. WILSON

Received at 6298 mtg - mtkl (12)

(Your Name) JEB P. BROWN
(Street and Unit) 509 UNIVERSITY AVE. #804
(City, State and ZIP code) HO, HI 96826-5008

Belt Collins Hawaii
680 Ala Moana Boulevard, First Floor
Honolulu, Hawaii 96813
ATTN: Ms. Molly Kihara

Dear Ms. Kihara:

I offer the following comments concerning the Ala Wai Canal Dredging draft environmental assessment:

●

JEB P. BROWN - HAWAIIAN ISLANDS HUMPBACK WHALE NATIONAL MARINE SANCTUARY / THE COUSTEAU SOCIETY

I SIMPLY WISH TO MAKE SURE THAT THIS PROJECT DOES "NOT" IN ANY WAY NEGATIVELY IMPACT THE NATIONAL MARINE SANCTUARY THAT HAS NOW BEEN ESTABLISHED IN HAWAII. ("DECEMBER IS THE BEGINNING OF THE MIGRATORY SEASON FOR THE HUMPBACK WHALES")

I "THANK YOU" FOR THE OPPORTUNITY TO VOICE THIS CONCERN.

(Include additional sheets if necessary)

Jeb P. Brown (Signed)
02-JUNE-98 (Date)

Please submit on or before June 8, 1998

Please fold bottom up to center dot (●), fold top down and seal with tape

BENJAMIN J. CAYETANO
GOVERNOR OF HAWAII

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REF:LD/WL-EK

SEP 23 1998

Mr. Jeb P. Brown
509 University Avenue, #804
Honolulu, Hawaii 96826-5008

Dear Mr. Brown:

Ala Wai Canal Dredging Draft Environmental Assessment

Thank you for your letter of June 2, 1998, commenting on the Ala Wai Canal Dredging Draft Environmental Assessment (EA). A brief description of the Hawaiian Islands Humpback Whale National Marine Sanctuary has been added to the EA (Section 4.1.1, Marine Biota), with an analysis of potential impacts included in Section 4.1.2.

Again, thank you for reviewing the draft EA and providing your comments. If you have any questions or comments, please contact Mr. Andrew Monden, Chief Engineer, at 587-0230.

Aloha,

for MICHAEL D. WILSON

DEPARTMENT OF WASTEWATER MANAGEMENT
CITY AND COUNTY OF HONOLULU
650 SOUTH KING STREET, 3RD FLOOR • HONOLULU, HAWAII 96813
PHONE: (808) 527-6663 • FAX: (808) 527-6675

JEREMY HARRIS
MAYOR

KENNETH E. SPRAGUE, P.E., Ph.D.
DIRECTOR

CHERYL K. OKUMA-SEPE, ESQ.
DEPUTY DIRECTOR

In reply refer to:
WCC 98-100

June 3, 1998

Ms. Molly M. Kihara
Belt Collins Hawaii Ltd.
680 Ala Moana Boulevard, First Floor
Honolulu, Hawaii 96813-5406

Dear Ms. Kihara:

Subject: **DRAFT ENVIRONMENTAL ASSESSMENT**
ALA WAI CANAL DREDGING
HONOLULU, OAHU, HAWAII

The State of Hawaii, Department of Land and Natural Resources and the U.S. Department of Transportation are proposing to dredge the Ala Wai Canal. Municipal sewer lines cross the Ala Wai Canal at three locations and the Manoa-Palolo Drainage Canal (MPDC) at one location. In case of a sewage spill during dredging, the contractor shall notify the State Department of Heath and send a copy of the notification to our department.

A concrete jacket encases both the 42-inch force main crossing the Ala Wai Canal just upstream of the Ala Moana Boulevard Bridge and the three-pipe siphon downstream of the MPDC. The tops of the concrete jackets are -20 feet mean sea level (MSL), and -15.75 feet MSL, respectively. The 30-inch sewer, with invert -8.76 feet MSL, crosses the MPDC at the Date Street Bridge. The sewer line is located just upstream of Dredge Area 4, which will have a maximum dredge depth of -10 feet MSL.

If you have any questions, please contact Mr. Scott Gushi of the Service Control Branch at 523-4886.

Sincerely,

Cheryl K. Okuma-Sepe
for KENNETH E. SPRAGUE
Director

BENJAMIN J. CAYETANO
GOVERNOR OF HAWAII

MICHAEL D. WILSON, CHAIRPERSON
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STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
P. O. BOX 621
HONOLULU, HAWAII 96809

REF:LD/WL-EK

SEP 23 1998

Mr. Kenneth E. Sprague, Director
Department of Environmental Services
City and County of Honolulu
650 South King Street, 3rd Floor
Honolulu, Hawaii 96813

Dear Mr. Sprague:

Ala Wai Canal Dredging Draft Environmental Assessment

Thank you for your letter dated June 3, 1998, under letterhead of the former Department of Wastewater Management, commenting on the Ala Wai Canal Dredging Draft Environmental Assessment (EA). Sections 4.10.1 and 4.10.2 of the EA have been modified to reflect your comments, including the specifics of the sewer lines and the requirement, in case of a sewage spill, to notify the State Department of Health and send a copy to your department.

Again, thank you for reviewing the draft EA and providing your comments. If you have any questions or comments, please contact Mr. Andrew Monden, Chief Engineer, at 587-0230.

Aloha,

MICHAEL D. WILSON

Hawaiian Electric Company, Inc. • PO Box 2750 • Honolulu, HI 96840-0001

(14)

Scott W.H. Seu, P.E.
Manager
Environmental Department

June 5, 1998

Ms. Molly Kihara
Belt Collins Hawaii
680 Ala Moana Boulevard, 1st floor
Honolulu, HI 96813

Dear: Ms. Kihara

Subject: Ala Wai Canal Dredging

Thank you for the opportunity to comment on your May 1998 Draft EA for the Ala Wai Canal Dredging, as proposed by the State of Hawaii, Department of Land and Natural Resources and U.S Department of Transportation, Federal Highway Administration. We have reviewed the subject document and have the following comments:

1. In 1989, HECO cut and abandoned in-place the two electrical lines which were installed prior to 1978, and installed two new electrical lines of higher capacity to provide for the load growth in the Waikiki area. HECO attempted to trench through the sediment with a water jet machine to attain the desired -16.0 feet MSL. However, the water jet machine uncovered many obstacles embedded in the silt (refrigerators, washing machines, cars parts, etc.). Accordingly, the new electrical lines were just allowed to settle in the silt. It is imperative that a cable locating company be hired by the contractor to pinpoint the location and depth of the new electrical lines.

2. There are two manholes containing the electrical lines: one on Kalolu Street at the intersection of Ala Wai Boulevard, and one on the mauka bank abutting the canal. The one on the mauka bank has concrete slab covers which can be removed to perform splicing operations within the manhole. However, these concrete slabs are not designed to withstand the weight of heavy vehicles. The dredging contractor must provide protection for the manholes and concrete covers via steel plates or other means.

3. HECO has a valid easement for this electrical line crossing. This easement grants HECO certain privileges and provides for the protection of its facilities. The dredging contractor is obligated to address HECO's concerns and provide the necessary measures to ensure HECO's continued operation of the cables.

4. It should be noted that electrical lines also cross the Ala Wai Canal in the McCully Street and Ala Moana Boulevard Bridges. However, as these electrical lines are encases in conduits within the bridge structures, no impacts by the dredging operation are foreseen.

Our point of contact for this project, and the originator of these comments, is Francis Hirakami (543-7536) principal engineer. I suggest your staff and consultants deal directly with Francis to coordinate HECO's continuing input on this project.

Sincerely,

for Scott W.H. Seu

cc: F. Hirakami

BENJAMIN J. CAYETANO
GOVERNOR OF HAWAII

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
P. O. BOX 621
HONOLULU, HAWAII 96809

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STATE PARKS
WATER RESOURCE MANAGEMENT

REF:LD/WL-EK

SEP 23 1998

Mr. Scott W.H. Seu
Manager, Environmental Department
Hawaiian Electric Company, Inc.
P.O. Box 2750
Honolulu, Hawaii 96840-0001

Dear Mr. Seu:

Ala Wai Canal Dredging Draft Environmental Assessment

Thank you for your letter of June 5, 1998, commenting on the Ala Wai Canal Dredging Draft Environmental Assessment (EA). We offer the following response:

Discussion of the electrical lines that were allowed to settle in the silt has been included in the EA (Sections 2.3 and 4.10).

The two manholes containing electrical lines have been noted in the EA (Sections 3.1.1 and 4.10.1). Neither is in a proposed work support area, so impacts related to heavy vehicles due to the dredging project are not anticipated.

Your comment regarding HECO's easement has been noted (Section 4.10.2), and will be addressed during the final design and contracting for the Ala Wai Canal dredging project.

The electrical lines in the McCully Street and Ala Moana Boulevard bridges have been noted Section 4.10.1).

Again, thank you for reviewing the draft EA and providing your comments. Should you have any questions or comments, please contact Mr. Andrew Monden, Chief Engineer, at 587-0230.

Aloha,

MICHAEL D. WILSON

Surfrider Foundation, Oahu Chapter
P.O. Box 356
Haleiwa, HI 96712

Ms. Molly Kihara
Belt Collins Hawaii
680 Ala Moana Boulevard, First Floor
Honolulu, Hawaii 96813

Dear Kihara:

The Surfrider Foundation and the Oahu Chapter of the Surfrider Foundation have reviewed the draft Environmental Assessment (EA) for the Ala Wai Canal Dredging Project dated May 1998. Overall, we find the document lacking pertinent technical information and data necessary to make substantive decisions on the various disposal options under consideration. It appears that document makes the ocean disposal option the option of choice based solely on cost considerations.

Our specific concerns relate to the appropriateness of this disposal alternative and whether it should even be considered in light of the fact that much of the sediment appears to be highly contaminated.

In fact, according to the draft EA, based on sediment chemistry results, only a small portion of the material (approximately 19,000 cubic yards) has been found suitable for ocean disposal. The draft EA also states that "the remainder (approximately 154,000 cubic yards) would require further testing to determine suitability" (page 3-11).

Furthermore, the comments from EPA and the ACOE contained in Appendix A indicate that based on current data, it appears that there will be some material unsuitable for ocean disposal. As a result, the agencies have recommended that rather conduct further testing to determine the suitability of the material for ocean disposal, other alternatives be considered.

We strongly agree with this recommendation and find that the draft EA does not adequately provide documentation to support the ocean disposal option.

In terms of potential effects of disposal of this dredged material in the ocean, Section 4.1.2 Potential Effects and Operating Constraints, provides no discussion of the marine environmental impacts that would be associated with disposal of this material in the ocean. For example, if organisms living in the canal are, in fact, being impacted by contaminants associated with sediments in the canal as indicated in the EA, these sediment-associated contaminants will likely have a similar affect on marine organisms in and around the ocean disposal site.

Furthermore, the EA does not provide any information on the marine biota in and around the ocean disposal site, the recreational and commercial fisheries in the region, and other existing uses of the area. Even the discussion of marine biota in the canal is limited and general. These factors render Section 4. Affected Environment, incomplete. In fact, the EA does not even contain a reference list in support of this type of information.

Surfrider Foundation, Oahu Chapter
P.O. Box 356
Haleiwa, HI 96712

The discussion of sediment quality contained in the EA (Section 4.2 Pollutants in the Ala Wai Canal), is unacceptable. Sediment quality will ultimately determine the appropriateness and cost of any placement option, yet this section provides no detailed analytical data. At a minimum, in fact, these data should have been included in location specific summary tabular form in the draft EA and must be included in the final EA. Regardless, the narrative entitled Sediment Quality leads us to conclude that these sediments are highly contaminated with contaminants of concern including heavy metals, pesticides, PCBs, and PAHs.

We look forward to your written response to these comments and request that you provide us with copies of analytical data regarding sediment testing and sediment quality. Finally, we urge you to abandon the ocean disposal option and select a more sound, environmentally acceptable disposal alternative.

Sincerely,

Peter N Cole
Oahu Chapter

Gregory R. Pollack, REP
Surfrider Foundation National Board of Directors

John A. Tiedemann
Coastal Advisory Services

BENJAMIN J. CAYETANO
GOVERNOR OF HAWAII

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
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Mr. Peter N. Cole
Surfrider Foundation, Oahu Chapter
P.O. Box 356
Haleiwa, Hawaii 96712

Dear Mr. Cole:

Ala Wai Canal Dredging Draft Environmental Assessment

Thank you for your letter received June 8, 1998, commenting on the Ala Wai Canal Dredging Draft Environmental Assessment (EA). We offer the following response:

The EA evaluates the ocean disposal option, as well as the upland disposal option, at specific sites. The sediment was first evaluated for ocean disposal suitability because potential impacts at the EPA-designated South Oahu Ocean Dredged Material Disposal Site (ODMDS) have been previously evaluated, and because of cost considerations and the existence of regulatory criteria to determine suitability.

As reflected in the final EA, the total volume of sediment found suitable for ocean disposal was erroneously reported in the draft EA. The correct total volume is 45,500 cubic yards. To clarify the statement in your letter, the remaining volume would have to be further tested (Tier III) before a determination could be made by EPA and ACOE as to suitability. They indicated that based on their past experience, it would be surprising if Tier III testing showed all of the remaining material as suitable.

Further documentation on the regulatory agency rationale for the ocean disposal suitability determination is provided in Appendix A of the final EA.

Regarding potential marine impacts, the biota section of the EA (Section 4.1) focuses on potential impacts to rare, threatened, or endangered species or its habitat. This is the case for discussions of both the canal and the ocean disposal site, and therefore Section 4.1 is not incomplete. Conditions and potential impacts in the vicinity of the South Oahu ODMDS are discussed in a 1980 environmental impact statement for Hawaii dredged material disposal sites. In addition, a presentation of the criteria for designating such sites has been added to Section 4.1.2 of the EA. Placement at such designated sites requires approval by the ACOE and EPA after appropriate testing of the sediment has been conducted.

There is a difference in environmental conditions at the Ala Wai Canal and the South Oahu ODMDS, and contaminants may not have the same impacts. In addition, if only a portion of the canal sediment is ocean disposed, it cannot be stated that if organisms in the Ala Wai Canal are being impacted by contaminants associated with sediments in the canal, that a similar effect on marine organisms in and around the ocean disposal site would occur.

The discussion of sediment quality in Section 4.2.1 provides a summative narrative description, including ranges of concentration levels. This is commensurate with the evaluation of impacts provided in Section 4.2.2. References are cited in footnotes, and in Chapter 6. Contaminant levels within the canal are variable and range from non-detects and higher. It is not appropriate to make the general statement that all of the sediment in the canal is "highly contaminated". The specific data corresponding to particular locations within the canal are documented in separate reports, and as noted in Section 3.1.1 of the final EA, the reports are available for public review at Belt Collins Hawaii. You can make arrangements to photocopy the reports at your expense.

Ocean disposal at the South Oahu ODMDS is a sound, environmentally acceptable disposal option that has been considered in the EA. The same is true for upland disposal at the Reef Runway.

Again, thank you for reviewing the draft EA and providing your comments. Should you have any questions or comments, please contact Mr. Andrew Monden, Chief Engineer, at 587-0230.

Aloha,

for MICHAEL D. WILSON

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

Molly Kihara
Belt Collins Hawaii
680 Ala Moana Boulevard
First Floor
Honolulu, Hawaii 96813

SUBJECT: EPA Comments on Ala Wai Dredging Draft Environmental Assessment

Dear Ms. Kihara:

EPA Region IX has reviewed the Ala Wai Dredging Draft Environmental Assessment (EA) with respect to the major dredging and disposal/reuse issues that have involved the Sediment Management Team within the Wetlands and Sediment Management Office. We appreciate the opportunity to be involved in the early stages of this project in order to facilitate the sediment sampling and sediment testing aspects. After reviewing this document, EPA Region IX has comments on the following dredging- and disposal/reuse-related aspects of this project.

Configuration of the Project Relative to Disposal/Reuse Options. The section in Chapter 3 that addresses this describes only one configuration (area and dredging depth) and the no-action alternative. The disposal/reuse options make assumptions about existing (calculated) capacities of the various options that may be approved by the local agencies. The Final EA should consider alternative dredging configurations (smaller areas and shallower dredging depths) that could still address the project objectives. This consideration was discussed in earlier meetings and appears to be missing in the Draft EA.

Description of the Disposal/Reuse Options. The section in Chapter 3 that addresses this describes the options in limited detail. Additional details are needed in the description of the disposal/reuse options and would be needed for any subsequent permit. It is important to determine what data and other information are presently available or must be collected to assess/confirm that there would be no significant impacts associated with use of these alternative sites. Other specific

aspects that should be described include, but are not limited, to the following:

1. Construction design and specifications for any dewatering facilities.
2. Need for excavation or construction of berms.
3. Need for linings to address leaching, if that is a concern.
4. Details on any binding/amendment process (i.e., Portland cement) to address leaching.
5. Need for cover material over the dredged material.

Sediment Chemistry Information. The EA should display some kind of summary table of the sediment data for the different dredging areas. The existing narrative is not compelling to an outside reader. The narrative in Appendix A provides more detail than the text in Chapter 3; however a summary table with the pertinent sediment chemistry for the different dredging areas would provide a much better presentation.

Suitability Determination of Sediments Proposed for Ocean Disposal. The footnote in Section 5.2.5 needs to be corrected to include the EPA Ocean Dumping Regulations at 40 CFR Parts 220-227 regarding the suitability determination of sediments proposed for ocean disposal.

Appendices. This is a minor comment- the labeling of the appendices needs to be clarified. Currently, it appears that the first two appendices are labeled as "Appendix A".

EPA Region IX has additional comments regarding water quality issues associated with the dredging project; however, they were not ready at the writing of this letter, and will have these comments submitted as soon as possible. Furthermore, EPA Region IX has examples to clarify some of the comments above which may be helpful (as templates) in the preparation of the Final EA. If these are acceptable to you, we can submit these by mail along with the original signed letter for inclusion in your administrative files.

Again, EPA Region IX appreciates the opportunity to provide assistance in this project. If you have any questions, or require additional information, please contact me at (415) 744-1980.

Sincerely yours,

Allan Y. Ota
Sediment Management Team (WTR-8)

cc: Wendy Wiltse (PICO)

BENJAMIN J. CAYETANO
GOVERNOR OF HAWAII

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
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REF:LD/WL-EK

SEP 23 1998

Mr. Allan Y. Ota
Sediment Management Team
U.S. Environmental Protection Agency, Region IX
75 Hawthorne Street WTR-8
San Francisco, California 94105

Dear Mr. Ota:

Ala Wai Canal Dredging Draft Environmental Assessment

Thank you for your facsimile transmittal received June 8, 1998, commenting on the Ala Wai Canal Dredging Draft Environmental Assessment (EA). We offer the following response:

Project configuration
The description in Chapter 3 of the dredge areas and depths presents the maximum dredge depths in the four areas, along with the No Action alternative. The areas were configured as such because of the different maximum dredge depths. By configuring the depths as the maximum, lesser dredge depths are included for consideration. Correspondingly, the dredge volumes associated with the maximum dredge depths are also presented, and the EA evaluates potential impacts for the most demanding scenario in terms of volume of material to be disposed.

Description of options
As discussed in Chapter 3, only options that individually and collectively (with other feasible and compatible components) have no substantial impacts will be allowed. This approach is intended to allow maximum flexibility for bidding to allow innovative approaches, while preventing substantial environmental impacts. In some cases, for an option to remain feasible, operating constraints are imposed, as discussed in Chapters 3 and 4. These constraints will be included in the construction bid specifications that will be developed during final design and incorporated into the final dredging contract. This will enable DLNR to suspend the contractor's operations if operating constraints are not followed. The description of options and operating constraints is sufficient for the purposes of the EA document. It is understood that any subsequent permit application submitted to your agency would require additional details including those on the specific aspects that you list. This will be developed during the final design phase of the project.

Discussion of the potential for acidification of dredged sediment during upland processing and placement has been added to the EA. Processing of sediment will involve binding agents to solidify the material for use as fill at the Reef Runway, the preferred upland disposal site. Dewatering effluent from sediment will not be discharged. Once material is solidified, runoff from the fill area would not likely carry contaminants that are bound in the fill material. Fugitive emissions from the upland site have also been addressed in the EA. Sections 3.1.1 and 4.2.2 contain discussion on these issues.

Sediment chemistry information
Section 3.1.1 of the EA has been revised to indicate that the material targeted for dredging was tested for sediment chemistry, for the purpose of determining suitability for ocean disposal; hence, the inclusion of EPA and ACOE comments on the sediment chemistry results. Chapter 4 summarizes the results in narrative fashion. For the purposes of the EA, this presentation of data was deemed the most appropriate, as a presentation of the complete data set would be too overwhelming for the outside reader, and a summary data table would not provide the complete picture. As noted in the final EA, copies of the reports are available for public review at Belt Collins Hawaii.

Suitability determination
The footnote in Section 5.2.5 has been corrected to include EPA Ocean Dumping Regulations.

Appendices
The first Appendix A is an appendix to the EA document. The second Appendix A is an appendix to the document entitled *Definition and Evaluation of Alternatives*. To avoid confusion, in the final EA, only the first Appendix A sheet is printed on colored paper.

Again, thank you for reviewing the draft EA and providing your comments. We will be glad to accept examples you wish to provide. If you have any questions or comments, please contact Mr. Andrew Monden, Chief Engineer, at 587-0230.

Aloha,

for MICHAEL D. WILSON

DEPARTMENT OF THE ARMY
U. S. ARMY ENGINEER DISTRICT, HONOLULU
FT. SHAFTER, HAWAII 96858-5440

REPLY TO ATTENTION OF

June 12, 1998

Operations Branch

Ms. Mollie Kihara
Belt Collins Hawaii
680 Ala Moana Blvd. First Floor
Honolulu, Hawaii 96813-5406

Dear Ms. Kihara:

Thank you for the opportunity to review the Ala Wai Canal Dredging Draft Environmental Assessment. The draft EA was reviewed by members of the Regulatory staff and the Environmental Division. The document provides a good description of the project components and alternatives and adequately addresses potential impacts to waters of the U.S. Specific comments are as follows:

1. Section 5.2.9 (and any reference to NPDES permit requirements associated with dewatering of dredged sediments). A permit under Section 404 of the Clean Water Act is required for discharges into waters of the U.S. associated with dewatering dredge sediments. This triggers the associated permit under Section 401, but not an NPDES permit. Dewatering effluent from sources other than dredge sediment is regulated under NPDES.

2. Definition and evaluation of alternatives (Table 3). ACOE is authorized under Section 103 of the Marine Protection, Research, and Sanctuaries Act to issue permits for the **transportation of dredged material for the purposes of disposal in the ocean.**

3. The document can be used as an attachment to provide background information relating to the permit application. However, more information will be required before the application is considered complete. This would include a final decision regarding dredging methodology and dredge material disposal options. Also, best management practices designed to minimize discharge of dredged or fill material to waters of the U.S. will have to be submitted for review.

If you have any further questions, please contact Mr. Alan Everson of my staff at 438-9258, extension 11.

Sincerely,

George P. Young, P.E.
Chief, Operations Branch

BENJAMIN J. CAYETANO
GOVERNOR OF HAWAII

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
P. O. BOX 621
HONOLULU, HAWAII 96809

MICHAEL D. WILSON, CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES

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FORESTRY AND WILDLIFE
HISTORIC PRESERVATION
LAND DIVISION
ENGINEERING BRANCH
PLANNING BRANCH
TECHNICAL & SUPPORT BRANCH
STATE PARKS
WATER RESOURCE MANAGEMENT

REF:LD/WL-EK

SEP 23 1998

Mr. George P. Young, P.E.
Chief, Operations Branch
U.S. Army Engineer District, Honolulu
Fort Shafter, Hawaii 96858-5440

Dear Mr. Young:

Ala Wai Canal Dredging Draft Environmental Assessment

Thank you for your letter dated June 12, 1998, and the facsimile transmittal from Alan Everson dated June 8, 1998, commenting on the Ala Wai Canal Dredging Draft Environmental Assessment (EA). We offer the following response:

Dewatering discharges
Sections 5.2.7 and 5.2.9 have been modified in accordance with your statement regarding the requirement for a permit under Section 404 of the Clean Water Act for discharges into waters of the U.S. associated with dewatering dredge sediments.

Table 3 in *Definition and Evaluation of Alternatives* in Appendix A
The second bullet in the first row of this table has been changed to state that the ACOE is authorized under Section 103 to issue permits for the transportation of dredged material for the purposes of disposal in the ocean.

Permit application
We understand that additional information beyond that provided in the EA will be required before the application for a Department of the Army permit can be considered complete. As stated in the EA, details are subject to refinement during the final design phase. These details will include a selection of dredging methodology and design of best management practices.

Again, thank you for reviewing the draft EA and providing your comments. Should you have any questions or comments, please contact Mr. Andrew Monden, Chief Engineer, at 587-0230.

Aloha,

for MICHAEL D. WILSON

Waikiki Yacht Club
ALA WAI BOAT HARBOR HONOLULU STATE OF HAWAII

June 8, 1998

RECEIVED (18)
JUN 8 1998
BELT COLLINS HAWAII LTD.

Ms. Molly Kihara
Belt Collins Hawaii
680 Ala Moana Blvd., First Floor
Honolulu, Hawaii 96813

Dear Ms. Kihara,

I offer the following comments concerning the Ala Wai Dredging draft environmental assessment:

1. We recommend that if dredged material must be transported to the Magic Island site that this be done via hydraulic pipeline rather that by small scow and keep in mind that many sail boats have a draft of as much as 12-14 feet. We anticipate that the smell of this material will affect everyone in the Ala Wai Harbor area.
2. We have recorded depth soundings in anticipation of sediment deposits reducing the water depth in the harbor as a result of this project. Should there be loss in the depth of the harbor, as a result of this project, we would expect that your company would remedy the situation.
3. The sediment in the harbor water may pose a health risk to the paddling community and to our Junior Sailing children.
4. The proposed staging area and barge mooring in the Ala Wai Harbor will pose a navigational hazard to the numerous boaters using the harbor and a substantial hardship on the many park users at Magic Island. We recommend the staging site at the Ala Wai Neighborhood Park and disposal of material via truck and through commercial ports.

Please keep me informed of the schedules and methods to be used on this project.

Sincerely,
Waikiki Yacht Club

Michael J. Rothwell
Commodore

CLUBHOUSE TEL: (808) 955-4405 • MAIL ADDRESS: 1599 ALA MOANA BLVD., HONOLULU, HAWAII 96814
FAX: (808) 941-5026 • E-MAIL: wyc@lava.net

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
P. O. BOX 621
HONOLULU, HAWAII 96809

REF:LD/WL-EK

SEP 23 1998

Mr. Michael J. Rothwell, Commodore
Waikiki Yacht Club
1599 Ala Moana Boulevard
Honolulu, Hawaii 96814

Dear Mr. Rothwell:

Ala Wai Canal Dredging Draft Environmental Assessment

Thank you for your letter of June 8, 1998, commenting on the Ala Wai Canal Dredging Draft Environmental Assessment (EA). We offer the following response:

Your preference for hydraulic dredging is noted. The assessment of alternatives in the EA has included both mechanical and hydraulic methods. A final decision on whether hydraulic or mechanical dredging will be pursued will be made either during the final design of the project, or the contract bid process. Your recommendation of hydraulic dredging has been noted in Section 3.4 of the EA.

Additional discussion of odor impacts has been added to the EA (Section 4.7).

Project responsibility related to use of work support areas, including that at Magic Island, involves restoring the area to previous conditions. This will include the area over which the transfer barge is moored. This is noted in Sections 3.1.1 and 4.4.2.

Sediment from dredging operations will be contained within silt curtains in the area of the dredge site, and in the area where sediment is transferred to the ocean going barge. Ala Wai Boat Harbor water quality conditions due to the dredging project are not expected to be any worse than at present. Direct exposure to sediment by the public is not expected. Please see Sections 4.2 and 4.3 for more detail.

Ala Wai Neighborhood Park A is the selected work support area for the upper portion of the canal; it is not a substitute for a work support area in the lower portion of the canal. Transport

of sediment by barge is the preferred method; truck transport had been ruled out early in the process because of the high volume of sediment to be dredged, the need to dewater prior to transport if trucks are used, and associated high costs of this activity. Impacts to park users have been addressed in detail (see Section 4.4, and new language in Section 4.4.2).

Again, thank you for reviewing the draft EA and providing your comments. If you have any questions, please contact Mr. Andrew Monden, Chief Engineer, at 587-0230.

Aloha,

for MICHAEL D. WILSON

University of Hawai'i at Mānoa

Environmental Center
A Unit of Water Resources Research Center
Crawford 317 · 2550 Campus Road · Honolulu, Hawai'i 96822
Telephone: (808) 956-7361 · Facsimile: (808) 956-3980

June 8, 1998
EA:00175

Andrew Monden
Department of Land and Natural Resources
1151 Punchbowl Street
Honolulu, Hawaii 96813

Dear Mr. Monden:

Draft Environmental Assessment
Ala Wai Canal Dredging
Honolulu, Hawaii

The referenced project proposes to restore the sediment holding capacities of the Ala Wai Canal, decrease flooding risks in surrounding areas, and improve recreational conditions by means of a dredging activity carried out over a duration of approximately one year. The Draft EA addresses six components: 1) limits of dredging; 2) dredging methodology; 3) sediment transportation; 4) use of waters and shore-side lands for dredging support operations (staging and material transfer); 5) sediment processing; and 6) sediment disposal or reuse.

We reviewed this draft Environmental Assessment (EA) with the assistance of Victoria Cullins of the Environmental Center.

In general, we support the ongoing maintenance and dredging of the Ala Wai Canal. The dredging of Hawaii's waterways and proper disposal of dredged materials are an important future concern not only for the Ala Wai Canal, but for areas such as Pearl Harbor, the proposed Honolulu Fishing Village, Honolulu Harbor, Keehi Lagoon, and certain stream mouths. The Ala Wai Canal dredging project has the potential to set a precedent for scientifically-sound practices and minimal environmental impact.

Bioassay Tests

The central issue of concern regarding the impacts of the project is the choice between disposal of the dredged materials on land or their disposal at the South Oahu Ocean Disposal Site. Levels of contamination in the sediments to be dredged are sufficiently elevated that bioassays are required in order to determine the suitability of the dredged materials for ocean disposal.

Protocols for bioassay determinations, including an effective field/lab methodology for mapping out polluted sediment distributions in our waterways have been promulgated by the U.S. EPA. However, concerns have been expressed that these protocols are geared towards dredged materials disposal scenarios characteristic of temperate, continental biomes, and they are inappropriate for conditions which prevail in Hawaii. It is not possible at this time, without an appropriate bioassay test, to determine if the present metal and pesticide concentrations create a biological hazard in an open ocean disposal scheme. However, land disposal cannot be guaranteed to eliminate the potential of environmental hazard either, as there remain concerns regarding possible significant impacts of this methodology as noted below. Currently tests are based on mainland shallow water benthic biota, whereas disposal here would be at depths in excess of 400 meters in a tropical ocean environment. It is critical for local and State of Hawaii agencies to establish appropriate "regional" bioassays and to evaluate the suitability of subtropical dredge material for various uses.

Land-Based Disposal:

There is a substantial potential for "acid mine drainage" in any upland disposal of dredged materials resulting from oxidation of FeS_2 and H_2S. The slightly acid rain found here in Hawaii further lowers the pH of the sediments. This can be prevented by buffering the dredged materials with carbonate to prevent the lowering of the pH to a point where metals could be released. However very large amounts of carbonate would have to be used, and long term monitoring would be required to insure adequate pH levels. With ocean disposal, the highly organic-rich material will remain at high pH (no metal mobilization) and because of its high oxygen demand will quickly establish an anoxic environment at depth immobilizing the metals present.

Land based disposal is usually chosen when high toxicity of sediments is present as determined by bioassays. As bioassays were not performed, the substantially higher cost of land disposal presently is not justified over ocean disposal.

The disposal site at the reef runway is limited, raising the long term question of where future dredged materials will be placed when the runway site is filled. Furthermore, what are the potential effects of the dredged materials on the water quality of Kewalo Basin and what is the potential that the dredged materials will create a plume extending to recreational waters, in the event of a heavy rainfall? Given the prevalent exposure of the site, what is the likelihood of aeolian transport of finer dry sediments, leading to dispersion of contaminated dusts.

Other Alternatives

The document does not discuss the possibility of filling the deeper section of the Kapahulu end of the canal as a means of reducing the residence time and improving the water quality.

DEPARTMENT OF THE NAVY
COMMANDER
NAVAL BASE PEARL HARBOR
BOX 110
PEARL HARBOR, HAWAII 96860-5020

IN REPLY REFER TO
11000
Ser N4(23)/ 4614
July 17, 1998
(30)

Ms. Molly Kihara
Belt Collins Hawaii
680 Ala Moana Boulevard
Honolulu, Hawaii 96813

Dear Ms. Kihara:

SUBJECT: ALA WAI CANAL DREDGING DRAFT ENVIRONMENTAL ASSESSMENT (EA) OF MAY 1998

The Navy was not consulted regarding this project. We have recently reviewed this document and offer the following comments:

Paragraph four of page 3-5 should be revised to state that the Waipio Peninsula alternative site for dewatering, processing and landfill cover is owned by the Navy and the City and County of Honolulu. The City and County own only about one-fourth of the area shown on Figure 3-6.

Although the Waipio site is not the preferred alternative, feasibility of using the Navy Waipio Ash Landfill site should be determined through consultation with the Navy. Page 5-9 shows that only the City Department of Public Works was consulted regarding use of the site.

If the Waipio Site owned by the Navy is found to be a feasible alternative, the final EA should address Navy concerns that may arise through the consultation process.

Please feel free to contact me at 474-0439 or by facsimile transmission at 474-2328 if you have any questions.

Sincerely,

STANFORD B.C. YUEN
Deputy Engineer
By direction of the
Commander, Naval Base, Pearl Harbor

Copy to:
U.S. Department of Transportation
Federal Highway Administration
Box 50206
Honolulu, HI 96850

Department of Land and Natural Resources
State of Hawaii
P.O. Box 621
Honolulu, HI 96809

11000
Ser N4(23)/ 4614
July 17, 1998

BENJAMIN J. CAYETANO
GOVERNOR OF HAWAII

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
P. O. BOX 621
HONOLULU, HAWAII 96809

REF:LD/WL-EK

SEP 23 1998

Mr. Stanford B.C. Yuen, Deputy Engineer
Department of the Navy Commander
Naval Base Pearl Harbor
Box 110
Honolulu, Hawaii 96860-5020

Dear Mr. Yuen:

Ala Wai Canal Dredging Draft Environmental Assessment

Thank you for your letter of July 17, 1998 (11000 Ser N4(23)/4614), commenting on the Ala Wai Canal Dredging Draft Environmental Assessment (EA). We offer the following response.
The EA has been modified to indicate that about three-fourths of the Waipio Peninsula site shown in Figure 3-6 is owned by the Navy.

As discussed, the Waipio site is not the selected site for upland placement. Should it need to be further evaluated, the Navy will be consulted and its concerns addressed.

Again, thank you for your reviewing the draft EA and providing your comments. If you have any questions, please contact Mr. Andrew Monden, Chief Engineer, at 587-0230.

Aloha,

MICHAEL D. WILSON

KALIHI-PALAMA COMMUNITY COUNCIL
1117 Kaili Street • Honolulu, Hawaii 96819

July 20, 1998

Michael Wilson, Director
Department of Land and Natural Resources
1151 Punchbowl Street
Honolulu, HI 96813

Mr. Abraham Wong
U.S. Department of Transportation
Federal Highway Administration
Box 50206
300 Ala Moana Boulevard
Honolulu, HI 96813

Dear Sirs:

The Kalihi-Palama Community Council (KPCC), along with the Kalihi-Palama Neighborhood Board (NB-15), has completed its review of the document Ala Wai Canal Dredging Draft Environmental Assessment (EA). Information was also attained during a presentation by DLNR and the contractor Belt Collins at the July 15 NB-15 meeting. KPCC submits this letter in concurrence with NB-15 whose majority of members in attendance at their last meeting supported the following position and concerns.

The Kalihi-Palama Community Council has major concerns with the draft EA and is vehemently opposed to all the disposal options for the dredged material proposed in the document. Two of the four disposal option sites are located within the Kalihi-Palama Community.

Our Community
KPCC has been established over fifty years to advocate for improvements in the Kalihi area. The Kalihi area included Damon Tract housing which used to lie where the airport is presently, so our residents have an historical connection to that area. In addition we have had a long term role as special community oversight over Sand Island. Therefore we have a vital interest as a potential destination for the dredged material. As a result we are very upset and suspicious as to why neither ourselves, NB-15, or our area elected officials were not notified of the proposed project, especially since all Ala Wai Canal Watershed area neighborhood boards and elected officials were notified.

Environmental Injustice
We find it galling that the EA cites Executive Order 12898, Environmental Justice, as a justification for dredging the canal. It is laughable to use this as such a justification especially when all three land-based disposal options are in minority and low income areas. Environmental Justice requires federal agencies, and requests other independent agencies, to address the potential for disproportionately high and adverse environmental effects of their actions on minority and low-income populations. Under item 4.13, Environmental Justice, the EA states, "The proposed action does not discriminate against these populations directly or inadvertently. This EA assesses the human health, economic, social, and environmental effects of the various alternatives." These two statements are erroneous. The draft EA proposes to remove potentially hazardous dredge material contributed from the more affluent communities of the Ala Wai Watershed such as Tantalus, Manoa, and Waikiki to within our community which is known as one of the most disadvantaged communities on Oahu because of our low-income and minority populations. In addition the discussions of human health and environmental impacts to the disposal community were not extensively discussed. Hence, we feel the land-based placement options make a case for Environmental Injustice, rather than Environmental Justice.

Another example of the Environmental Injustice was the notification process acknowledged in the draft EA. Appendix F lists all agencies, organizations, elected officials, and individuals contacted for comment on the draft EA. Of those 17 pages of contact names, not one member from our community was listed. We only found out that Kalihi-Palama was a planned destination for the dredge material as a result from a few of our members who read it in an article in the Honolulu Weekly. We think since Kalihi-Palama has two of the proposed disposal sites that we are as important a party as any other group in this process and should have been contacted. We have been verbally told that this was an oversight. We are suspicious to the fact that this may be an orchestrated oversight.

Affected Environment
Section 4.2 of the draft EA discusses pollutants in the Ala Wai Canal. Primary pollutants identified in the sediment include heavy metals (lead, copper, chromium, zinc, mercury), pesticides (chlordane, heptachlor, dieldrin, DDE), PCBs, Phthalates, and PAHs. We understand the draft EA states that a TCLP will be performed on the dredge material to determine its leaching rate and determine if the material can be handled as a solid or hazardous waste. However, the draft EA states on pages 4-19 and 4-20 that "Processing and placement activities may affect water quality at the upland sites through surface runoff from precipitation during processing or once the sediment has been placed, and through potential leaching of contaminants from the placed fill material to groundwater or the ocean." The ocean at the reef runway, Keehi Lagoon and West Loch of Pearl Harbor are the receptor waterbodies from the runoff or leaching. We understand that certain physical and chemical methods will be used to treat the dredge material to reduce its runoff/leaching potential. The draft EA insufficiently discusses these control measures. There is also no discussion on having long term monitoring being conducted or upgrading of monitoring measures to ensure that the treatments are working. Such monitoring information should be made available to the affected community.

Public Health
Section 4.3 of the draft EA insufficiently discusses potential public health effects on the placement community. The draft EA mentions that there is a significant cancer risk among those consuming fish on a regular basis from the Ala Wai Canal. It seems that risk would be transferred to our recreational fisherman near Sand Island and those who fish near the reef runway. If the leachate or runoff is not controlled then it will be absorbed into the tissues of our

coastal fish and enter our food chain. We are a partner in having eight new baseball/recreational fields installed at Sand Island State Recreation Park. The draft EA fails to discuss the risk of ingesting fugitive dust from the placement site at Sand Island to the near by users of our recreational fields.

Air Quality
Section 4.7 of the draft EA insufficiently discusses air quality risks to our Sand Island State Recreation Park users. Fugitive dust is not sufficiently discussed. Many of the chemical contaminants are attached to sediment. When the sediment dries then there is the risk of it becoming airborne and being ingested by a park user. The draft EA dismisses odor concerns by park users. The draft EA does not provide any data as to the duration and level of odor strength that the community can anticipate from Sand Island being used as a disposal site.

Recreation
Section 4.4 of the draft EA discusses impacts on recreational uses at the Ala Wai canal and on the proposed placement sites. We disagree with the draft EA's conclusion that there will be no impact to recreational users in our community. The leaching and runoff potential from both Sand Island and the reef runway could pollute near shore waters sufficiently that fishing would be prohibited. If water quality impairment in Keehi Lagoon increased as a result of the placement of the dredge material nearby then Hawaiian canoe racers and thrill craft users would be at greater exposure risk. If fugitive dust is not managed then baseball, softball, and soccer players may have to find other venues to hold their practices and games.

We do want to acknowledge that KPCC supports the need to dredge the Ala Wai Canal to regain flood control capacity and to rid this vital water body of persistent pollutants found in its sediment. We understand the dredging is part of a whole community based watershed restoration project that will reduce polluted runoff from the environs that drain into the canal. However, our support does not mean we agree with the EA as to how to handle the dredge material.

Sincerely,

Charles Torigoe

Charles Torigoe, First Vice President
Kalihi-Palama Community Council

cc: Governor Benjamin Cayetano
Senator Rod Tam
Senator Suzanne Chun-Oakland
Representative Felipe Abinsay
Representative Dennis Arakaki
Councilmember Jon Yoshimura
Mayor Jeremy Harris
Senator Norman Sakamoto
Representative Romy Cachola
Representative Lei Ahu Isa
Councilmember Donna Kim
Chair Neighborhood Board 15

BENJAMIN J. CAYETANO
GOVERNOR OF HAWAII

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
P. O. BOX 621
HONOLULU, HAWAII 96809

MICHAEL D. WILSON, CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES

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GILBERT COLOMA-AGARAN

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TECHNICAL & SUPPORT BRANCH
STATE PARKS
WATER RESOURCE MANAGEMENT

REF:LD/WL-EK

AUG 10 1998

Mr. Charles Torigoe, First Vice President
Kalihi-Palama Community Council
1117 Kaili Street
Honolulu, Hawaii 96819

Dear Mr. Torigoe:

Ala Wai Canal Dredging Draft Environmental Assessment

Thank you for your letter of July 20, 1998 regarding the Environmental Assessment (EA) for dredging the Ala Wai Canal. We have carefully considered your comments and believe that the following information may be helpful in addressing the issues of concern to you.

Proper public notice has been given of the project, including two (2) public meetings, four (4) Notice of Public Meeting published in the Honolulu Advertiser and Honolulu Star-Bulletin and publication in the OEQC Bulletin "The Environmental Notice" which was sent to the Kalihi-Palama Neighborhood Board No. 15 on May 8, 1998. We are sorry that the project was not brought to your attention though these efforts; we have put the Kalihi-Palama Community Council on a direct mailing list for the project.

Dredging the Ala Wai Canal is necessary to restore sediment holding capacities, and improve conditions for recreational use of the canal. We have done a thorough evaluation of the possible ways to accomplish this dredging in a manner that is economically feasible and environmentally and socially responsible. In evaluating the range of technically feasible options, some appear in the EA that are not preferred because of technical or environmental concerns. As a result of the this analysis, reuse of the dredged material for fill at Sand Island is not an option that is being pursued.

As I think you can appreciate, dredging the canal in its urban and congested setting is not an easy task, and cannot be accomplished without some disruption of normal activities and effects on normal environmental conditions. The only options we are pursuing for dredging the canal and for disposing or reusing the dredged materials are those that do not have significant impacts to human and natural environments, and which are efficient in the time required for completion of the project.

BENJAMIN J. CAYETANO
GOVERNOR OF HAWAII

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
P. O. BOX 621
HONOLULU, HAWAII 96809

MICHAEL D. WILSON, CHAIRPERSON
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STATE PARKS
WATER RESOURCE MANAGEMENT

REF:LD/WL-EK

SEP 23 1998

Mr. Gary Siu
Office of Solid Waste Management
Hawaii Department of Health
P.O. Box 3378
Honolulu, Hawaii 96801

Dear Mr. Siu:

Ala Wai Canal Dredging Draft Environmental Assessment

Thank you for your comments transmitted via two electronic mail messages dated June 5 and 8, 1998, on the Ala Wai Canal Dredging Draft Environmental Assessment (EA). The information you provided has been added to Section 5.2.15 of the EA, which was previously based on input received during meetings with DOH in September 1997. We look forward to working with you and providing information you require for obtaining solid waste permit coverage for Ala Wai Canal dredged sediment.

Again, thank you for reviewing the draft EA and providing your comments. If you have any questions, please contact Mr. Andrew Monden, Chief Engineer, at 587-0230.

Aloha,

MICHAEL D. WILSON

(22)

From: "Gary Siu - SWM" <gsiu@eha.health.state.hi.us>
To: HAWAII.BCH(molly)
Date: 6/5/98 5:30PM
Subject: Comments re Ala Wai Dredging

My comments are regarding the land disposal of dredge spoils.

We have categories for solid waste materials. They are inert waste, C&D waste and MSW waste. This is different from inert fill which is not regulated as solid waste but could include materials such as clean concrete. Inert fill is regulated by the City Grading Ordinaces.

We are in the process of defining and setting standards for these solid waste materials and are actively working with the City grading staff as our concern is to establish standards to prevent the use of materials for fills that contain environmental risk.

Expanding on the solid waste categories:

Inert Waste is materials that pose minimal environmental risk as solid waste.

C&D waste are defined in the rules and must be disposed in regulated C&D landfills.

MSW waste are also defined and must be disposed in regulated MSW landfills.

The disposal or use of inert waste will be considered based on its environmental risk. The environmental risk will then determine the level of environmental protection needed. Environmental protection includes the use of siting criteria, design requirements such as liners, monitoring requirements such as groundwater, and closure/post closure care requirements. Typically, all landfills also require Notice to Deed documents that notify future users and owner of the past history of the site.

The above is a very rough explaination as you requested comments by June 8, 1998.

The OSWM (Office of Solid Waste Management) notes that the solid waste permit for the airport facility discussed does not include conditions to accept dredge spoils for disposal. A permit modification or new solid waste permit for that purpose would be needed.

CC: HAWAII.BCH(jane),HAWAII.INTERNET("JHARDER@eha.heal...

Page 1

From: Molly Kihara
To: Jane Dewell
Date: 6/8/98 10:29AM
Subject: Re: Ala Wai Dredge Spoils

>>> "Gary Siu - SWM" <gsiu@eha.health.state.hi.us> 06/08/98 09:17AM >>>
We are trying to define the standards for inert fill and inert waste. Inert fill can be used anywhere and will not be on our regulatory plate. Inert waste are those that exceed PRGs as we are looking at them now.

You can't use TCLP for the above comparison you have to use totals. As it is your project can you take a look.

We may try to set interim standards for this project to kick off our work.

If there are PCS in the material we will need to look for standard there too.

The Doh staff in this project are myself , Ed Saiire, and Lene Ichinotsubo.

Addressing the long-term implications of land based disposal practices in general throughout the state, and the overall need for a long-term plan for managing land-based dredge spoil disposal sites are very complex. This issue is beyond the scope of the proposed action and therefore outside the scope of the EA. It should be noted that land-based disposal has taken place with sediment dredged from Kahaluu Harbor, such that Ala Wai Canal dredging will not be precedent-setting.

DLNR is a participating member of the Pacific Islands Regional Dredging Team, which was established to seek regional solutions to dredging issues in the Pacific. Perhaps this would be a more suitable forum for addressing state-wide issues regarding land disposal of dredged material.

Perceived regulatory need for upland disposal of dredged materials in Hawaii
We recognize that the Hawaii environment presents special conditions that may not be best addressed by existing regulations, as mentioned by Dr. Krock in a Pacific Island Regional Dredging Team meeting. However, in considering disposal options for Ala Wai Canal sediment, we must comply with regulations established by the EPA and ACOE. Given the timing of funding availability, and the effort and time involved in attempting to modify regulations, we are not in a position to question or challenge the existing regulatory framework, or to risk creating a negative impression on the regulators.

Alternatives and best management practices
A discussion of best management practices (BMPs), including mention of the examples provided, has been added to Section 2.2.2. Please note that implementation of BMPs would not remove existing sediment that has already accumulated in the Ala Wai Canal and Manoa-Palolo Drainage Canal, and therefore it is not presented as an alternative to the proposed action.

Specific comments (Table and page references are from the draft EA)
Table 1-4. The findings and determination under the HRS 343 significance criteria have been elaborated upon in the final EA. As discussed above, a finding of no significant impacts has been made for all components, including upland placement at Reef Runway site.
Page 2-2. The term "regeneration" is discussed in footnote 6 of the final EA.
Page 2-14, paragraph before "Environmental Characteristics." Additional detail regarding odor, and hydrogen sulfide gas, has been added to the EA (Section 4.7).
Page 2-15, fish advisories. The drafters of the EA have been informed of your commendation.
Page 3-11, ocean disposal suitability. Timely implementation of the project is also affected by the Legislative appropriation of funds for dredging, which lapses on June 30, 2000. For the purposes of completing the EA process so that the final design phase can commence, the EA evaluates potential impacts at placement sites for the most demanding scenario in terms of volume of material to be disposed. This does not preclude the pending decision by DLNR during the design phase on whether to conduct Tier III testing.
According to regulatory requirements in 40 CFR 261, sediment that may be placed at an upland site have been tested under TCLP to determine whether it will be regulated as a hazardous or solid waste. The regulatory determination on suitability for ocean disposal is based on another set of criteria developed by the EPA, in 40 CFR 220-227.

If and when the capacity of the Reef Runway SMF is reached, the other options at that time cannot be predicted currently. Given the available options and regulatory determinations at this time, ocean disposal and placement at the Reef Runway are the most feasible options. We look forward to participating in the Regional Dredging Team activities to address longer-term, state-wide solutions for sediment disposal.

Page 3-11, third full paragraph. Generally, EPA was hopeful that Area 1 would be "cleaner" than Areas 2 and 4. However, chemical levels overall were in the "gray area," such that suitability for ocean disposal could not

be determined based on the sediment chemistry results (see Appendix A, comments from EPA on Sediment Chemistry Results - Summary dated February 10, 1998). Station 1-1 was of concern due to butyltin levels, as likely contributed from the Ala Wai Boat Harbor, to which Area 1 is closest.
Page 3-11, last paragraph. The results of the sediment chemistry testing are valid, and the sampling and analysis plans and results reports have been provided to the TAG for its review. As for the total volumes indicated as suitable for ocean disposal and as requiring further testing to determine ocean disposal suitability, there was a calculation error, such that 45,500 cubic yards have been found suitable and 127,500 cubic yards require further testing.
Page 3-12, regarding upland placement of sediment. Discussion of the potential for acidification of dredged sediment during upland processing and placement has been added to the EA. Processing of sediment will involve binding agents to solidify the material for use as fill at the Reef Runway, the preferred upland disposal site. Dewatering effluent from sediment will not be discharged. Once material is solidified, runoff from the fill area would not be likely to carry contaminants that are bound in the fill material. Fugitive emissions from the upland site have also been addressed in the EA. Sections 3.1.1 and 4.2.2 contain discussions of these issues.
Page 4-11, existing conditions. The sentence containing reference to seawater as a pollutant source has been revised to clarify that water from the Ala Wai Boat Harbor is a potential source of pollutants in the Canal.
Page 4-13, TCLP. Your point regarding TCLP testing pH as compared to that for ocean disposal is well taken. Given the existing regulatory context, the emphasis of the ocean disposal impacts discussion focuses on EPA and ACOE approval, on which TCLP is not the basis.
Pages 4-13 and 4-15, Water Quality. The first occurrence of heavy metals has been annotated to heavy (suspended) metals, so as to address your concern but not affect the flow of text. We agree that the identification of heavy metals does not, in and of itself, constitute determination of a polluted environment.

Again, thank you for reviewing the draft EA and providing your comments. If you have any questions, please contact Mr. Andrew Monden, Chief Engineer, at 587-0230.

Aloha,

for MICHAEL D. WILSON

justified. However, in our technical advisory capacity, it is our opinion that the EA does not provide sufficient information to make that determination if upland disposal is selected.

Sincerely,

Jacquelin N. Miller, Ph.D.
Chairperson, Ala Wai Technical Advisory Committee

cc. Ala Wai Technical Advisory Committee
Senator Les Ihara

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
P. O. BOX 621
HONOLULU, HAWAII 96809

REF:LD/WL-EK

SEP 23 1998

Dr. Jacquelin Miller, Chairperson
Ala Wai Canal Technical Advisory Group
c/o University of Hawaii Environmental Center
2550 Campus Road, Room 317
Honolulu, Hawaii 96822

Dear Dr. Miller:

Ala Wai Canal Dredging Draft Environmental Assessment

Thank you for your letter of May 18, 1998, with respect to the documents discussing the Assessment of Dredge Volumes and Limits and the Definition and Evaluation of Alternatives. Thank you also for your letter of June 8, 1998 on the Ala Wai Canal Dredging Draft Environmental Assessment (EA). We offer the following response to these letters:

Need for bioassay testing and rationale for selection of land disposal alternatives
The purpose of bioassay (Tier III) testing would be to collect data to be evaluated by the EPA and ACOE with regard to suitability for ocean disposal. As documented in Appendix A, Comments from EPA/ACOE on Sediment Chemistry Results - Summary for June 10, 1997, EPA indicated it would be surprising if Tier III testing showed all of the material as suitable for ocean disposal, and recommended that more effort be placed on considering alternative options. As discussed in Section 3.1.1, in consideration of this regulatory opinion and other factors, our strategy acknowledged potential for beneficial reuse by further investigating potential reuse sites and technologies. It is still possible that a reduction in upland reuse volumes may be achieved by performing Tier III testing during the final design phase, determination of which is pending by our department.

FONSI for upland disposal
The finding of no significant impact is for the proposed action, which includes placement of sediment at the Reef Runway Soil Management Facility. This facility presents a unique circumstance for reuse at a site that is isolated and is permitted to receive certain material. A modification to its solid waste permit or a new permit will be sought. The potential impacts (including construction and compliance costs and long-term stability) due to placement of Ala Wai Canal sediment and the cumulative impacts with Pearl Harbor sediment being placed at that facility are discussed in the EA. Costs addressed include those for construction and compliance. Impacts discussed include leaching, storm water runoff, 100-year storm, and tsunamis, as mentioned in your letter. Discussion of storm surge and tsunami hazards has been added to the EA (in Section 4.12, with references to this contained in Sections 4.1.2 and 4.2.2). Impacts at an upland site, in contrast to ocean disposal, may not be as simple, but can be addressed and a finding of no significant impact made for upland placement at the Reef Runway.

p3-11, regarding suitability of dredged sediments for ocean disposal. We appreciate the importance of timely implementation of this project owing to the constraints imposed by federal funding. However, it is equally important to not set a bad precedent by assuming that urban dredged material is mostly unsuitable for ocean disposal. This has important implications for material from Pearl Harbor, Honolulu Harbor, Keehi Lagoon, etc. It is also likely that future maintenance dredging of the Ala Wai should produce cleaner materials owing to increased environmental awareness and implementation of BMP's in the community.

It is important to determine quantitatively whether dredged materials are or are not suitable for ocean disposal. Material should be tested according to Toxicity Characteristic Leaching Procedure (TCLP) protocols to determine whether it should be classified as toxic or not. (Material tested to date has shown it is *not*, see p3-12, first full paragraph). This test is a requirement for upland disposal and subjects the material to a very mild acetic acid leach that is alleged to simulate the effect of rainfall on landfills. Seawater has a pH range of 7.8-8.3 depending on location and other parameters. If the material (particularly the metal-contaminated residues) passes the slightly acid pH test for toxicity, it will be even more stable at higher alkaline pH. Therefore a bioassay (especially one that is totally inadequate based on its design) is not necessary to evaluate the suitability of this dredged material for ocean disposal in terms of metal toxicity. This reinforces the need for "proper testing in an objective manner".

Although the use of the airport runway as an upland disposal site is currently feasible (albeit considerably more expensive), and even potentially beneficial if done properly, what will be the option when that site is full? Disposal at other upland sites will likely be prohibitively expensive. This again exemplifies the need to consider options carefully now and avoid subjective decision making.

Same page, third full paragraph. On what basis did EPA determine that material from Area 1 would need Tier III testing to determine suitability for ocean disposal? Past research has shown that material from this area is generally cleaner than that found further upstream in areas where EPA has deemed sediment suitable for ocean disposal. This decision is inconsistent with existing data and is another example of a subjective evaluation.

Same page, last paragraph. We question seriously the validity of the numbers presented here as an assessment of the portions of sediments suitable and not suitable for ocean disposal.

p3-12, regarding upland placement of sediment. There is substantial potential for "acid mine drainage" in any upland disposal of dredge spoils resulting from oxidation of FeS_2

and H_2S. An inordinately large amount of carbonate would be needed to buffer the acid production and prevent lowering of the pH to a point where metals could be released. The EA and the summary presentation thereof at the public meeting indicated that the dredge spoils are generally fine, as long as the pH is not lowered significantly. We believe this is exactly what will happen with land disposal; normal chemical processes attendant on weathering will lower pH substantially, leading to metal release. With ocean disposal, the highly organic-rich material will remain at high pH (no metal mobilization) and because of its high oxygen demand (needed to oxidize the organic matter) will quickly establish an anoxic environment at depth and likely maintain toxic anthropogenic organics bound to natural organic matter and metals immobilized, either on oxides (surface of sediment pile), or as sulfides (in the anoxic sediment pile).

This possibility raised by Chris Smith and Eric De Carlo regarding acid production consequent to sulfide oxidation when these sediments are exposed to air needs to be further examined in the EA. The leaching tests (TCLP) may not have disclosed enough information on chemical transformations expected in disposal sites on land.

p4-11, existing conditions. We do not concur that seawater is a source of pollutants. Our research clearly shows that seawater is cleaner than canal water in terms of metals (dissolved and suspended) content. This is also likely true for organics, pathogens, etc.

p4-13, TCLP. This discussion indicates the material should not pose a problem for ocean disposal at a higher pH than used in the TCLP test.

P4-13, Water Quality. The EA correctly describes the confusion arising between dissolved metals (which are low in concentration) and suspended metals (which can be high during high flow and the concomitant high total suspended solids. However, the third line of the second paragraph of this section should be edited to reflect the above. On p4-15, there is another discussion of metals and their sources. The identification of heavy metals does not, in and of itself, constitute determination of a polluted environment.

Summary

The issues surrounding the dredging of the Ala Wai Canal are complex and have far reaching consequences. Each of us is fully aware of the importance of this project and the need to improve the drainage capacity and aesthetics of the Ala Wai Canal. However, we are also fully cognizant of the importance of making environmental decisions based on a full understanding of the consequences of those decisions. To the extent that the dredged materials can be ocean disposed, then a Finding of No Significant Impact seems readily

continued increase in pesticides in the Ala Wai sediments and if this alternative were implemented, it could assist in reducing the push for land disposal.

Land Disposal Alternative

Impacts of dredge spoil disposal on land are significant and will require preparation of an Environmental Impact Statement under both NEPA and State law. Land disposal of contaminated sediments will have significant long term cumulative impacts on the physical, natural and human environment. These impacts, when assessed, are likely to be greater than disposal of dredge spoil at the well-studied and previously approved ocean sites.

The disposal site at the reef runway has a capacity of about 750,000 cu. yards. The Ala Wai volume to be disposed of is about 150,000 cu. yards. However, sediments will continue to be trapped in the Ala Wai, in Honolulu and Pearl Harbors, and in stream mouths and bays such as Kahaluu and Kaneohe. The EA needs to examine the long term implications of land based disposal practices. By setting the precedent of disposal on land of the Ala Wai Canal dredged material, the state is committing the community to long-term impacts which have yet to be assessed and which will be significant. We will not have adequate storage space on land for contaminated sediments. We do not have a long-term plan for monitoring and managing such land-based dredge spoil disposal sites. The costs of this land based disposal will be enormous.

The favored land disposal site, near Honolulu International Airport's reef runway, is not, at present, permitted to receive Ala Wai Canal sediments. Modification of the existing permit, or drafting of a new one, will be necessary prior to the use of this site for upland disposal of the Ala Wai Sediments. The anticipated conditions of this permit and any state, county, or federal monitoring requirements should be discussed in the final EA. Costs for any permit conditions must be included in the overall economic appraisal of the project.

It should be recognized, in the EA, that there are potential long-term impacts at the reef runway site due to leaching, storm water runoff, hurricane storm surge, or tsunamis. Land-disposed sediments may be disturbed and carried to the natural or human environment. The short term impacts to the coastal waters during transfer of sediments from a barge to the airport landfill site are not simply or economically mitigated in contrast to ocean disposal.

The rationale for the selection of land disposal alternatives should be fully documented. This is particularly important due to the lack of guidance provided by EPA on the subject. The decision to dispose of dredged material on land has not been made via application of the criteria which were developed by federal agencies. Bio-assays (tier III

testing) have not been done in this situation. Instead, the EA applies undisclosed threshold levels of contaminants conveyed by EPA Region 9 technicians who apparently have told the EA preparers and the applicants that "...the tier II [chemical tests of Canal sediment] have elevated levels of contaminants and therefore may not pass tier III tests." There is a significant lack of scientific criteria for this decision presented in the EA. If, as seems the case, the decision was based on best professional judgment at the federal agencies, the responsible parties/programs and the reasoning followed should be disclosed. This information needs to be included in the EA.

Furthermore, it is well known in Honolulu that bio-assays have been performed recently on sediments at a location different from the Ala Wai in geography, but similar in terms of watershed land uses, and that such sediments pass many bio-assay test components.

While our technical advisory group has reservations about the specific details of tier III test procedures as presently drafted, and recommends that significant revisions be undertaken to make the testing applicable to our open ocean, non-continental shelf conditions, we also believe that such tests could be useful for decision-making if properly devised and applied for our environmental conditions.

Specific Comments

p1-9 Table 1-4. This table, based on regulatory criteria, is misleading. Many of these "Significance Criteria" reflect a subjective determination of the effects of certain actions. We concur that the long term effects of dredging and ocean disposal are not likely to trigger the "significance criteria" presented, however, that is not the case if upland disposal is considered.

p2-2, first line. The term "regeneration" as taken from the E. Noda reference, needs to be defined.

p2-14, paragraph before "Environmental Characteristics". The source of odor should be identified as H_2S. To avoid undue concern, it is important to specify this impact. A short discussion of levels of H_2S that cause odor versus those that are detrimental to health should be included for informational purposes.

p2-15, regarding posting the canal for fish advisories. This is a very important point, and the drafters of the EA should be commended for including this in the document. The current (fishing) immigrant population at greatest risk needs to be informed.

Ala Wai Technical Advisory Committee

June 8, 1998

Ms. Molly Kihara
Belt Collins Hawaii
680 Ala Moana Boulevard, First Floor
Honolulu, Hawaii 96813

Dear Ms. Kihara:

Ala Wai Canal Dredging
Review Comments
Draft Environmental Assessment

The Ala Wai Technical Advisory Committee has reviewed the referenced Environmental Assessment (EA) for the Ala Wai Canal Dredging project and offers the following comments for your consideration in preparing the Final EA.

General Comments

We have given very careful and considerate review to the Draft EA document and find many potential issues associated with dredging the Ala Wai Canal to be adequately addressed and presented in a clear and insightful manner. The disposal of the dredged material poses the most seriously problematic issue of the project. While offshore disposal has been a subject of extensive environmental review in the past, and the offshore site has been used continuously for the past 20+ years with no adverse effects, we have concerns regarding potentially significant impacts if upland disposal is implemented. Hence, while a finding of no significant impact is appropriate for the dredging operation and ocean disposal of the dredged materials, such a finding cannot be supported by the information currently presented in the EA with respect to disposal at an onshore site. Specific concerns with the EA are presented in the following paragraphs.

Alternatives and best management practices

The EA should discuss the subject of best management practices to reduce the dredging volumes or the contamination levels. A table of relevant BMP's for trash control, erosion control, and sediment retention, etc. that could, if implemented, reduce dredging costs in the next round, should be included in the final EA. Sediment retention structures in the Manoa Palolo Canal & Golf course might be especially useful in this regard.

Maintenance dredging is required about every 10 years. Best management practices with regard to the problems of erosion and generation of contaminants in this watershed have been evaluated by others and should be made a part of the overall set of alternatives to maintenance dredging and disposal as proposed in the EA. The EA should discuss plans for implementation of BMP's including but not limited to the following examples:

a. Promulgation of local ordinances to require use of non metallic brakepads to reduce metals entering the Ala Wai Canal. Up to 1.6 million vehicle miles per day have been estimated for the watershed, and this volume of traffic generates a significant amount of metal residue from brakepads alone, not to mention tire or asphalt wear.

b. Soil erosion control measures, especially along urban stream banks and certain Conservation District areas, should be intensified to reduce the volume of sediment. Previous reports have estimated up to 75 percent of the sediment reaching the Ala Wai Canal may originate in the undeveloped Conservation District. Remediation of this problem will take a long time, and the EA should at least discuss the nature of this problem and consider some of the alternatives which apply. Likewise, a significant share of urban soil erosion is likely to originate from unlined urban stream banks, and the EA should discuss stream bank restoration measures as part of the set of alternatives.

c. Sediment retention structures could be constructed in either or both of the Manoa-Palolo Canal and a small corner of the Ala Wai Golf Municipal Course. This single measure would greatly reduce the volume of sediment now reaching the Ala Wai Canal and would significantly reduce the cost of maintenance dredging. Sediment retention basins could be dredged frequently using readily available land-based equipment. De-watering on site, if at small volumes, would be unobtrusive, and the rich sediment could be well used in nearby parks or by residents.

d. Tax incentives or grants could be considered for building owners in the watershed to install roof gutters which direct rainfall runoff from the roof away from the building foundation towards the street. Installation of roof gutters has been suggested as a relatively inexpensive BMP which would significantly reduce the source of termiticides appearing in Ala Wai sediments and fish and in nearby groundwater wells (notably the Board of Water Supply's Kaimuki well). Pest control operators placed dieldrin and chlordane in the ground at the roof's drip line. Installation of gutters would reduce the runoff or infiltration of these chemicals into surface or ground waters. This is another alternative to the

PCER 5198-3271

University of Hawai'i at Mānoa

Environmental Center
A Unit of Water Resources Research Center
Crawford 317 • 2550 Campus Road • Honolulu, Hawai'i 96822
Telephone: (808) 956-7361 • Facsimile: (808) 956-3980

Mr. Marvin Char
Department of Transportation Services
City and County of Honolulu
869 Punchbowl Street
Honolulu, Hawaii 96813

Dear Mr. Char:

Review Comments
Ala Wai Canal Dredging Project

It has not been possible to gather our whole technical advisory group together these past weeks due to other commitments. However, they have assured me that they will make time to review the Draft Environmental Assessment for the Ala Wai Canal Dredging project that is currently out for public comments.

I do have a few brief comments from individual discussions with committee members with respect to the documents discussing the Assessment of Dredge Volumes and Limits and the Definition and Evaluation of Alternatives.

First, the most serious concerns continue to be many of the comments we transmitted in our July 1, 1997 review. Specifically, without bioassay tests and results, the existing conditions at the proposed dredging sites are still uncertain. We have levels of chemicals or metals in the sediments, but little analysis of that data to determine its environmental significance.

Secondly, at this time and given the information presented, we can not concur with the anticipated *finding of no significant impact* for upland disposal. Certainly the dredging of the canal is an ongoing, maintenance action and one that has been studied and closely scrutinized for potential impacts. We concur that such maintenance dredging of the Ala Wai will not have significant impacts and thus a *finding of no significant impact* is appropriate for the dredging operation. Furthermore, ocean disposal at the deep water South Oahu Site has also been subjected to extensive scrutiny

and public review through the EIS process and a *finding of no significant impact* to the ocean disposal site is similarly environmentally responsible. However, no such full assessment of upland disposal sites has been undertaken in Hawaii. The cumulative impacts of the precedent setting move to land disposal of dredged material will have long term, permanent, economic impacts and may have substantial and significant natural environment impacts as well. Disposal of the volumes of dredged material that will be excavated in the future from Honolulu Harbor and Pearl Harbor, as well as any number of stream mouths or drainage canals, will be affected by this decision. A full analysis including an EIS and public review of the long term and cumulative impacts of the upland disposal of dredged material from the Ala Wai Canal should be initiated, so that the City and State of Hawaii are not forced into future excessive costs for similar dredging projects in years to come.

Efforts should be made to question or challenge the environmental management wisdom of the perceived regulatory need for upland disposal of dredged materials in Hawaii.

We look forward to reviewing the Draft EA and will be providing comments during the designated review period.

Sincerely,

Jacquelin N. Miller

cc: Tanya Dolte, Belt Collins
Ala Wai Technical Committee
Roger Fujioka

Land-Based Disposal
Discussion of the potential for acidification of dredged sediment during upland processing and placement has been added to the EA. Processing of sediment will involve binding agents to solidify the material for use as fill at the Reef Runway, the preferred upland disposal site. Dewatering effluent from sediment will not be discharged. Once material is solidified, runoff from the fill area would not likely carry contaminants that are bound in the fill material. Fugitive emissions from the upland site have also been addressed in the EA. Sections 3.1.1 and 4.2.2 contain discussion on these issues.

Monitoring of the site will occur under solid waste permit conditions since the site is an existing Soil Management Facility, and may also receive additional permits to cover use for dredged sediments. See Sections 3.3 and 5.2.15.

A discussion of cumulative impacts, including use of the Reef Runway by other dredging projects, has been added to the EA (Section 4.15).

Other Alternatives
The possibility of filling the deeper section of the Kapahulu end of the Ala Wai Canal has been included in the final EA. Discussion of this option is provided in Chapter 3, and evaluation of potential impacts is in Chapter 4.

Soil Erosion Control Measures
A discussion of best management practices (BMPs), including soil erosion control measures and sediment retention structures, has been added to Section 2.2.2. Please note that implementation of BMPs would not remove existing sediment that has already accumulated in the Ala Wai Canal and Manoa-Palolo Drainage Canal, and therefore it is not presented as an alternative to the proposed action.

Conclusion
The finding of no significant impact is for the proposed action, which includes placement of sediment at the Reef Runway Soil Management Facility. This facility presents a unique circumstance for reuse at a site that is isolated and is permitted to receive certain material. A modification to its solid waste permit or a new permit will be sought. The potential impacts (including construction and compliance costs) due to placement of Ala Wai Canal sediment, and the cumulative impacts of Pearl Harbor sediment being placed at that facility, are discussed in the EA. Costs addressed include those for construction and compliance. Impacts discussed include leaching, storm water runoff, 100-year storm, and tsunamis, as mentioned in your letter. Impact mitigation at an upland site, in contrast to ocean disposal, may not be as simple, but can be addressed and a finding of no significant impact made for upland placement at the Reef Runway.

Again, thank you for reviewing the draft EA and providing your comments. If you have any questions, please contact Mr. Andrew Monden, Chief Engineer, at 587-0230.

Aloha,

MICHAEL D. WILSON

Soil Erosion Control Measures

Urban stream banks and areas in the Conservation District should implement intensified soil erosion control measures, as this is the main source of sedimentation received by the Ala Wai Canal. These measures, as well as plans for stream bank restoration, should be discussed in the Draft EA. Also, sediment retention structures should be built in areas of high sedimentation (i.e., Manoa-Palolo Canal) to further reduce the need for maintenance dredging of the canal.

Conclusion

The EIS law states, "A Statement [EIS] shall be required if the agency finds that the proposed action may have an significant effect on the environment" (Chapter 343, HRS). The Draft EA does not support a *finding of no significant impact*, as it cannot guarantee that the upland disposal of dredged materials will not have a significant effect. Land disposal effects of contaminated sediments have not been investigated, nor have the impacts been assessed. Long term cumulative impacts of land disposal of contaminated sediments may have a far greater impact on the physical and human environment than would disposal of the same sediments at the approved ocean dump sites

Although the Environmental Center concurs with the need to dredge the Ala Wai Canal in a timely manner, we find that this Draft EA does not provide a full disclosure of the potential impacts in compliance with Chapter 343 HRS.

Thank you for the opportunity to comment on this draft EA.

Sincerely,

John T. Harrison
Environmental Coordinator

cc: OEQC
Roger Fujioka
Victoria Cullins

REF:LD/WL-EK

SEP 23 1998

Dr. John T. Harrison
Environmental Coordinator
UH Environmental Center
2550 Campus Road, Room 317
Honolulu, Hawaii 96822

Dear Dr. Harrison:

Ala Wai Canal Dredging Draft Environmental Assessment

Thank you for your letter dated June 8, 1998, commenting on the Ala Wai Canal Dredging Draft Environmental Assessment (EA). We offer the following response:

Bioassay Tests
In the final EA, the statement that Tier III testing to determine suitability of the remaining sediment for ocean disposal is possible during the final design phase for dredging has been expanded to state that the decision on whether to conduct Tier III testing will be made by our department. Final design will take place after completion of the EA process.

Under existing regulations, it could be determined that ocean dumping at a designated site is required because of unavailability of feasible alternatives, and a waiver sought. The waiver request is handled at the level of the U.S. Environmental Protection Agency (EPA) Administrator and Secretary of the Army, and such a request has never been granted. Discussion of this has been added to Section 5.2.5 of the final EA. Other alternatives to EPA ocean disposal standards are currently not available under the existing regulatory framework, and are therefore not included in the EA. While it may be possible to propose new ocean disposal standards based on characteristics comparable to the South Oahu Ocean Dredged Material Disposal Site, or to establish appropriate "regional" bioassays, the timing for implementation of any such regulations would occur after the dredging funds appropriated by the Legislature in 1997 have lapsed.

The Hawaii Department of Health, Office of Solid Waste Management, has jurisdiction over upland disposal of dredged sediment in the state. The information it provided as of June 8, 1998 regarding permitting of Ala Wai Canal sediment for placement at the Reef Runway facility has been added to Section 5.2.15 of the final EA.

BENJAMIN J. CAYETANO
GOVERNOR OF HAWAII

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
P. O. BOX 621
HONOLULU, HAWAII 96809

MICHAEL D. WILSON, CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES

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LAND DIVISION
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PLANNING BRANCH
TECHNICAL & SUPPORT BRANCH
STATE PARKS
WATER RESOURCE MANAGEMENT

REF:LD/WL-EK

SEP 23 1998

Dr. Bruce S. Anderson
Deputy Director for Environmental Health
Hawaii Department of Health
P.O. Box 3378
Honolulu, Hawaii 96801

Dear Dr. Anderson:

Ala Wai Canal Dredging Draft Environmental Assessment

Thank you for your letter (98-102/epo) dated June 26, 1998, on the Ala Wai Canal Dredging Draft Environmental Assessment (EA). We offer the following response:

We understand that a Section 401 Water Quality Certification from the Department of Health (DOH) may be required, and that the jurisdictional federal agency is the U.S. Army Corps of Engineers, Honolulu Engineer District.

The requirements you state in your letter, regarding site-specific best management practices, assigned uses presently allowed in the Ala Wai Canal, and minimization of discharges into State waters other than the Ala Wai Canal have been listed in Section 5.2.8 of the EA.

Again, thank you for reviewing the draft EA and providing your comments. If you have any questions, please contact Mr. Andrew Monden, Chief Engineer, at 587-0230.

Aloha,

MICHAEL D. WILSON

BENJAMIN J. CAYETANO
GOVERNOR OF HAWAII

LAWRENCE MIKE
DIRECTOR OF HEALTH

RECEIVED
JUN 29 1998
BELT COLLINS HAWAII LTD.

STATE OF HAWAII
DEPARTMENT OF HEALTH
P.O. BOX 3378
HONOLULU, HAWAII 96801

In reply, please refer to:

June 26, 1998 98-102/epo

Ms. Molly Kihara
Belt Collins Hawaii
680 Ala Moana Boulevard, First Floor
Honolulu, Hawaii 96813

Dear Ms. Kihara:

Subject: Draft Environmental Assessment (DEA)
Ala Wai Canal Dredging Project
Honolulu, Hawaii

Thank you for allowing us to review and comment on the subject project. We have the following comments to offer:

Water Pollution

1. Based on the information contained in the DEA, a Section 401 Water Quality Certification from the Department of Health (DOH) may be required before any dredging or placement activity can begin unless:

   a. A Federal permit or license is not required; or

   b. A Federal permit or license is specifically exempt by the jurisdictional Federal agency. In this case, the Federal agency is the U. S. Army Corps of Engineers, Honolulu Engineer District.

2. Site-specific Best Management Practices are required for the proposed activities in accordance with Hawaii Administrative Rules (HAR) Section 11-54-03 of Chapter 11-54, "Water Quality Standards."

3. The U. S. Department of Transportation, Federal Highway Administration, and the State Department of Land of Natural Resources shall ensure that:

   a. the quality of the return flow or runoff from the dredged spoils dewatering site(s) meet the State Water Quality Standards established for the Ala Wai Canal;

   b. the proposed activities shall not interfere with or become injurious to any assigned uses (as specified in Section 11-54-03 of the HAR), presently allowed in the Ala Wai Canal; and

   c. the proposed activities shall avoid or minimize any discharges into State waters other than the Ala Wai Canal.

Should you have any questions, please contact Mr. Ed Chen of the Clean Water Branch at 586-4309.

Sincerely,

BRUCE S. ANDERSON, Ph.D.
Deputy Director for
Environmental Health

c: CWB

BENJAMIN J. CAYETANO
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Ref. No. P-7492

June 10, 1998

Ms. Molly M. Kihara
Belt Collins Hawaii Ltd.
680 Ala Moana Boulevard, First Floor
Honolulu, Hawaii 96813-5406

Dear Ms. Kihara:

Subject: Ala Wai Canal Dredging Draft Environmental Assessment

We have reviewed the Ala Wai Canal Dredging Draft Environmental Assessment. We note that page 5-2 indicates that an assessment of the project relative to the Coastal Zone Management (CZM) objectives and policies will be submitted to our office before the final EA. We look forward to reviewing this assessment.

Improving water quality in the Ala Wai Canal will benefit residents and visitors in many ways. The Ala Wai Canal Watershed Improvement Project, for example, will benefit from close coordination and exchange of information with your project. As a whole, all of the Ala Wai Canal projects have the potential to dramatically increase recreational opportunities in and around the canal. We also encourage close coordination with other Federal, State, and County programs designed to improve the water quality and recreation value of the Ala Wai Canal.

If there are any questions, please contact Steve Olive of our CZM Program at 587-2877.

Sincerely,

Rick Egged
Director
Office of Planning

cc: Seiji F. Naya

BENJAMIN J. CAYETANO
GOVERNOR OF HAWAII

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
P. O. BOX 621
HONOLULU, HAWAII 96809

MICHAEL D. WILSON, CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
DEPUTY
GILBERT COLOMA-AGARAN
AQUACULTURE DEVELOPMENT PROGRAM
AQUATIC RESOURCES
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HISTORIC PRESERVATION
LAND DIVISION
ENGINEERING BRANCH
PLANNING BRANCH
TECHNICAL & SUPPORT BRANCH
STATE PARKS
WATER RESOURCE MANAGEMENT

REF:LD/WL-EK

SEP 23 1998

Mr. Bradley J. Mossman, Director
Office of Planning
Department of Business, Economic Development and Tourism
235 South Beretania Street, 6th Floor
Honolulu, Hawaii 96813

Dear Mr. Mossman:

Ala Wai Canal Dredging Draft Environmental Assessment

This is in response to Mr. Rick Egged's letter dated June 10, 1998, on the Ala Wai Canal Dredging Draft Environmental Assessment (EA). A copy of all comment letters received and our responses thereto will be included in the final EA. In addition, a CZM assessment will be submitted to your office.

The Ala Wai Canal Watershed Improvement Project is on the Agency Working Group for this project. Coordination related to the Ala Wai Canal dredging project with other federal, state, and county entities is noted in Chapter 5 of the EA.

We appreciate your taking the time to review the draft EA. If you have any questions, please contact Mr. Andrew Monden, Chief Engineer, at 587-0230.

Aloha,

MICHAEL D. WILSON

BENJAMIN J. CAYETANO
GOVERNOR OF HAWAII

MICHAEL D. WILSON, CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES

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STATE PARKS
WATER RESOURCE MANAGEMENT

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
P. O. BOX 621
HONOLULU, HAWAII 96809

REF:LD/WL-EK

SEP 23 1998

The Honorable Carol Fukunaga
State Senator, District 12
State Capitol, Room 225
Honolulu, Hawaii 96813

The Honorable Les Ihara, Jr.
State Senator, District 10
State Capitol, Room 214
Honolulu, Hawaii 96813

Dear Senators Fukunaga and Ihara:

Ala Wai Canal Dredging Draft Environmental Assessment

Thank you for your letter of June 8, 1998, commenting on the Ala Wai Canal Dredging Draft Environmental Assessment (EA). We offer the following response:

Coordination with community
Coordination of Ala Wai Canal dredging activity with community members and recreational groups will be undertaken by the Department of Land and Natural Resources (DLNR), as noted in Section 3.3. Potential hours of operation (i.e., 5-days a week, 10-hours a day with 8-hours of dredging) are noted in Sections 2.3 and 3.3, and referred to throughout the text. Constraints on hours of operation include noise permitting issues (described in Sections 4.8 and 5.2.13).

Complaints on noise or odors by the community should be addressed to the agencies responsible for follow-up (namely the Department of Health, Noise and Radiation Branch, and Clean Air Branch, respectively). To better address sequence and timetable, and clarify potential impacts to recreational users of the Ala Wai Canal and environs, dredging timeframes for areas of the canal was compared to a schedule of recreational uses. An "ideal" timeframe was developed from this that will help to clarify when and where impacts will occur to recreational uses. Section 4.4.2 contains this new information. The roster of parties who have received notices during the EA process is included in Appendix F of the EA; this roster will be used as a starting point for the coordination effort.

Potential odor impact
Additional information on source of odors and impacts has been added to Section 4.7.

Potential noise impacts
Noise attenuation to meet regulatory requirements is described in Section 4.8.2. Specific measures for the equipment that will be used for dredging and support work would be defined during final design and/or the bid process. Details regarding noise permitting are contained in Section 5.2.13.

Cost comparison
A cost comparison of upland and ocean disposal alternatives has been added to the EA. This information is described in Section 3.3 and Tables 3-3 and 3-4.

Bioassay testing
Section 3.1.1 of the final EA has been clarified to state that the material targeted for dredging was tested for sediment chemistry for the purpose of determining suitability for ocean disposal (i.e., for U.S. Army Corps of Engineers and U.S. Environmental Protection Agency approval of placement at the South Oahu Ocean Dredged Material Disposal Site [ODMDS]), and that copies of the reports documenting the results are available for public review at Belt Collins Hawaii. Note that due to a computational error in the draft EA, the total volume currently found suitable for ocean disposal is 45,500 cubic yards, not 19,000 cubic yards. Additional justification of the regulatory determination based on sediment chemistry has been included in Appendix A. The statement that Tier III testing, to determine suitability of the remaining sediment for ocean disposal, is possible during the final design phase for dredging has been expanded to state that the decision on whether to conduct Tier III testing will be made by DLNR. The final design phase will take place after completion of the EA process.

EPA and ocean disposal standards
Under existing regulations, it could be determined that ocean dumping at a designated site is required because of unavailability of feasible alternatives, and a waiver sought. The waiver request is handled at the level of the EPA Administrator and Secretary of the Army, and such a request has never been granted. Discussion of this has been added to Section 5.2.5 of the final EA.
Other alternatives to EPA standards are currently not available under the existing regulatory framework, and are therefore not included in the EA. While it may be possible to propose new ocean disposal standards based on characteristics comparable to the South Oahu ODMDS, the timing for implementation of any such regulations would occur after the dredging funds appropriated by the Legislature in 1997 have lapsed.

Dredging depth
A discussion regarding design criteria to prolong the duration between the current dredging project and the next required dredging has been added to Section 2.2.2. Note, as stated in the new language, that the above approach is different from the one used to determine the maximum dredge depths for the proposed action.

Flood study
Reference to the planned flood study, to be undertaken by DLNR, has been added to Section 2.2.3.

Again, thank you for reviewing the draft EA and providing your comments. We look forward to ongoing coordination with you and your constituents to minimize any short-term adverse effects to users and neighbors of the Ala Wai Canal and to completing the dredging for the long-term benefit of the community. If you have any questions, please contact Mr. Andrew Monden, Chief Engineer, at 587-0230.

Aloha,

MICHAEL D. WILSON

The Senate
Nineteenth Legislature
State of Hawaii

RECEIVED
1998 JUN 10 A 11:09
(17)

June 8, 1998

Ms. Molly Kihara
Belt Collins Hawaii
680 Ala Moana Boulevard
Honolulu, Hawaii 96813

Subject: Ala Wai Canal Dredging Draft Environmental Assessment

Dear Ms. Kihara:

We have reviewed the Ala Wai Canal Dredging Draft Environmental Assessment and offer our comments, which essentially request that additional information be provided in the document. Thus, the format used below lists the information requested.

1. **Coordination of Dredging Implementation with the Community** – describe the actions that will be taken by the dredging contractor, including the need to coordinate with community, recreational, and other groups regarding (a) hours of operation, (b) procedures for reporting and taking appropriate actions in response to complaints about odors, noise, etc., (c) deciding the sequence and timetable for dredging the four areas identified in the EA, (d) providing adequate notice to residents regarding the above, including boards of directors of condominiums near the Ala Wai Canal. We note that including the above information in the EA document is important because they represent actions that the dredging contractor must take to mitigate negative impacts to the surrounding community.

2. **Impact of Odors** – describe the impacts of odors in the worst case situation; indicate whether there might be circumstances when dredging will be halted due to an exceedingly high level of odor, e.g. on Kona-wind days; describe the procedures that will be taken to stop and/or mitigate such high-level odors.

3. **Noise Impacts** – describe the specific noise attenuation methods, e.g. mufflers, etc. that will be required to meet Class A and Class B state noise limits; describe the impacts to the surrounding condominiums and other facilities if a community noise permit is granted to allow the project to exceed state noise limits; describe alternative actions that will be required if a community noise permit application is denied; describe the procedures that will be used to address noise complaints.

4. **Cost Comparisons of Ocean Versus Land Disposal Alternatives** – show comparative cost estimates of various percentages of ocean versus land disposal alternatives; for example, the study assumes 19,000 c.y. of sediment for ocean disposal (11%) and 154,000 c.y. for upland fill (89%), but further tier III testing may allow ocean disposal for an additional amount of sediment. We suggest cost comparisons assuming 25% ocean disposal vs. 75% land disposal, 50% vs. 50%, 75% vs. 25%, and 0% vs. 100%, ocean versus land disposal percentages, respectively.

5. **Bioassay Testing** – describe the quantitative criteria used to determine that Ala Wai Canal sediment will require further tier III testing to allow ocean disposal; either include a statement that further testing, e.g. bioassay, will be done to determine the amount of sediment that will be disposed on land and in the ocean, or describe the quantitative criteria or other rationale used to justify why the project will dispose only 19,000 c.y. out of a total of 173,000 c.y. in the ocean.

6. **Alternatives to EPA's Ocean Disposal Standards** – describe any references in EPA regulations which allow for exemptions to EPA's ocean disposal standards, and an explanation regarding whether the project might qualify for it; describe other possible options that could be considered to exempt the project from the EPA regulations, e.g. congressional exemption or possible proposal for new ocean disposal standards based on characteristics comparable to the South Oahu ODMDS.

7. **Dredging Depths** – describe specific design criteria that have been or will be considered to prolong the duration between the current dredging project and next required dredging, e.g. dredge deeper in those areas of the canal where sedimentation is expected to settle at faster rates, e.g. at intersection of the Manoa-Palolo Drainage Canal and Ala Wai Canal.

8. **Flood Study** – describe DLNR's current plans to conduct a flood study of the Ala Wai Canal, in conjunction with the Army Corp of Engineers (the 1997 Legislature appropriated $200,000 in state funds to be matched by $200,000 in federal funds).

Thank you for the opportunity to comment on the Ala Wai Canal Dredging Draft Environmental Assessment. If you have any questions, please feel free to contact us at 586-6250 (Ihara), or at 586-6890 (Fukunaga).

Sincerely,

CAROL FUKUNAGA
State Senate, 12th District

LES IHARA, JR.
State Senate, 10th District

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
P. O. BOX 621
HONOLULU, HAWAII 96809

REF:LD/WL-EK

SEP 23 1998

Mr. William D. Balfour, Jr., Director
Department of Parks and Recreation
City and County of Honolulu
650 South King Street, 10th Floor
Honolulu, Hawaii 96813

Dear Mr. Balfour:

Ala Wai Canal Dredging Draft Environmental Assessment

Thank you for your letter dated June 30, 1998, commenting on the Ala Wai Canal Dredging Draft Environmental Assessment (EA). As the responsible department in charge of the dredging, we offer the following response:

Legal limits of liability and right-of-entry permit
The legal limits of liability shown on the figures attached to your letter have been added to Figures 3-1 and 3-2 of the final EA as the proposed boundary delineation. We anticipate that specific legal language regarding site boundary limits of liability, responsibility, and absolution of responsibility will be included in the right-of-entry permit as will be negotiated between the City's Corporation Counsel and the State Attorney General. In addition, we will ensure that applicable plans be submitted to your department for review prior to the use of park lands in accordance with the contractor's application for a right-of-entry permit.

Hours of operation
Potential impacts have been evaluated in the EA based on a five-day work week. Statements have been added to Sections 3.3 and 4.4.2 of the final EA regarding the Department of Parks and Recreation's limitation to working week days only, exclusive of holidays, unless approved by its Director.

Restoration to original preconstruction condition
As discussed in previous meetings, the park areas used will be restored to their original preconstruction condition. This is discussed in Sections 3.1.1, 3.3, and 4.4.2 of the EA.

Again, thank you for reviewing the draft EA and providing your comments. We look forward to continuing to work with you and your department to minimize any short-term adverse effects to parks and to completing the dredging for the long-term benefit of recreational activities related to the use of the Ala Wai Canal. If you have any questions, please contact Mr. Andrew Monden, Chief Engineer, at 587-0230.

Aloha,

MICHAEL D. WILSON

541.1301/019-1 4.27.96

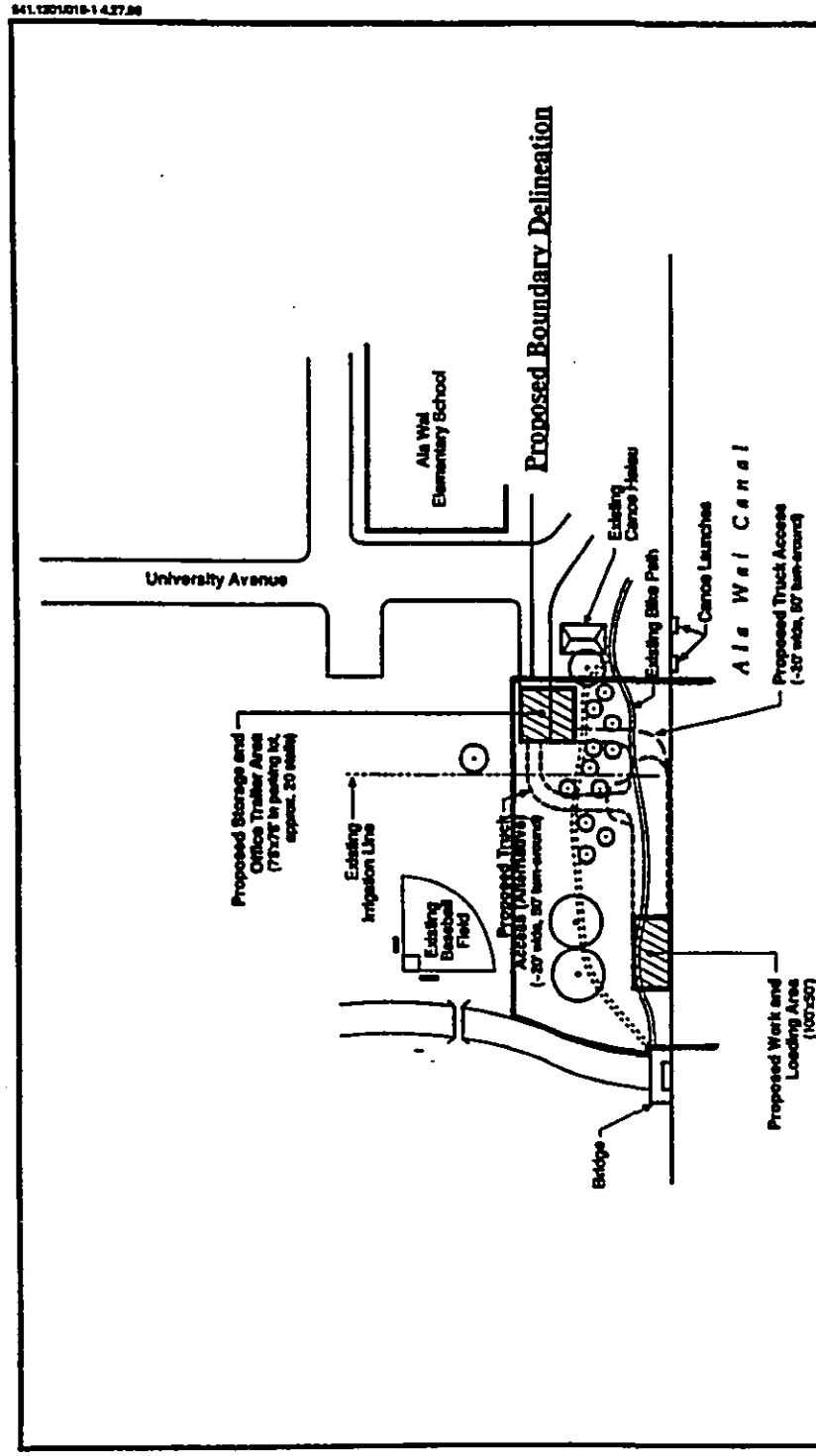

Figure 3-1
STAGING AREA SCHEMATIC LAYOUT–
ALA WAI NEIGHBORHOOD PARK A
Ala Wai Canal Dredging Environmental Assessment
Belt Collins Hawaii
May 1996

541.1301/019-1 4.27.96

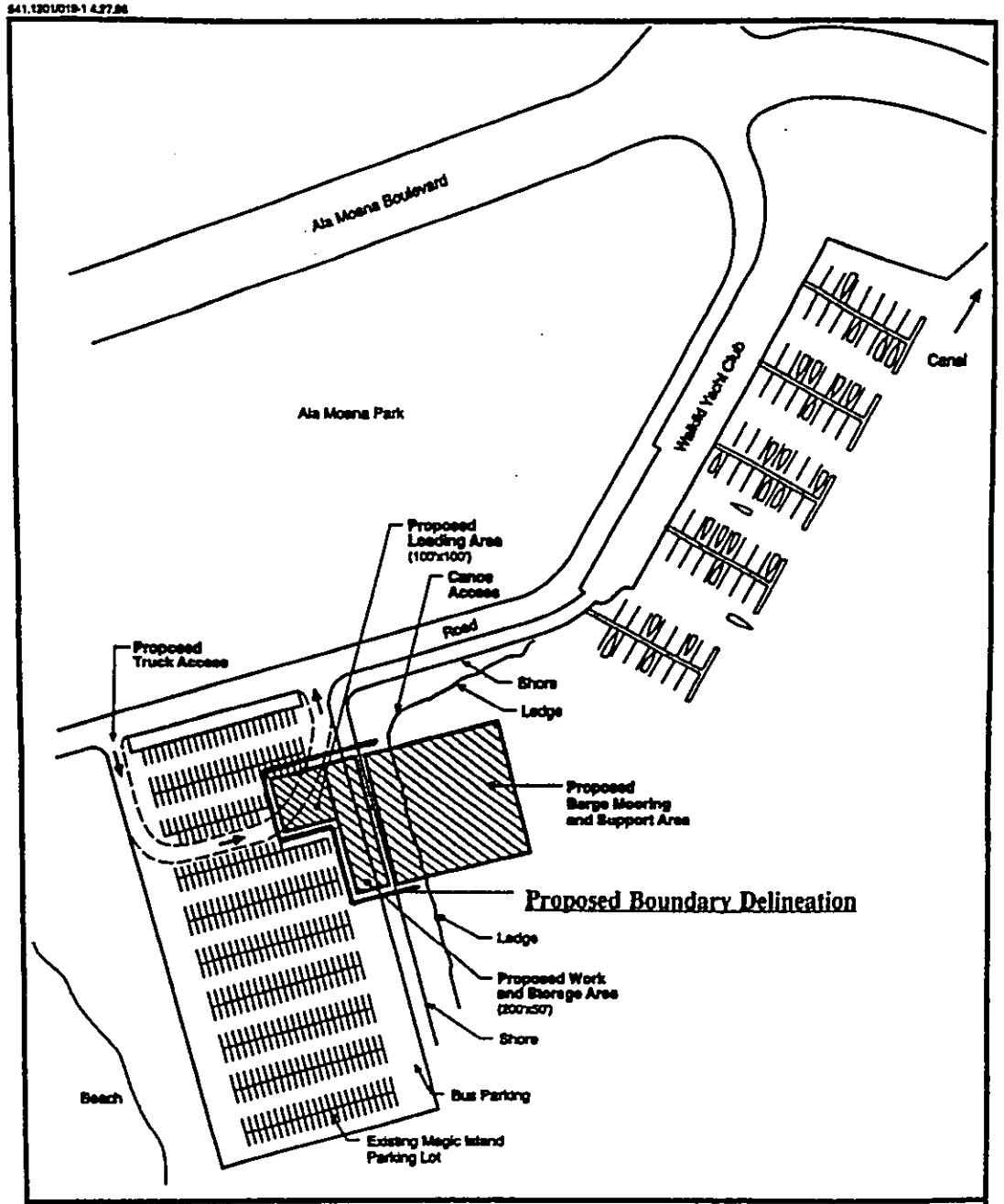

Figure 3-2
STAGING AREA SCHEMATIC LAYOUT–MAGIC ISLAND
Ala Wai Canal Dredging Environmental Assessment
Belt Collins Hawaii
May 1996

DEPARTMENT OF PARKS AND RECREATION
CITY AND COUNTY OF HONOLULU
650 SOUTH KING STREET, 10TH FLOOR • HONOLULU, HAWAII 96813
PHONE: (808) 523-4182 • FAX: (808) 523-4034

JEREMY HARRIS
MAYOR

WILLIAM D. BALFOUR, JR.
DIRECTOR

MICHAEL T. AMII
DEPUTY DIRECTOR

June 30, 1998

Ms. Molly M. Kihara
Belt Collins Hawaii, Ltd.
680 Ala Moana Boulevard, First Floor
Honolulu, Hawaii 96813-5406

Dear Ms. Kihara:

Subject: Ala Wai Canal Dredging Project
Draft Environmental Assessment

This supersedes our letter of June 3, 1998, and is in response to the draft environmental assessment (DEA) for the proposed Ala Wai Canal dredging project. Based on review of the DEA, we are offering the following comments.

We believe the long-term impact of the proposed project would benefit the recreational activities (i.e., canoe activities and fishing) related to the use of the Ala Wai Canal.

It is the department's understanding that the "most favorable" areas cited by the DEA that will be needed for construction support during the dredging project are City parks that are currently owned, maintained, and operated by the department. These preferred locations for a work support site along the Ala Wai Canal were identified as the Ala Wai Neighborhood Park A and the Magic Island parking lot.

We do not anticipate any long-term, adverse impact on historic or recreational resources in these parks as a result of the temporary use of the land. However, we anticipate that there will be short-term impacts that will result in the disruption and inconveniences to recreational facilities, programs, and maintenance activities. If these sites are selected, we expect the contractor and responsible department in charge to develop mitigation measures that will:

1. Define the legal limits of liability to those areas indicated on the attached "Figures." All areas within the indicated boundaries will become the legal responsibility of the contractor and the responsible department in charge until full completion of the project. This legal responsibility shall absolve the Department of Parks and Recreation from any maintenance of the areas and any litigation resulting from damages, negligence, etc., resulting from any actions related to the proposed project.

2. Assure the department that construction activities and operations for the temporary use of the proposed park areas be limited to week days only, exclusive of holidays unless otherwise authorized by the Director of the Department of Parks and Recreation.

3. Assure the department that all park facilities including infrastructure, landscaping, parking lot areas, shoreline areas, and other impacted park areas will be restored to its original preconstruction condition.

In addition, we would require that the contractor submit applicable plans to the department for review prior to the use of the park lands in accordance with the contractor's application for a right-of-entry permit.

Thank you for the opportunity to comment on the subject DEA.

Please contact Mr. Brian Suzuki, Planner, of our Advance Planning Branch, at 527-6316 if you have any questions.

Sincerely,

W. D. Balfour, Jr.

WILLIAM D. BALFOUR, JR.
Director

WDB:js

Attachments

Bike path
As discussed in Sections 3.1.1 and 4.4.2, the bike path in the vicinity of Ala Wai Neighborhood Park A (see Figure 3-1) will be temporarily re-routed.

Pouhala Marsh
As discussed in Section 4.1.2, endangered birds using the Pouhala Marsh adjacent to the Waipio site may be affected by noise associated with unloading the barge and with process and placement of the sediment. The affected birds could temporarily use an alternate habitat, the Pearl Harbor National Wildlife Refuge.

Findings and reasons supporting the FONSI determination
Section 1.5 has been expanded to discuss the findings and reasons supporting the FONSI determination based on the significance criteria listed in HAR 11-200-12.

Again, thank you for reviewing the draft EA and providing your comments. If you have any questions, please contact Mr. Andrew Monden, Chief Engineer, at 587-0230.

Aloha,

MICHAEL D. WILSON

(8) Is individually limited but cumulatively has considerable effect on the environment, or involves a commitment for larger actions;

By planning now to address the future needs of the community and the State, improvement of the transportation system is consistent with the long term plans for Maui. No views will be obstructed or be visually incompatible with the surrounding area.

(9) Substantially affects a rare, threatened or endangered species or its habitat;

No endangered plant or animal species are located within the highway corridor.

(10) Detrimentally affects air or water quality or ambient noise levels;

Any possible impact to near-shore ecosystems resulting from surface runoff, will be mitigated by the establishment of on-site retention basins during the construction phases of development. After development, retention areas within the highway right-of-way will serve the same function to encourage recharge of the groundwater.

(11) Affects or is likely to suffer damage by being located in an environmentally sensitive area, such as a flood plain, tsunami zone, beach, erosion-prone area, geologically hazardous land, estuary, freshwater, or coastal waters.

Development of the property is compatible with the above criteria since there are not environmentally sensitive areas associated with the project and the physical character of the corridor has been previously disturbed by agricultural uses. As such, the property no longer reflects a "natural environment". Shoreline, valleys, or ridges will not be impacted by the development.

(12) Substantially affects scenic vistas and view planes identified in county or state plans or studies;

Due to topographical characteristics of the property, views of the area to be developed are generally not significant although they are visible. The majority of the proposed project will not be visible, except from higher elevations by the general public or from persons traveling along the highway.

(13) Requires substantial energy consumption.

The location of the proposed project is between Maui's major growth areas. This relationship will reduce travel times and energy consumption after project build out through efficiencies gained by the increased capacity of the highway. Construction of the proposed project will not require substantial energy consumption relative to other similar projects.

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
P. O. BOX 621
HONOLULU, HAWAII 96809

REF:LD/WL-EK

SEP 23 1998

Mr. Gary Gill, Director
Office of Environmental Quality Control
236 South Beretania Street, Suite 702
Honolulu, Hawaii 96813

Dear Mr. Gill:

Ala Wai Canal Dredging Draft Environmental Assessment

Thank you for your letter of June 8, 1998, commenting on the Ala Wai Canal Dredging Draft Environmental Assessment (EA). We offer the following response:

Testing results
Section 3.1.1 of the EA has been revised to indicate that the material targeted for dredging was tested for sediment chemistry, for the purpose of determining suitability for ocean disposal. Hence, the inclusion of U.S. Environmental Protection Agency and U.S. Army Corps of Engineers comments on the sediment chemistry results. Chapter 4 summarizes the results in narrative fashion. For the purposes of the EA, this presentation of data was deemed the most appropriate, as a presentation of the complete data set would be too overwhelming for the outside reader, and summary data table would not provide the complete picture. As noted in the final EA, copies of the reports are available for public review at Belt Collins Hawaii.

Localized depression areas
The possibility of filling the deeper section of the Kapahulu end of the Ala Wai Canal has been included in the final EA. Discussion of this option is provided in Chapter 3, and evaluation of potential impacts is in Chapter 4.

Canoe club use
To further assess potential impacts to recreational users of the Ala Wai Canal and environs, dredging timeframes for areas of the canal were compared to a schedule of recreational uses. An "ideal" timeframe was developed will help to clarify when and where impacts will occur to recreational uses. Section 4.4.2 contains this new information.

8.0 DETERMINATION, FINDINGS AND REASONS FOR SUPPORTING DETERMINATION

8.1 SIGNIFICANCE CRITERIA

According to the Department of Health Rules (11-200-12), an applicant or agency must determine whether an action may have a significant impact on the environment, including all phases of the project, its expected consequences both primary and secondary, its cumulative impact with other projects, and its short and long-term effects. In making the determination, the Rules establish "Significance Criteria" to be used as a basis for identifying whether significant environmental impact will occur. According to the Rules, an action shall be determined to have a significant impact on the environment if it meets any one of the following criteria:

(1) Involves an irrevocable commitment to loss or destruction of any natural or cultural resources;

The proposed project will not impact scenic views of the ocean or any ridge lines in the area. The visual character of the area will change from the current agricultural land to an improved 4-lane highway which is compatible with the surrounding land use plans and programs being implemented for the region. The highway corridor is comprised of "Prime" agricultural land which is an important resource. Development of drainage systems will follow established design standards to ensure the safe conveyance and discharge of storm runoff. In addition, the subject property is located outside of the Count's Special Management Area (SMA).

As previously noted, no significant archaeological or historical sites are known to exist within the corridor. Should any archaeologically significant artifacts, bones, or other indicators of previous on-site activity be uncovered during the construction phases of development, their treatment will be conducted in strict compliance with the requirements of the Department of Land and Natural Resources.

(2) Curtails the range of beneficial uses of the environment;

Although the subject property is suitable for agricultural uses, the land area adjoining the Mokulele Highway is naturally suited for transportation purposes due to its location proximate to an existing highway system. To return the site to a natural environmental condition is not practical from both an environmental and economic perspective.

(3) Conflicts with the State's long-term environmental policies or goals and guidelines as expressed in Chapter 344, HRS; and any revisions thereof and amendments thereto, court decisions, or executive orders;

The proposed development is consistent with the Environmental Policies established in Chapter 344, HRS, and the National Environmental Policy Act.

(4) Substantially affects the economic or social welfare of the community or state;

The proposed project will provide a significant contribution to Maui's future population by providing residents with the opportunity to "live and work in harmony" in a high quality living environment. The proposed project is designed to support surrounding land use patterns, will not negatively or significantly alter existing residential areas, nor will unplanned population growth or its distribution be stimulated. The project's development is responding to projected population growth rather than contributing to new population growth by stimulating in-migration.

(5) Substantially affects public health

Impacts to public health may be affected by air, noise, and water quality impacts, however, these will be insignificant or not detectable, especially when weighed against the positive economic, social, and quality of life implications associated with the project. Overall, air, noise, and traffic impacts will be significantly positive in terms of public health as compared to the "no action" alternative.

(6) Involves substantial secondary impacts, such as population changes or effects on public facilities

Existing and planned large-scale housing development projects within Wailuku-Kahului and Kihei will contribute to a future population growth rate that will require expansion of public and private facilities and services. These improvements will become necessary as the overall population of Maui grows and settlement patterns shift. However, the proposed project will not in itself generate new population growth, but provide needed infrastructure the area's present and future population.

In addition, new employment opportunities will generate new sources of direct and indirect revenue for individuals and the County of Maui by providing both temporary and long-term employment opportunities during the construction period. Indirect employment in a wide range of service related industries will also be created from construction during project development.

(7) Involves a substantial degradation of environmental quality;

The proposed development will utilize existing vacant agricultural land. With development of the proposed project, the addition of urban landscaping will significantly mitigate the visual impact of the development as viewed from outside the site while the overall design will complement background vistas.

Makai views from the subject property are available, however, they are not significant nor generally available to the public in the property's present restricted condition.

BENJAMIN J. CAYETANO
GOVERNOR

GARY GILL
DIRECTOR

STATE OF HAWAII
OFFICE OF ENVIRONMENTAL QUALITY CONTROL
235 SOUTH BERETANIA STREET
SUITE 702
HONOLULU, HAWAII 96813
TELEPHONE (808) 586-4185
FACSIMILE (808) 586-4186

(27)

June 8, 1998

Mr. Michael Wilson, Chair
Department of Land and Natural Resources
P.O. Box 621
Honolulu, Hawaii 96809

Dear Mr. Wilson:

Subject: Draft Environmental Assessment for the Ala Wai Canal Dredging

This is in response to the review of the subject document. We have the following questions and comments.

1. The sediments for the Ala Wai Canal is recognized as a principal contributor in causing the canal to exceed the State water quality standards. Please summarize the results of the various toxicity tests on the sediment samples and describe where the sediments from the different dredging locations (areas 1 to 4) will be placed.

2. Localized depression areas do not favor good circulation of the water and causes poor water quality. There appears to a localized depression area near the Ala Wai Golf Course. This depression area will not be filled to even out the bottom to create more favorable water circulation. Please describe the rationale for not filling the localized depression area.

3. More than 30 canoe clubs practice in the Ala Wai Canal. Please describe whether any club would be prevented from using the canal during the duration of the project. If so, develop alternatives for affected clubs to access the canal.

4. A bike path runs along the Ala Wai Canal. Please describe whether any portion of the path would be closed during the duration of the project. If so, develop alternatives for bicyclists to continue their trip along the canal.

5. Endangered birds using the Pouhala Marsh adjacent to the Waipio site may be affected by noise associated with unloading the barge and with processing and placement of the sediment. Please describe specific mitigation measures to reduce this impact.

6. Please discuss the findings and reasons for supporting the FONSI determination based on the significant criteria listed in §11-200-12 of the EIS rules. Please see the enclosed example.

Should you have any questions, please call Jeyan Thirugnanam at 586-4185.

Sincerely,

Gary Gill
Director

Attachment

c: ✓Belt Collins

DEPARTMENT OF PUBLIC WORKS
CITY AND COUNTY OF HONOLULU
650 SOUTH KING STREET, 11TH FLOOR • HONOLULU, HAWAII 96813
PHONE: (808) 523-4341 • FAX: (808) 527-5857

JEREMY HARRIS
MAYOR

JONATHAN K. SHIMADA, PhD
DIRECTOR AND CHIEF ENGINEER
ROLAND D. LIBBY, JR.
DEPUTY DIRECTOR

ENV 98-128

June 5, 1998

RECEIVED (24)
JUN 9 1998
BELT COLLINS HAWAII LTD.

Ms. Molly Kihara
Belt Collins Hawaii
680 Ala Moana Blvd., 1/F
Honolulu, Hawaii 96813-5406

Dear Ms. Kihara:

Subject: Draft Environmental Assessment (DEA)
Ala Wai Canal Dredging
TMK: 2-3-6 & 7

In addition to our comments dated May 27, 1998, we wish to include the following:

Dredged material must meet the following soil specifications to be accepted as final cover material on the Waipahu Ash Landfill:

a. Maximum aggregate size of two inches or less.

b. Well-graded material, with less than 5% passing the No. 200 sieve.

c. Organic composition of less than 10%, by weight.

d. Dewatered and passes the paint filter test for free liquids.

e. Non-hazardous concentrations of heavy metals.

Should you have any questions, please contact Mr. Alex Ho, Environmental Engineer, at 523-4150.

Very truly yours,

JONATHAN K. SHIMADA, PhD
Director and Chief Engineer

BENJAMIN J. CAYETANO
GOVERNOR OF HAWAII

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
P. O. BOX 621
HONOLULU, HAWAII 96809

MICHAEL D. WILSON, CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES

DEPUTY
GILBERT COLOMA-AGARAN

AQUACULTURE DEVELOPMENT PROGRAM
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TECHNICAL & SUPPORT BRANCH
STATE PARKS
WATER RESOURCE MANAGEMENT

REF:LD/WL-EK

SEP 23 1998

Mr. Jonathan K. Shimada, Director
Department of Facility Maintenance
City and County of Honolulu
650 South King Street, 11th Floor
Honolulu, Hawaii 96813

Dear Mr. Shimada:

Ala Wai Canal Dredging Draft Environmental Assessment

Thank you for your letter of June 5, 1998, commenting on the Ala Wai Canal Dredging Draft Environmental Assessment (EA). The soil specifications for final cover material at the Waipahu Ash Landfill, as noted in your letter, have been added to Section 3.1.1 of the final EA.

Again, thank you for reviewing the draft EA and providing your comments. If you have any questions, please contact Mr. Andrew Monden, Chief Engineer, at 587-0230.

Aloha,

MICHAEL D. WILSON

(Your Name) Larry Hurst
(Street and Unit) 1122 Elm St., #505 (23)
(City, State and ZIP code) Honolulu, HI 96814

Belt Collins Hawaii
680 Ala Moana Boulevard, First Floor
Honolulu, Hawaii 96813
ATTN: Ms. Molly Kihara

Dear Ms. Kihara:

I offer the following comments concerning the Ala Wai Canal Dredging draft environmental assessment:

Sediment must be regarded as extremely hazardous to human life.

Viruses, bacteria, fungi, and protozoans will be abundant and unseen in every bit. Just among the protozoal Subphylum Sarcomastigophra are numerous genera of flagellates and amebae that harm humans with poisoning, liver disease, external and internal lesions, and pyorrhea. One invading spiny ameba can result in blindness. Amebiasis is the infectious dysentery that causes people to defecate to death (I saw this in the Vietnam war).

Health monitoring of the public near any work area should be done. Workers should be monitored for fevers at least.

If workers do not wear biohazard-protective gear they will be at risk, also if they don't it will connote there is no danger.

(Include additional sheets if necessary)

[signature] (Signed)

6-7-98 (Date)

Please submit on or before June 8, 1998

Please fold bottom up to center dot (●), fold top down and seal with tape

BENJAMIN J. CAYETANO
GOVERNOR OF HAWAII

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
P. O. BOX 621
HONOLULU, HAWAII 96809

MICHAEL D. WILSON, CHAIRPERSON
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HISTORIC PRESERVATION
LAND DIVISION
ENGINEERING BRANCH
PLANNING BRANCH
TECHNICAL & SUPPORT BRANCH
STATE PARKS
WATER RESOURCE MANAGEMENT

REF:LD/WL-EK

SEP 23 1998

Mr. Larry Hurst
1122 Elm Street
Apartment 505
Honolulu, Hawaii 96814

Dear Mr. Hurst:

Ala Wai Canal Dredging Draft Environmental Assessment

Thank you for your letter of June 6, 1998, on the Ala Wai Canal Dredging Draft Environmental Assessment (EA). A copy of all comment letters received and our responses thereto will be included in the final EA. We appreciate your taking the time to review the draft EA.

Your concerns regarding infectious potential of Ala Wai Canal sediments is noted. No dredged sediments will be located in places where direct public exposure is possible, so monitoring of the public should not be necessary. Worker safety and health plans will be developed during the final design of the project, and will address all known biological and chemical contaminants that workers may be exposed to (see Section 4.3).

If you have any questions, please contact Mr. Andrew Monden, Chief Engineer, at 587-0230.

Aloha,

[signature]
MICHAEL D. WILSON

Options for disposal or reuse of dredged sediments are thoroughly regulated by the U.S. Environmental Protection Agency (EPA), the U.S. Army Corps of Engineers, and the State Department of Health. The materials to be dredged have been tested and are not hazardous materials. All disposal will be in accordance with standards established by these agencies for the protection of public and environmental health. As a result of examining disposal options in light of these standards, some of the material will be disposed of offshore in the existing South Oahu Ocean Dredge Material Disposal Site, which has been approved by the EPA for ocean disposal of dredged material, and which is of long standing use for both State and Federal dredging projects, such as Honolulu Harbor and Pearl Harbor. Use of this site was evaluated and approved in an Environmental Impact Statement prepared by the EPA. Some of the material will be used to fill low areas adjacent to the Reef Runway, where it will be pumped from barges directly into contained cells, mixed with a cement or other soil binders and used for fill. This re-use of the material for beneficial purposes is preferred by the EPA, and can be designed using standard engineering practices for containment such that runoff or leachate does not enter the ocean or ground water.

Neither of these disposal options exposes members of the Kalihi-Palama community to hazards or inconvenience. Both disposal sites are not adjacent to or available for use or contact by members of the community.

With regard to the specific topics raised in your letter, the following additional points are relevant. Environmental justice is not a rationale for dredging the canal. The action including the reuse of the material at the Reef Runway, is in compliance with Executive Order 12898. No significant adverse effects are likely to result from proper placement of sediments at the Reef Runway, and at that location no such impacts would disproportionately affect minority or low-income populations. The sediments have been tested and classified as solid waste. The processing and placement of sediments at the Reef Runway will be regulated by the Department of Health to ensure runoff and leachate do not impact the adjacent waters. Design measures to achieve the above may include the use of liners and covers as appropriate.

Because the material to be disposed at the South Oahu Ocean Dredge Material Disposal Site has been found suitable for ocean disposal based on chemical testing, and the remaining material will be reused in a contained site at the Reef Runway, no pathway for exposure of contaminants exists that would affect fish or recreational users. Some of these matters were not described in the draft EA, and will be dealt with in the final EA with greater specificity.

I appreciate the time you have taken in reviewing the draft EA and hope we have addressed your concerns. The Kalihi-Palama Community Council will be provided a copy of the final EA which will include responses to comments submitted.

Should you have any questions, please contact Mr. Andrew Monden, Chief Engineer at 587-0230.

Aloha,

MICHAEL D. WILSON

c: Mr. Abraham Wong
U.S. Dept. of Transporation

Bernadette Young
1512 Iao Lane
Honolulu, HI 96817

(32)

Mr. Michael Wilson, Director
Department of Land and Natural Resources
1151 Punchbowl Street
Honolulu, HI 96813

Mr. Abraham Wong
U.S. Department of Transportation
Federal Highway Administration
Box 50206
300 Ala Moana Boulevard
Honolulu, HI 96813

Gentlemen:
The Kalihi-Palama Neighborhood Board #15, at its July 15, 1998 meeting unofficially voted overwhelmingly against the two disposal option sites located within the Kalihi-Palama community out of four chosen sites. An official vote will be taken at its August, 1998 meeting.

This Board, our Councilmembers, State Legislators and residents were not informed of this project but discovered the selection in an article in the Honolulu Weekly. It is an outrage to be told this was an oversight. Information was also attained at a 7/15/98 presentation by DLNR and the consultant, Belt Collins Hawaii, Ltd.

The Ala Wai Canal Dredging Draft Environmental Assessment (EA) proposes to remove hazardous dredge materials from the more affluent communities from the Ala Wai watershed such as, Manoa, Tantalus, etc. to a most disadvantaged one like ours with the highest concentration of low-income, elderly, homeless and minority groups. In addition, the EA does not adequately address the health and environmental impacts to the disposal community. While there is environment justice for the more affluent communities, for us, there is only <u>environmental injustice.</u>

Other options given in the presentation such as ocean disposal off the shores of Sand Island, disposal of the sludge in a landfill then capping it, mixing the sludge with cement to form bricks for disposal, storage at Sand Island or the Reef Runway are totally unacceptable to this community.as these disposal options are too near to the shoreline and pose great environmental risks. The draft EA insufficiently discusses control measures for seepage and leachings to our groundwater and our greatest resource: the ocean.

Other communities had years of preparation to clean the watershed at the Ala Wai, which we have no objections, Kalihi-Palama had only 1-1/2 weeks to read and comment from excerpts of the draft EA given to us at our insistence.

We are concerned of the dangers of hazardous materials mentioned in the EA, therefore vehemently oppose the 173,000 cubic yards of sludge material proposed for disposal at these two sites.

Sincerely,

Bernadette Young

Bernadette Young
Chair, Kalihi-Palama Neighborhood Board #15

CC: U.S. Representative Neil Abercrombie
Govenor Benjamin Cayetano
Mayor Jeremy Harris
Senator Rod Tam
Senator Suzanne Chun Oakland
Senator Norman Sakamoto
Representative Romy Cachola
Representative Dennis Arakaki
Representative Jun Abinsay
Representative Loi Ahu Isa
Councilmember Donna Mercado Kim
Councilmember Jon Yoshimura
Andy Monden, DLNR

BENJAMIN J. CAYETANO
GOVERNOR OF HAWAII

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
P. O. BOX 621
HONOLULU, HAWAII 96809

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WATER RESOURCE MANAGEMENT

REF:LD/WL-EK

AUG 10 1998

Ms. Bernadette Young
Chair, Kalihi-Palama Neighborhood Board No. 15
1512 Iao Lane
Honolulu, Hawaii 96817

Dear Ms. Young:

Ala Wai Canal Dredging Draft Environmental Assessment

Thank you for your letter regarding the Environmental Assessment (EA) for dredging the Ala Wai Canal. We have carefully considered your comments and believe that the following information may be helpful in addressing the issues of concern to you.

Proper public notice has been given of the project, including two (2) public meetings, four (4) Notice of Public Meeting published in the Honolulu Advertiser and Honolulu Star-Bulletin and publication in the OEQC Bulletin "Environmental Notice" which was sent to the Kalihi-Palama Neighborhood Board No. 15 on May 8, 1998. We are sorry that the project was not brought to your attention through these efforts; we have put the Kalihi-Palama Neighborhood Board No. 15 on a direct mailing list for the project.

Dredging the Ala Wai Canal is necessary to restore sediment holding capacities, and improve conditions for recreational use of the canal. We have done a thorough evaluation of the possible ways to accomplish this dredging in a manner that is economically feasible and environmentally and socially responsible. In evaluating the range of technically feasible options, some appear in the EA that are not preferred because of technical or environmental concerns. As a result of the this analysis, reuse of the dredged material for fill at Sand Island is not an option that is being pursued.

As I think you can appreciate, dredging the canal in its urban and congested setting is not an easy task, and cannot be accomplished without some disruption of normal activities and effects on normal environmental conditions. The only options we are pursuing for dredging the canal and for disposing or reusing the dredged materials are those that do not have significant impacts to human and natural environments, and which are efficient in the time required for completion of the project.

Options for disposal or reuse of dredged sediments are thoroughly regulated by the U.S. Environmental Protection Agency (EPA), the U.S. Army Corps of Engineers, and the State Department of Health. The materials to be dredged have been tested and are not hazardous materials. All disposal will be in accordance with standards established by these agencies for the protection of public and environmental health. As a result of examining disposal options in light of these standards, some of the material will be disposed of offshore in the existing South Oahu Ocean Dredge Material Disposal Site, which has been approved by the EPA for ocean disposal of dredged material, and which is of long standing use for both State and Federal dredging projects, such as Honolulu Harbor and Pearl Harbor. Use of this site was evaluated and approved in an Environmental Impact Statement prepared by the EPA. Some of the material will be used to fill low areas adjacent to the Reef Runway, where it will be pumped from barges directly into contained cells, mixed with a cement or other soil binders and used for fill. This re-use of the material for beneficial purposes is preferred by the EPA, and can be designed using standard engineering practices for containment such that runoff or leachate does not enter the ocean or ground water.

With regard to the specific topics raised in your letter, the following additional points are relevant. No significant adverse effects are likely to result from proper placement of sediments at the Reef Runway or South Oahu Ocean Dredge Material Disposal Site, and such actions will not disproportionately affect minority or low-income populations. Neither of these disposal options exposes members of the Kalihi-Palama community to hazards or inconvenience. Both disposal sites are not adjacent to or available for use or contact by members of the community.

The processing and placement of sediment at the Reef Runway will be regulated by the Department of Health to ensure runoff and leachate do not impact the adjacent waters. Design measures to achieve the above may include the use of liners and covers as appropriate. Some of these matters were not described in the draft EA, and will be dealt with in the final EA with greater specificity.

I appreciate the time you have taken in reviewing the draft EA and hope we have addressed your concerns. The Kalihi-Palama Neighborhood Board will be provided a copy of the final EA which will include responses to comments submitted.

Should you have any questions, please contact Mr. Andrew Monden, Chief Engineer at 587-0230.

Aloha,

MICHAEL D. WILSON

c: Mr. Abraham Wong,
U.S. Dept. of Transportation

3011

The Senate

The Nineteenth Legislature of the State of Hawaii

STATE CAPITOL
HONOLULU, HAWAII 96813

RECEIVED
98 JUL 28 P3:49
WATER & LAND DEVELOPMENT

July 23, 1998

Michael Wilson, Director
Department of Land and Natural Resources
1151 Punchbowl Street
Honolulu, Hawaii 96813

Re: Ala Wai Canal Dredging Draft Environmental Assessment

Dear Mr. Wilson:

The Kalihi-Palama Community Council and the Kalihi-Palama Neighborhood Board contacted me with concerns regarding the disposal options listed in the draft environmental assessment for the Ala Wai Canal Dredging. They are justifiably upset about not being notified of the disposal plans or being invited to provide input since two of the disposal sites are within our district.

After attending the Kalihi-Palama Neighborhood Board emergency meeting on July 15, 1998 and hearing the presentation made by Department of Land and Natural Resources staff, I feel it is my obligation to make sure that their concerns are addressed.

First and foremost, I would like to be assured that there would be absolutely no potential health hazard to anyone who might be in or near the potential disposal sites. Secondly I would like to be assured that the material disposed would not increase current levels of pollution in the area selected. I would also like to be assured that the disposal does not present potential for future environmental problems.

I support your efforts to clean the Ala Wai Canal and to try to treat the material so it is reusable. However, the community expected to accept this material has the right to clearly understand the proposal and its associated risk. Furthermore, they need to be assured that the plan poses no threat to the health or environment of their community.

Sincerely,

Norman Sakamoto

Norman Sakamoto
Senator, 16th District

98 JUL 28 P3:25
RECEIVED
DEPARTMENT OF LAND & NATURAL RESOURCES
STATE OF HAWAII

BENJAMIN J. CAYETANO
GOVERNOR OF HAWAII

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
P. O. BOX 621
HONOLULU, HAWAII 96809

REF:LD/WL:EK

SEP 23 1998

MICHAEL D. WILSON, CHAIRPERSON
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TECHNICAL & SUPPORT BRANCH
STATE PARKS
WATER RESOURCE MANAGEMENT

The Honorable Norman Sakamoto
State Senator, District 16
State Capitol, Room 207
Honolulu, Hawaii 96813

Dear Senator Sakamoto:

Ala Wai Dredging Draft Environmental Assessment

Thank you for your letter of July 20, 1998, regarding the environmental assessment for dredging the Ala Wai Canal. We have carefully considered your comments and believe that the following additional information may be helpful in addressing the issues of concern to you.

Extensive public notice has been given of the project, including two public meetings, announcements in the Honolulu Advertiser and Star Bulletin, and publication in The Environmental Notice, which is distributed to the Neighborhood Boards. We are sorry that the project was not brought to your attention through these efforts; we have put the Kalihi-Palama Neighborhood Board on a direct mailing list for the project.

Dredging the Ala Wai Canal is a serious and immediate need, which will benefit the entire community by improving flood control, boating, paddling, and water quality. We have done a thorough evaluation of the possible ways to accomplish this dredging in a manner that is economically feasible and environmentally and socially responsible. In evaluating the range of technically feasible options, some appear in the EA that are not preferred because of technical or environmental concerns. As a result of this analysis, reuse of the dredged material for fill at Sand Island is not an option that is being pursued.

As I think you can appreciate, dredging the canal in its urban and congested setting is not an easy task, and cannot be accomplished without some disruption of normal activities and effects on normal environmental conditions. The only options we are pursuing for dredging the canal and for disposing or reusing the dredged materials are those that do not have significant impacts to the human and natural environments, and which are efficient in the time required for completion of the project, so that the duration of the period of disruption will be as short as practical.

Options for disposal or reuse of dredged sediments are thoroughly regulated by the U.S. Environmental Protection Agency (EPA), the US Army Corps of Engineers, and the State of Hawaii Department of Health. The materials to be dredged have been tested and ARE NOT hazardous materials. All disposal will be in accordance with standards established by these agencies for the protection of public and environmental health. As a result of examining disposal options in light of these standards, some of the material will be disposed of offshore in the existing South Oahu Ocean Dredged Material Disposal Site, which has been approved by the EPA for ocean disposal of dredged material, and which is of long-standing use for both state and federal dredging projects such as Honolulu Harbor and Pearl Harbor. Use of this site was evaluated and approved in an Environmental Impact Statement prepared by the EPA. Some of the material will be used to fill low areas adjacent to the Reef Runway, where it will be pumped from barges directly into contained cells, mixed with a cement like material and used for fill. This re-use of the material for beneficial purposes is preferred by the EPA, and can be designed using standard engineering practices for containment such that runoff or leachate does not enter the ocean.

Neither of these disposal options exposes members of the Kalihi-Palama community to hazards or inconvenience. The Reef Runway is not a location adjacent to or available for use or contact by members of the community. The disposition for reuse of dredged material at that location will not have any effect on the community, and will be performed in a manner that contains all the material on site.

No significant adverse effects are likely to result from proper placement of sediments at the Reef Runway. The processing and placement of sediments at the Reef Runway will be regulated by the Department of Health to ensure runoff and leachate do not impact adjacent waters. Design measures to achieve this end include the use of liners and covers as appropriate.

I appreciate the time you have taken in reviewing the draft EA and hope we have addressed your concerns. You will be provided a copy of the final EA which will include responses to comments submitted.

Should you have any questions or comments, please contact Mr. Andrew Monden, Chief Engineer, at 587-0230.

Aloha,

MICHAEL D. WILSON