

LINDA LINGLE
GOVERNOR OF HAWAII



STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
OFFICE OF CONSERVATION AND COASTAL LANDS
POST OFFICE BOX 621
HONOLULU, HAWAII 96809

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COMMISSION ON WATER RESOURCE MANAGEMENT

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CONSERVATION AND COASTAL LANDS
CONSERVATION AND RESOURCES ENFORCEMENT
ENGINEERING
FORESTRY AND WILDLIFE
HISTORIC PRESERVATION
KAHOOLAWE ISLAND RESERVE COMMISSION
LAND
STATE PARKS

REF:OCCL:TM

CDUA: OA-3297

180-Day Exp. Date: September 10, 2006

Perry J. White
Planning Solutions
Ward Plaza, Suite 330
210 Ward Avenue
Honolulu, Hawaii 96814-4012

MAY 30 2006

Dear Mr. White:

SUBJECT: Conservation District Use Permit (CDUP) OA-3297

This is to inform you that on May 26, 2006, the Board of Land and Natural Resources approved your client's Conservation District Use Application (CDUA) for the Duke Kahanamoku Lagoon Restoration Project located at Kalia, Waikiki, island of Oahu, portion of TMK: (1) 2-3-037:021 subject to the following conditions:

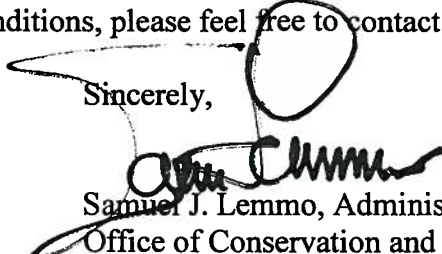
1. The applicant shall comply with all applicable statutes, ordinances, rules, regulations, and conditions of the Federal, State, and County governments, and applicable parts of the Hawaii Administrative Rules, Chapter 13-5;
2. The applicant shall comply with all applicable Department of Health Administrative Rules;
3. The applicant, its successors and assigns, shall indemnify and hold the State of Hawaii harmless from and against any loss, liability, claim or demand for property damage, personal injury or death arising out of any act or omission of the applicant, its successors, assigns, officers, employees, contractors and agents under this permit or relating to or connected with the granting of this permit;
4. The applicant and their contractors shall coordinate construction activities with the Division of Boating and Recreation to minimize disruption of public use and shall not preclude vehicular or pedestrian access to the Harbor facilities and shoreline areas;
5. The applicant shall obtain the appropriate authorization from the Land Division, Department of Land and Natural Resources, for the use of State Lands;
6. All conditions imposed under all required permits for this project shall be observed by the applicants;

7. Before proceeding with any work authorized by the Board, the applicant shall submit four (4) copies of the construction and grading plans and specifications to the Chairperson or his authorized representative for approval for consistency with the conditions of the permit and the declarations set forth in the permit application. Three (3) of the copies will be returned to the applicant. Plan approval by the Chairperson does not constitute approval required from other agencies;
8. Any work done or construction to be done on the land shall be initiated within one year of the approval of such use, in accordance with construction plans that have been signed by the Chairperson, and, unless otherwise authorized, shall be completed within three (3) years of the approval. The applicant shall notify the Department in writing when construction activity is initiated and when it is completed;
9. All representations relative to mitigation set forth in the accepted environmental assessment or impact statement for the proposed use are incorporated as conditions of the permit;
10. The applicant understands and agrees that this permit does not convey any vested rights or exclusive privilege;
11. In issuing this permit, the Department and Board have relied on the information and data that the applicant has provided in connection with this permit application. If, subsequent to the issuance of this permit, such information and data prove to be false, incomplete or inaccurate, this permit may be modified, suspended or revoked, in whole or in part, and/or the Department may, in addition, institute appropriate legal proceedings;
12. Where any interference, nuisance, or harm may be caused, or hazard established by the use, the applicant shall be required to take the measures to minimize or eliminate the interference, nuisance, harm, or hazard;
13. The applicant shall submit an Alien Aquatic Management Plan and obtain the Division of Aquatic Resources approval of the plan within 180 days of this permit approval;
14. Should historic remains such as artifacts, burials or concentration of charcoal be encountered during construction activities, work shall cease immediately in the vicinity of the find, and the find shall be protected from further damage. The contractor shall immediately contact HPD (692-8015), which will assess the significance of the find and recommend an appropriate mitigation measure, if necessary;
15. The applicant shall plan to minimize the amount of dust generating materials and activities. Material transfer points and on-site vehicular traffic routes shall be centralized. Dusty equipment shall be located in areas of least impact. Dust control measures shall be provided during weekends, after hours and prior to daily start-up of project activities. Dust from debris being hauled away from the project site shall be controlled;
16. Where any polluted run-off, interference, nuisance, or harm may be caused, or hazard established by the use, the applicant shall be required to take measures to minimize or eliminate the polluted run-off, interference, nuisance, harm, or hazard;


17. During construction, appropriate mitigation measures shall be implemented to minimize impacts to the marine environment, off-site roadways, utilities, and public facilities;
18. The applicant shall conduct at a minimum weekly inspections of the sand cover over the buried armored berm to ensure that a minimum of 0.5' of sand cover remains in place on the top of the berm and a minimum of 1.0' of sand remains in place on the sloping sides of the berm;
19. The applicant shall monitor pipes left in place in the ocean and shall take corrective action should any pipes become exposed;
20. The applicant shall conduct daily inspections of the lagoon, weekly or more frequent cleaning of the exposed portion of the beach sand and agitation of the lagoon bottom sand;
21. The applicant shall maintain a minimum of 2' of sand cover over the geotextile fabric within the lagoon;
22. During construction and completion of the proposed project, access and traditional and customary uses (surfing, canoeing, swimming) of the ocean and shoreline shall not be hampered, impeded, or limited;
23. The sand source for the project shall be approved by the Department of Land and Natural Resources;
24. Other terms and conditions as may be prescribed by the Chairperson; and
25. Failure to comply with any of these conditions shall render this Conservation District Use Permit null and void.

Please acknowledge receipt of this approval, with the above noted conditions, in the space provided below. Please sign two copies. Retain one and return the other within thirty (30) days. Should you have any questions on any of these conditions, please feel free to contact Tiger Mills at 587-0382.

Sincerely,


Samuel J. Lemmo, Administrator
Office of Conservation and Coastal Lands

Receipt acknowledged:


Applicant's Signature

Date 6/15/06

c: Chairperson
ODLO/DAR/DOBAR
City & County of Honolulu, Department of Planning & Permitting

**STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
OFFICE OF CONSERVATION AND COASTAL LANDS
Honolulu, Hawaii**

May 26, 2006

180-day Exp. Date: September 10, 2006

**Board of Land and
Natural Resources
State of Hawaii
Honolulu, Hawaii**

REGARDING: Conservation District Use Application (CDUA) OA-3297
for the Duke Kahanamoku Lagoon Restoration Project

APPLICANT: Hilton Hawaiian Village, LLC (HHV)

LANDOWNER: State of Hawaii

LOCATION: Waikiki, Island of Oahu

TMK: (1) 2-3-037:021

AREA OF PARCEL 22.363 acres

USE: ≈ 5.0 acres

SUBZONE: General

BACKGROUND

On August 7, 2002, the Honolulu City Council adopted resolution 02-225, CD1, the Special Management Area Permit (SMP) for the Hilton Hawaiian Village (HHV) Waikikian Development. Condition fulfillment for this SMP required the HHV, in part: "Within 2 years from the date of approval...submit a detailed plan and timetable for the restoration of the lagoon to a safe and sanitary body of water. The plan shall include a detailed maintenance plan to ensure that the lagoon will remain in compliance with State water quality requirements." (**Exhibit 1 & 2**) The HHV is applying for this Conservation District Use Permit to comply with the provisions of Resolution 02-225.

APPROVED BY THE BOARD OF
LAND AND NATURAL RESOURCES
AT ITS MEETING HELD ON

MAY 26 2006

ITEM K-1

DESCRIPTION OF AREA AND CURRENT USE

The proposed project site is located at the Ewa (west) end of Waikiki Beach makai and adjacent of the HHV Rainbow Tower. The lagoon is bordered by public beach to the east and south, by Ala Wai Harbor to the west and by the HHV property to the northeast. The Duke Kahanamoku Lagoon lies within the General subzone of the Conservation District (**Exhibit 3 & 4**). The lagoon was created by a combination of excavation and fill along the shoreline in 1956 when the Hilton Hawaiian Village was originally developed. The subject parcel is owned by the State of Hawaii. However, terms of an Indenture and Deed from the Territory of Hawaii dated September 22, 1955 gave the HHV the right to construct, use and maintain the lagoon.¹

The hourglass shaped lagoon is 675 feet long. At its widest, it is 420 feet across and at its narrowest; it is only 240 feet wide. The existing water surface area is \approx 4.6 acres. There is a small island in the southeast quadrant with an area of about 2,600 ft². At the deepest point in the lagoon the top of the sediment is \approx 8.5 feet below mean sea level (msl).

The area immediately around the lagoon is classified as mixed fill land. It appears that most of the material that now makes up the banks of the lagoon originated from within it or from nearby ocean shoreline areas that were dredged when the Territory of Hawaii constructed the 'Crescent Beach.' Kahanamoku Beach, the strip of beach fronting the HHV that was created at the same time as the lagoon, consists mainly of light-colored sands and larger material derived from coral and seashells. Much of the sand has eroded from the western end of the beach. What remains is exposed coral substrate, cemented sand, gravelly stones, and in a few areas, a thin veneer of soil that has washed down from the surrounding landscaped areas.

The lagoon currently contains electrical, gas and water lines serving the ornamental island and is traversed by submerged power cables running from the Lagoon tower to the existing pump house (**Exhibit 5**). No sewer lines come into or out of the project area.

There is virtually no terrestrial vegetation in the project area. Vegetation in the vicinity consists of exotic species planted after the fill was placed in the mid-1950s. No terrestrial plant species on the proposed site are identified as threatened or endangered nor are any known to be candidates for such status.

Terrestrial mammalian species found at the project site are limited to introduced species such as mice, rats and feral cats. Informal observation of avifaunal resources note common introduced birds.

¹ Lagoon construction was part of a littoral rights exchange between the abutting property owners (Kaiser and the Paoa Estate) and the Territory of Hawaii. Ownership of the lagoon passed to the Territory of Hawaii, under deed covenants specifying, that the Territory would preserve the lagoon as a "safe and sanitary" body of water and that HHV would maintain the lagoon for as long as economically practical. If HHC determines that this is impractical and notifies the State of its intent to discontinue maintenance of the lagoon the State must fill the lagoon in to make a flat land area, provide an easement for the HHV and create a "no building" zone.

There are 68 aquatic species that are known to be present in the lagoon most of the species found in the lagoon are believed to have entered through the pipes connecting the lagoon to the ocean but humans may have purposely introduced some. The most dominant species seen from the shoreline is tilapia. In the water, much of the floor of the lagoon is occupied by a mix of jellyfish (Cassipoea), red algae and sea grass. None of the species identified are rare, threatened or endangered or particularly unusual.

There are no known valued cultural, historical, and natural resources in which traditional and customary native Hawaiian rights are exercised in the project area.

The poorly circulating lagoon waters are turbid. The lagoon bottom is covered with soft, anaerobic sediment that emits an unpleasant odor when disturbed. Most of the sediment within the lagoon is anoxic silt and sand. Where sand is present, it is covered with a mat of fleshy algae. The lagoon shore has eroded in many areas exposing hard coral and gravel substrate. Currently it is impossible to walk completely around the lagoon shoreline because the retaining walls that support the HHV's swimming pool extends into the water.

Pumped water from the lagoon into the Ala Wai Harbor lowers the water level in the lagoon below that of the adjacent ocean. This causes water to flow from the ocean into the lagoon at all times. The rate of inflow varies over time, while the discharge into the harbor remains constant. Lagoon waters rise and fall in response to the tide.

The original pump capacity provides a turnover rate of one time per day. This is too slow to support water quality appropriate for recreational uses of the lagoon. The pump no longer operates at its original capacity and the positioning of the pipes that supply and withdraw water from the lagoon leads to short-circuiting. These factors have lead to an average turnover rate in the entire lagoon of once every 1.5 to 2 days and the water in many areas turns over far more slowly than that.

The lagoon is presently supplied with ocean water via two ocean intake pipes. These pipes draw relatively turbid water from the near shore area into the lagoon. Sediment suspended by ocean movement settles and accumulates on the bottom of the lagoon in the form of soft sediment. With no ocean energy, the sediment becomes anaerobic. The intake pipes have also introduced a variety of marine organisms to the lagoon.

In addition storm water runoff from adjacent areas including approximately half of the HHV property currently discharges into the lagoon. There are elevated concentrations in the lagoon closest to these storm water discharges.

PROPOSED USE

The applicant proposes to reduce the volume of water in the lagoon by $\approx 50\%$ and shrink the surface area by $\approx 25\%$ from 4.64 acres to 3.43 acres. The anaerobic sediments on the bottom of the lagoon would be sealed in place using an impermeable geotextile fabric covered by 15,000-20,000 yd³ of sand. The geotextile layer provides separation between

the anaerobic sediment and the fill above. This will prevent sand loss into the soft dregs and contamination of the sand. The sand shall come from approved on-land sources **(Exhibit 6 & 7)**.

The existing ocean intakes will be sealed and wells will draw saline ground water from between 77' and 251' below sea level. Each of the seven exploratory wells will have a capacity of at least 2500 gallons per minute (gpm). Together, they will deliver a minimum of 15,000 gpm of water into the lagoon. The various depths of the well are to maximize the well's yield while producing water warm enough for comfortable swimming in the lagoon **(Exhibit 8)**.

Existing 50 year-old pipes within the lagoon shall be removed and replaced with a new circulation system that uses pumps for both the inflow and outflow from the lagoon. The existing 36" diameter pipe that discharges lagoon water into the Ala Wai Harbor middle basin will continue to be utilized in addition to a proposed installation of a new pipeline for discharge to the inner harbor basin. The purpose of the aforementioned proposals are to improve the quality and circulation of water in the lagoon. It is expected that the lagoons water quality shall be restored to within safe recreational standards. The system will be automated. HHV will be responsible for the ongoing maintenance and operation of the system.

In addition, storm drains will be rerouted and are proposed to include a filtration capacity not present in the existing system. Storm water runoff will be diverted into the mauka basin of the Ala Wai Harbor. Prior to entering the pump stations, all runoff will be treated using a "flow-through" storm water treatment system. These treatment systems are designed to mechanically filter sediments prior to storm water being discharged to the harbor.

Other improvements within the Conservation District include public walkways, scenic amenities and landscaping. The proposed overall Waikikian Development plan requires the applicant to provide a public walkway that extends entirely around the lagoon. Portions of the walkway and landscaping are also proposed within the Conservation District. Proposed landscaping include grass and sturdy shoreline plants such as naupaka, beach morning glory and palms. Along the beach frontage, the proposed design uses textured boards made of weather-resistant material as the walking surface. The walkway would be approximately 8' wide. Bollards (posts ≈ 9- to 12- inches in diameter) would be located at 12-foot intervals along the ocean side of the boardwalk. The bollard posts will be grouted into holes bored into the coral **(Exhibit 9, 10 & 11)**.

The secondary walkway around the mauka side of the lagoon is partially on hotel property. According to the applicant, in accordance with its different purpose and identity and the desire to have it look like an extension of the beach, a markedly different material would be used for this secondary walkway. The design had not been finalized but present plans call for the use of concrete with a sand finish and/or a grass paving system approximately 5-feet wide. The existing concrete pool deck at the Lagoon Tower will be

removed to allow a continuous access around the lagoon. A riprap wall is also proposed in the lagoon fronting the Rainbow Tower (**Exhibit 12**).

The applicant also proposes to emplace a buried rubble mound structure beneath the existing berm to increase its stability. Once constructed, the berm would be completely covered with sand and would blend in with the surrounding beach. The shoreline sand berm is proposed to be +5- to +6-feet msl. The top of the stone structure would be set at an elevation of +4.5-feet msl. The base of the structure is proposed at 2.0 feet below sea level with a 3:1 slope on the makai side. The required armor stone size is approximately 3 feet or about 2,700 pounds/stone. The crest would be at least 10 feet across and then there will be a steeper 2:1 slope on the mauka side. The proposed alignment of the berm is proposed entirely inland of the 40-foot setback area and is not within the Conservation District. The purpose is to reduce the possibility that high waves could wash out the sand or completely breach the lagoon/ocean separation. As necessary, the applicant proposes to utilize mechanical equipment for periodic restoration of sand slopes.

Alternatives to the proposed action

The applicant considered many alternatives to the proposed action such as different pumping rates, reversing the flow in the existing system, using ocean water from relocated ocean intakes, installing sand filtration system on ocean intake, opening a channel to the ocean, biological measures, alternate methods of disposing of storm water, lagoon reconfiguration, lagoon bottom restoration, in addition to widening the beach by filling in the lagoon and no action. However these alternatives would not meet the objective of restoring water quality and/or enhance the lagoons recreational and scenic qualities. In addition, the SMP for the Waikikian Development mandates that the lagoon be restored to a safe and sanitary body of water within three years from the date of the plan's approval. Therefore these alternatives were eliminated from further consideration.

SUMMARY OF COMMENTS

The application was referred to the following agencies for their review and comment: the **State**: Department of Health; Office of Hawaiian Affairs; Office of Environmental Quality Control; Department of Land and Natural Resources Divisions of: Aquatic Resources, Boating and Recreation, Conservation and Resource Enforcement, Engineering, Forestry and Wildlife, Oahu District Land Office and Historic Preservation; the **City and County of Oahu**: Department of Planning & Permitting, the Waikiki Neighborhood Board and the Waikiki Resident's Association. In addition, the CDUA and the Environmental Assessment was sent to the nearest public library, the Waikiki-Kapahulu Public Library, to make this information readily available to those who may wish to review it.

Comments were received and summarized from the following agencies:

STATE OF HAWAII

DEPARTMENT OF HEALTH (DOH)

Our review of the water quality modeling inputs, assumptions, and results is currently incomplete, and will be provided during the processing of required DOH applications. Total Maximum Daily Loads (TMDLs) for the lagoon receiving waters have not been established by the State. It is clear that there would be some increases in certain pollutant loads from the proposed project, our forthcoming evaluation of the modeling results will more directly address the overall impacts of the proposed project on receiving water quality and the potential achievement of water quality standards in these receiving waters.

Applicant's Response

We understand that your review of the water quality modeling inputs, assumptions, and results is currently incomplete and that the Environmental Planning Office will examine the situation more closely during the processing of applications for required DOH permits. We are pleased that your evaluation will consider the overall impacts of the proposed project on receiving water quality and the potential achievement of water quality standards in these receiving waters.

Clean Water Branch (CWB)

As stated in the CDUA and EA, the proposal will require the Federal Clean Water Act Section 401 Water Quality Certification (WQC) and Section 402 National Pollutant Discharge Elimination System (NPDES) permit. The CDUA/EA also states the requirement of a Department of the Army permit.

The CWB is working closely with the applicant and its agent and will provide the applicant with site-specific comments before and during the processing of the required applications.

OFFICE OF ENVIRONMENTAL QUALITY CONTROL

An April 2001 study for the Waikikian Project has an inset of a map indicating archaeological sites and fishponds. Please enlarge the map in the FEA so that pertinent details on the names of the fishponds and the historic shoreline are legible.

Applicant's Response

The map included with the EA was from the State Historic Preservation Division. Its primary purpose was to demonstrate that the historic shoreline was well inland of the project site and to show that no archaeological sites or fishponds existed in the area to be affected by the project. The names of the sites and the fishponds were not provided on the map.

DEPARTMENT OF LAND AND NATURAL RESOURCES (DLNR)

Division of Aquatic Resources (DAR)- September 15, 2005

Storm Water Runoff

Currently, all storm water runoff empties into the lagoon and has compromised the water quality. To improve the water quality, the applicant proposes to redirect all of the storm water runoff into the Ala Wai Harbor after it is treated in a “flow-through” system designed to filter sediment. DAR cautions that the storm water runoff, in addition to carrying solid particulates, can also act as a vehicle for transporting toxic substances from surface areas around the hotel and lagoon into the marine environment as it empties into the Ala Wai Yacht Harbor.

Impermeable Geotextile Sheet

DAR is concerned whether the anchoring system for the material is sufficient to keep it in place during rough ocean conditions. If the fabric separates, the soft sediment will mix with the sand overlay compromising the water quality in the lagoon.

Ocean water flowing into the lagoon would be a source for aquatic alien species. By emptying lagoon waters into the Ala Wai Harbor, dispersal of aquatic alien species may be enhanced and spread along the coast around Magic Island, Ala Moana Beach, etc.

Non-native Species

DAR is concerned with the protection and sustainability of our native species in addition to monitoring the introduction of non-natives that may become invasive and adversely affect native species and ecosystems. DAR strongly recommends that the applicant develop a management plan to address alien species in the lagoon. Important to this management plan is a monitoring component where the lagoon waters are surveyed periodically to insure that no alien species have been introduced into the lagoon. It should also include a component to address both eradication and prevention procedures to minimize any further spreading of any alien organism that manages to find its way into the lagoon waters. The proposed improved circulation system for the lagoon should not be a mechanism for aiding in the spread of invasive species. Therefore DAR strongly recommends that the applicant develop and have an aquatic alien species management plan in place to address these issues.

Applicant's Response

Storm Water Runoff

Because the proposed new system will have sediment filtration systems that are absent from the existing system, the quality of the storm water runoff that enters the harbor is likely to be better than at present. The Hilton Hawaiian Village (HHV) employs

established maintenance and emergency response procedures to ensure proper storage and treatment of toxic substances and prompt cleanup in the event of a spill. This is part of the regular maintenance of the resort, designed to minimize danger to their personnel and guests. HHV will also be responsible for maintaining the improved lagoon area, and it will take similar precautions to minimize the presence of toxic materials in that area. The on-site storm water filtration system that is proposed is expected to reduce the potential for suspended toxics to enter State waters, but it will not substantially affect dissolved substances. HHV personnel work to control the latter through appropriate Best Management Practices.

Impermeable Geotextile Sheet

HHC plans to reinforce the existing shoreline berm in order to prevent the geotextile fabric layer from loosening when waves overtop the berm during large storm events. This will be done by emplacing an armor-stone structure beneath the existing berm and using it to anchor the geotextile fabric.

Regarding overtopping waves that may carry organisms into water flowing into the lagoon as a source for aquatic alien species, most organisms would not be able to travel through the discharge pump system into the Ala Wai Harbor. These organisms most likely already exist within the Harbor considering that the Harbor is open to the ocean where the organisms originate. The pipes are a tiny fraction of the size of the existing entrance to the Harbor, which allows organisms of almost any size from the ocean to enter freely. Substituting wells for the existing ocean water intakes as the water source for the lagoon will greatly reduce the risk of invasive species traveling between the ocean, the lagoon, and the Harbor compared to current conditions. It does not appear that there is any mechanism through which the proposed new lagoon circulation system could increase the dispersal of any alien species of concern. HHC would welcome the opportunity to work with DAR to develop and implement a plan for monitoring the evolution of the lagoon ecosystem over time to ensure that the restored lagoon does not become a source of invasive species that could harm other water bodies.

Non-native Species

Essentially all of the biota now present in the lagoon will be removed as part of the proposed project. The wells drawing saline water from depth to supply water to the lagoon are not a potential source of alien species and the well water is not a threat in this regard.

It is possible that some alien species may eventually find their way into the lagoon as a result of large storm waves or tsunami spilling water into it. The public may release organisms into the lagoon. These pathways already exist and would be reduced by the proposed project. Because the restored lagoon will be rapidly flushed with fresh, aerated well water it will not become a favorable habitat for relatively high densities of stinging jellyfish and other invasive species that thrive in mud-bottom/quiescent habitats.

Rather than enhancing the spread and dispersal of invasive species, the proposed restoration work is likely to decrease the extent to which that occurs.

Division of Aquatic Resources- December 2, 2005

Alien species introductions and dispersals are a major concern for the DLNR-Division of Aquatic Resources. The current population of organisms in the lagoon includes seventeen acknowledged alien aquatic organisms, five of which are of particular concern. Two of these are marine algae that have been the target of collaborative eradication programs between the state and its partners. Preventing the introduction of alien aquatic organisms is critical, but just as important is preventing and/or minimizing their dispersal. Even though the ocean is big and is already likely to be home to many alien aquatic organisms, this is not something to take lightly. We find ourselves faced with difficult issues because of the very perception that the ocean's vastness will act as a shield and provide protection. Unfortunately, we are finding out more and more often that this is not the case.

Hilton Hawaiian Village, as the applicant/tenant of the property, must assume responsibility for assuring that the proposed improvements will not result in new or additional problems. DAR is strongly recommending that the applicant develop an alien aquatic organism management plan. The plan will act as a tool to provide direction and appropriate action for addressing various alien aquatic organism problems. The plan should include best management measures for preventing and/or minimizing dispersal, eradication and proper disposal of alien aquatic organisms found in the lagoon. Elements to consider include: a monitoring protocol, record keeping, action to take upon detection, eradication, disposal and a notification network to alert the appropriate agencies.

Applicant's Response

We share the Division of Aquatic Resources belief in the importance of limiting the introduction and spread of alien species. The proposed plan for restoring the lagoon would eliminate virtually all of the alien species that are currently present in the lagoon. It calls for the existing ocean intake pipes to be permanently sealed. This will eliminate the main pathway through which alien species have historically entered the lagoon. The saline well water that will replace the ocean water does not contain alien species and therefore will eliminate a source of potential introductions of alien species. It will be a significant improvement over the current situation.

We have begun preparation of a draft alien aquatic organism management plan for the lagoon and expect to be able to submit that to your Division for review. The plan will include the BMPs to prevent or minimize dispersal, eradication and proper disposal of alien aquatic organisms found in the lagoon. It will address a monitoring protocol, record keeping and the actions that the applicant will take if necessary to limit the spread of invasive organisms or to eradicate them. It will also stipulate notification procedures that will be followed if such a discovery is made.

As described in the EA, the monitoring plan will include a daily visual inspection of the lagoon shoreline to look for signs of unusual biologic activity or foreign material. In addition, a qualified biologist will conduct periodic swim-through surveys of the lagoon aimed at characterizing the biota that are present and identifying any trends that may be evident in the population structure of the biota. Upon completion of construction, this will be done to establish a baseline against which future conditions can be judged. Subsequent surveys will be done on at least an annual basis and more frequently if conditions warrant.

Division of Conservation and Resource Enforcement (DOCARE)

No Comments

Division of Boating and Ocean Recreation

Upon completion, conceptual plans with sufficient details should be submitted to DLNR. These plans should clearly identify the jurisdictional boundaries. No discharge shall be allowed into the Ala Wai harbor during construction of the lagoon improvements. Discharge can be restored after completion of the lagoon improvements and after testing is done to assure that water quality measurements meet acceptable levels.

The existing discharge pipe into the middle basin of the Ala Wai Harbor should be cleaned and inspected for damage by the contractor and any damage should be repaired. Elevation of new discharge pipe into Ala Wai Inner basin should be at or below Mean Lower Low Water. Subsidence from long term pumping of saline wells should be addressed.

All easement, Right-of Entry and other legal documents must be fully executed prior to the commencement of any construction activity within the Ala Wai Harbor or state property. Fugitive dust and noise levels should be minimized and comply with Department of Health rules and regulations.

Construction activities within the Harbor should allow access and continuous service to parking, berths and other harbor facilities at all times. If access or service needs to be temporarily restricted, the Contractor shall take action to provide adequate notice and implement necessary mitigative measures (alternative access routes, signage, fencing, etc.). Proposed modifications to parking stall count, use, and/or configuration within the Ala Wai harbor property should be coordinated with DOBAR. A construction schedule identifying the dates and duration of work within the Ala Wai Harbor property should be furnished to DOBOR.

Impacts to aquatic resources and habitat as a result of construction activities or discharge should be coordinated and addressed among appropriate agencies.

Applicant's Response

The applicant shall submit final plans upon completion. Improvements have been discussed with DOBOR and the applicant will continue to work with DOBAR regarding proposed modifications for parking, use and/or configuration within the Ala Wai Harbor property. It is understood that no discharge shall be allowed into the Ala Wai harbor during construction of the lagoon improvements. Compliance with DOH permit conditions shall be met prior to resuming discharge into the harbor to insure water quality standards. Plans call for inspection, cleaning and if necessary repairs to the discharge pipe into the middle basin of the Ala Wai Harbor.

Prior to the commencement of any construction, all easements, right-of-entry and other legal documents shall be fully executed regarding activity within the Harbor and other State property. The proposed construction activities shall allow access and continuous service to parking, berths and other facilities at all times. If access or service needs to be temporarily restricted, adequate notice and implementation of alternative access routes and signage and other mitigative measures shall be executed.

An anticipated construction schedule has been provided to DOBOR and shall be update with any changes. Coordination with DAR and other applicable agencies shall take place for provisions designed to protect aquatic resources and habitat from adverse construction activity impacts.

Engineering

We confirm that the project site, according to the Flood Insurance Rate map (FIRM), is located in flood Zones A, AE and AO. Please note that the project must comply with the rules and regulations of the National Flood Insurance Program (NFIP) presented in Title 44 of the Code of Federal Regulations, whenever development within a Special Flood Hazard Area is undertaken. Be advised that 44CFR indicates the minimum standards set forth by the NFIP. The community's local flood ordinance may prove to be more restrictive and thus take precedence over the minimum NFIP standards.

Applicant's Response

Our assessments of flood zone designations are consistent with your determination. The project's design takes into consideration all applicable NFIP standards and local ordinances. Consistency with flood hazard regulations has been addressed in the EA.

Forestry & Wildlife (DOCARE)

No Comments

Oahu District Land Office (ODLO)

No Comments

Office of Conservation and Coastal Lands

The proposed work is an important improvement to the lagoon and recreational access to the shoreline area.

1. There are concerns regarding the proposed “buried rubble mound structure” seaward of the lagoon. We recommend increasing dune height through dune restoration or creation as an alternative to construction of a buried seawall. We understand that this is historically an engineered coastline and will require continued maintenance. An alternative to a natural dune would be a hard structure that is continually covered in sand as part of the Operation and Maintenance plan.
2. The Department requests removal of the existing intake pipes once the current circulation system is shut down. The Department would be satisfied with removal of all exposed intake pipe and capping the end of the shortened pipe. We request that continued monitoring for any future exposed pipe removal be included in the Operation and Maintenance plan.
3. The Department recommends renourishment of the makai-Ewa portion of the shoreline fronting the public parking lot inside the existing jetty. This area currently has minimal sand coverage and is a cobble and hard sand water entry. Since the nature of this project is restoring the lagoon and nearby environment for improved access and recreation, we believe renourishment of the connected beaches should be an essential step within the scope of the project.

We recommend that this project incorporate the dune restoration and beach renourishment suggested above to facilitate the preservation and maintenance of the current beach environment. Contact the OCCL to obtain the requirements for Small Scale Beach Nourishment (SSBN).

Applicant's response

The proposed design for the shoreline berm is the hard structure suggested as an alternative. It consists of large (2,700 pound) armor stone located a minimum of 40' inland of the certified shoreline that will be continually buried under a sand cover. It is far inland from the active beach zone and does not constitute a buried seawall. HHC accepts that maintenance will be required to keep the sand cover in place, particularly on areas where the buried structure is closest to the surface, and agrees to assume responsibility for that maintenance. The following will be added to the operations and maintenance activities:

Regular inspection of the sand cover over the buried shoreline berm to ensure that a minimum of 0.5' of sand cover remains in place on the top of the berm and 1.0' of sand cover remains on the sloping sides of the berm.

Should the cover fall below these minimums, HHC will push sand from adjacent areas back atop the berm.

Regarding the existing intake pipes, HHC's proposal is to remove the exposed end of the pipe and fill the remainder with concrete once the current circulation system is shut down. Regarding continued monitoring and corrective action for any pipe that is left in place; we have added the following in the Operation and Maintenance plan:

HHC will monitor any pipe that is left in place in the ocean to insure that it does not become exposed in the future. Should the monitoring indicate wave action is eroding the sand cover, HHC will initiate corrective action.

Regarding the renourishment of the makai-Ewa portion of the shoreline fronting the public parking lot inside the existing jetty, while we agree the addition of sand to this portion of the shoreline would improve the recreational value of the area, such improvements are outside the limits of the proposed project. This would require analyses and permits that would add uncertainty and demand additional time. Consequently, HHC requests that it not be required to make ocean shoreline restoration part of its proposed lagoon restoration. HHC would be pleased to work with OCCL regarding any type of restoration effort as long as all analyses and required permits are dealt with separately so that they do not delay the lagoon restoration project.

UNIVERSITY OF HAWAII

Environmental Center

Water Quality

Salt-water wells can produce water containing toxic hydrogen sulfide as a result of anoxic conditions. Was hydrogen sulfide encountered in the test well?

The well water being used to flush the lagoon will be high in dissolved inorganic nutrients and low in dissolved oxygen. It is assumed that the high flushing rate would remove the phytoplankton faster than they could grow. However, some algae have a doubling rate of only a few hours. Even if flushing rates successfully keep the phytoplankton under control, benthic algal mats may still be an issue. Shallow water, high sunlight penetration and high nutrient concentrations will promote growth of algal mats that may cover the sandy bottom. These mats tend to break away and float to the surface during times of peak photosynthesis and may detract the aesthetic appeal of the lagoon. Will there be sufficient herbivorous fish in the lagoon to control the algae?

Organic detritus may build up in the lagoon as a result of biological reduction. Most may be consumed by herbivores or will be fine enough to remain suspended and flush out with the outflow. Otherwise, some form of regular suction maintenance may be needed to avoid another buildup of anoxic mud.

The heart of the proposal is the pump-reliant well system. General procedures of pump operation and maintenance are listed in the EA but there is no explanation regarding the effect of environmental forces on the pump system and the impacts of pump replacement when it is needed.

Cassiopea (Jellyfish)

The *Cassiopea spp* that occur in the lagoon do not depend on ocean input and will persist in a closed lagoon. Care must be taken to remove all of the life stages from the lagoon and an ongoing program of surveillance and removal should be undertaken to completely eliminate or control this organism. This removal plan is key to the usefulness of the lagoon for recreation purposes yet the details of the removal plan are not discussed.

Geotextile Covering

The composition and stability of the geotextile fabric is not made clear in the EA. There are concerns regarding effects on the fabric of overtopping into the lagoon of storm or tsunami waves. In the event the material is damaged, how will it be repaired, and what will be the impacts on the environment if such damage occurs?

Sediments and Debris

It is proposed to use a geotextile fabric to contain the anaerobic sediment presently at the bottom of the lagoon. There are concerns over what will constitute future bottom lagoon sediments once both recreational use and addition of water low in dissolved oxygen ensues. Specifically, will another anaerobic community evolve, and if so, what remedial action will be taken? How will the current bottom sediment be managed once the geotextile fabric is in place?

Beach Stability

The proposed beach stabilization may affect sand deposition and erosion patterns at adjacent sites down beach from the stabilization structure. The proposed construction activities and the structure itself may jeopardize the beach stabilization on the adjacent beach. Please discuss the potential effects on adjacent beach sites along Waikiki.

Applicant's Response

Hydrogen sulfide was not encountered in the test borehole or any of the seven production wells that have been completed.

Phytoplankton growth is not expected to be a problem. The average residence time in the lagoon is 4.4 hours and the lagoon water circulation system minimizes the possibility of areas having turnover rates significantly below the average. If small areas were to have turnover rates half the average of the entire lagoon, the exchange of water would still be so rapid that even fast-growing algae would not have an opportunity to bloom. Because

all of the source water for the lagoon will be from saline wells and not the ocean, there will be minimal “seeding” of the lagoon with living phytoplankton.

HHC is committed to an active maintenance program in the lagoon. This work would include daily inspections to look for unusual biologic activity, weekly (or more frequent) cleaning of the exposed portion of the beach sand and agitation of the lagoon bottom sand using a mechanical device. These measures will be designed to eliminate the development of algal mats. No decision has been made with respect to stocking the lagoon with herbivorous fish.

The new water circulation system will turn over the water in the lagoon more than five times as fast as present. The proposed decrease in the volume of water in the lagoon will in itself decrease algal in combination with mechanical disturbance of the bottom will prevent a substantial buildup of organic detritus in the lagoon.

The pump system is designed to work in the high-salt environment characteristic of the lagoon shoreline. The pumps and other equipment within the pump house are flood-proofed and the control equipment is placed well above the regulatory flood level. The multiple-pump system is designed so that it will continue to circulate water through the lagoon at a reduced rate when pumps are taken out of service for regular maintenance or repair.

Regarding *Cassiopea* spp, this stinging jellyfish is an undesirable inhabitant of the existing lagoon. Although the exact construction methodology has not yet been determined, it is believed that prior to the start of construction the water level in the lagoon will be lowered by continuing operation of the existing discharge pumps after placing a temporary seal in the intake pipes. This will allow the contractor to physically remove macrofauna, including adult *Cassiopea* from the exposed bottom. During the time the water level is lowered and the extent of the lagoon is reduced, nets may be used to capture fish and remove them from the lagoon. Many of the adult *Cassiopea* may be caught in the process, but the capture rate will be less than 100% and some may remain in the lagoon.

Restoration of the lagoon will involve installation of a geotextile fabric over the existing lagoon sediments and placement of a minimum of 2' of sand (and in almost all cases much more than that) over the fabric. This will bury everything that has been left on the bottom. It is unlikely that many of the *Cassiopea* will survive this treatment. The regular maintenance of the lagoon that is planned is expected to make the future lagoon bottom a far different and less inviting place for the species to grow than is the low-energy/never-disturbed environment of the existing lagoon.

Specifications for the geotextile liner have been made in HHC's Request for Proposals for the lagoon restoration. The proposed design calls for the geotextile fabric to be secured around the perimeter. Conceptual designs for anchoring are presented. The buried stone reinforcement that is planned under the existing beach berm on the seaward side of the lagoon would prevent the berm from washing away, and any water that comes

over its top would have a relatively low velocity and limited erosive force as it flow down the inland side of the beach berm. Because of the substantial amount of sand fill that is being placed in this area, there is little chance that the water would reach the geotextile fabric anchor. Therefore, the geotextile fabric is very unlikely to fail and release the sediment that is buried beneath it.

Regarding dissolved oxygen, while the groundwater source produces water that is initially low in dissolved oxygen, the proposed design of the circulation system includes substantial aeration of source water as it is cascaded into the lagoon. It is expected to be at or near saturation. The aeration together with the management measures noted previously will prevent the development of another anaerobic community in the lagoon. No management of the entrapped bottom sediment is needed or planned.

All of the work that is planned for the proposed project is inland of the 40-foot shoreline setback. The proposed design that uses rocks placed below the existing grade of the berm maintains the existing shape of the shoreline berm and is outside the area that is affected by normal shoreline processes. Consequently, it does not have the potential to affect adjacent beach sites.

CITY AND COUNTY OF HONOLULU

DEPARTMENT OF PLANNING AND PERMITTING

The restoration of the lagoon is being undertaken in response to a condition of an earlier Special Management Area Permit (SMP) for the construction of a high rise tower and other improvements that required that the HHV, within 2 years, submit a detailed plan and timetable for the restoration of the lagoon and implement that plan within 3 years, or, if that is found to be infeasible, submit a detailed plan and timetable for filling the lagoon and widening the beach. Although the restoration of the lagoon was identified as a priority in the former SMP, the details of the means and technology to be used were not addressed, and the restoration will require a major SMP. Other county approvals may be required once special boundary or flood hazards are examined.

The permit requirements associated with the development of the Waikikian Tower should be clarified as noted above. The EA should also clarify that filling the lagoon and widening the beach was a possible alternative that would satisfy the 2002 SMP.

The proposed buried protective berm will be located just beyond the 40-foot shoreline setback. The easternmost 400 feet of the proposed Waikiki Promenade extension would be situated atop the beach berm separating the lagoon basin from Kahanamoku Beach. Should the location of the berm or promenade be within the shoreline setback, a variance will be required.

More information regarding the size, height, and type of the pump house structure should be provided. The relationship to the special district and flood hazard districts should also be clarified.

A larger plan that shows the lagoon in relation to the HHV and abutting areas should be included, such as the parking lot, roadway, crosswalks, Lagoon Tower pool areas, Great Lawn and Rainbow Tower.

Along the southern end of the promenade, coconut palm plantings should occur on the lagoon side of the promenade to create a more interesting walking experience. Additional palm plantings should also be considered between the Rainbow Tower and the State parking lot to provide some relief from the stark contrast between the grassy lawn areas, promenade, and sandy beach.

Clarify in the document that the existing concrete pool deck at the Lagoon Tower will be removed to allow a continuous access around the lagoon.

Special district precinct boundaries as well as the flood hazard district boundaries should be illustrated on a map with the proposed improvements. The project description should clarify how much of the existing landscape, such as coconut palms, will be removed and/or retained.

Applicant's Response

It's noted that the project will reflect the requirement for a Major Special Management Area permit. Plans for the pump house have been modified so that they are consistent with the applicable flood regulations. Plans for the pump house have been modified so that they are consistent with the applicable flood regulations. Tree relocation is consistent with the Planned Development-Resort project approval (PDR). There are at least ten more trees than required.

Regarding the clarification that filling the lagoon and widening the beach was a possible alternative that would satisfy the 2002 SMP, we have included text in the FEA regarding the alternative of filling the lagoon should HHC be unable to obtain approvals that are required. Once HHC notifies the State that it cannot obtain the permits needed to restore the lagoon to the condition mandated by the PDR, the State must fill in the lagoon to make a flat land area, provide an easement in favor of HHC and create a "no buildings" zone.

In the FEA, it shall be stated that should the rock reinforcement be placed within 40 feet of the shoreline, a Shoreline Setback Variance would be required or the improvements may be shifted inland to remain outside the setback area. In addition, the FEA will include an elevation drawing that depicts the enlarged pump house that will be flood proof. We believe that the pump house is in accord with applicable flood regulations.

A landscape plan and the requested details of the project have been included with the FEA. We understand that the Department of Planning and Permitting will make a formal decision on the landscaping plan as part of its PDR and Special District review of the

project when HHC formally submits its plans. In addition, clarification regarding that a public walkway extends entirely around the lagoon has also been included with the FEA.

Regarding Special District precinct boundaries as well as the flood hazard district boundaries have also been included with the FEA. All of the lagoon and the beach area is in the Public Precinct. Areas inland are in the Resort Mixed Use precinct. The FEA contains flood hazard district boundaries, zoning and Special District boundaries.

WAIKIKI NEIGHBORHOOD BOARD

The project was presented to the Waikiki Neighborhood Board on March 8, 2005. The presentation provided an extensive overview of the project to improve and restore the Lagoon for use by residents and visitors after it is completed.

ANALYSIS

After reviewing the application, the Department has found that:

1. The proposed use is an identified land use in the General subzone of the Conservation District, pursuant to §13-5-22, Hawaii Administrative Rules (HAR), P-6, PUBLIC PURPOSE, D-2, "...Land uses which are undertaken by non-governmental entities which benefit the public and are consistent with the purpose of the conservation district." Please be advised, however, that this finding does not constitute approval of the proposal;
2. Pursuant to §13-5-40 (4), HAR, a Public Hearing will be required;
3. In conformance with Chapter 343, Hawaii Revised Statutes (HRS), as amended, and Chapter 11-200, HAR, a Finding Of No Significant Impact to the environment (FONSI) was published in the December 23, 2005 edition of OEQC's Environmental Notice.

Conservation District Criteria

The following discussion evaluates the merits of the proposed land use by applying the criteria established in Section 13-5-30, HAR.

1. *The proposed land use is consistent with the purpose of the Conservation District.*

The objective of the Conservation District is to conserve, protect and preserve the important natural resources of the State through appropriate management and use to promote their long-term sustainability and the public health, safety, and welfare.

The project is considered an identified land use in the subject area of the Conservation District; as such, it is subject to the regulatory process established in Chapter 183C, HRS and detailed further in Chapter 13-5, HAR. This process provides for the application of appropriate management tools to protect the relevant resources, including objective analysis and thoughtful decision-making by the Department and Board of Land and Natural Resources.

The lagoon restoration project will improve water quality within the lagoon, preserving it as an important shoreline resource. The improvements around the perimeter of the lagoon will increase its recreational value, make the area more attractive, substantially improve public access, and enhance public safety.

2. *The proposed land use is consistent with the objectives of the subzone of the land on which the use will occur.*

The objective of the General subzone is to designate open space where specific conservation uses may not be defined, but where urban use would be premature. The proposed project promotes open space and will provide scenic and recreational value for the General Public.

3. *The proposed land use complies with provisions and guidelines contained in Chapter 205A, HRS, entitled "Coastal Zone Management," where applicable.*

Resolution 06-106, granted Special Management area use Permit for the restoration of the Duke Kahanamoku Lagoon and landside improvements was adopted by the Council of the City and County of Honolulu April 12, 2006. In addition, Staff believes the proposed land use complies with provisions and guidelines contained in Chapter 205A, HRS.

4. *The proposed land use will not cause substantial adverse impacts to existing natural resources within the surrounding area, community, or region.*

Staff believes the proposed land use will not cause substantial adverse impacts to existing natural resources within the surrounding area, community or region. The proposed land use does not change but shall improve the water quality of the lagoon environment and enhance the existing use of the area. Staff notes that the armored stone berm shall be below grade and completely buried and is not expected to interact with or impact littoral processes.

5. *The proposed land use, including buildings, structures and facilities, shall be compatible with the locality and surrounding area, appropriate to the physical conditions and capabilities of the specific parcel or parcels.*

The proposed project consists of re-shaping the lagoon and significantly upgrades the manmade water circulation system. The walkways and landscaping are

designed to blend into and enhance the existing beach setting. The improvements will increase the suitability of the lagoon for its existing public recreational uses.

6. *The existing physical and environmental aspect of the land, such as natural beauty and open space characteristics, will be preserved or improved upon, which ever is applicable.*

The proposal preserves and improves upon the open space environment in and around the lagoon by significantly improving water quality and widening the beach for the General Public.

7. *Subdivision of the land will not be utilized to increase the intensity of land uses in the Conservation District.*

No subdivision of land is proposed for this project.

8. *The proposed land use will not be materially detrimental to the public health, safety and welfare.*

The proposed work in and around the lagoon is intended to improve public safety by enhancing water quality, removing stinging jellyfish from the lagoon, and enhancing the lighting and walkways in the area. Implementation of the plan will improve public welfare by enhancing the quality of the shoreline environment and the recreational resources that it provides.

DISCUSSION

The restoration of the Duke Kahanamoku Lagoon is a required condition of an earlier Special Management Area Permit (SMP) for the development of the Waikikian high rise tower and other improvements that required the HHV, within 2 years, to submit a detailed plan and timetable for the restoration of the lagoon and implement that plan within 3 years, or, if that is found to be infeasible, submit a detailed plan and timetable for filling the lagoon and widening the beach.

The following are some of the major concerns of the project:

Alien Aquatic Organism Management Plan

The Division of Aquatic Resources (DAR) has strongly recommended that the applicant develop an alien aquatic organism management plan. The plan will act as a tool to provide direction and appropriate action for addressing various alien aquatic organism problems. The plan should include best management measures for preventing and/or minimizing dispersal, eradication and proper disposal of alien aquatic organisms found in the lagoon. Elements to consider include: a monitoring protocol, record keeping, action to take upon detection, eradication, disposal and a notification network to alert the appropriate agencies.

The applicant has responded to DAR's concerns and shall submit a management plan to include the BMPs to prevent or minimize dispersal, eradication and proper disposal of alien aquatic organisms found in the lagoon. It will address a monitoring protocol, record keeping and the actions that the applicant will take if necessary to limit the spread of invasive organisms or to eradicate them. It will also stipulate notification procedures that will be followed if such a discovery is made.

The monitoring plan will include a daily visual inspection of the lagoon shoreline to look for signs of unusual biologic activity or foreign material, weekly (or more frequent) cleaning of the exposed portion of the beach sand and agitation of the lagoon bottom sand using a mechanical device. These measures will be designed to eliminate the development of algal mats.

In addition, a qualified biologist will conduct periodic swim-through surveys of the lagoon aimed at characterizing the biota that are present and identifying any trends that may be evident in the population structure of the biota. Upon completion of construction, this will be done to establish a baseline against which future conditions can be judged. Subsequent surveys will be done on at least an annual basis and more frequently if conditions warrant.

The proposed plan for restoring the lagoon would eliminate virtually all of the alien species that are currently present in the lagoon. It calls for the existing ocean intake pipes to be permanently sealed. This will eliminate the main pathway through which alien species have historically entered the lagoon. The saline well water that will replace the ocean water does not contain alien species and therefore will eliminate a source of potential introductions of alien species. It will be a significant improvement over the current situation.

Water Quality

Several aspects of the proposed action are expected to have long-term effects on water quality. This would include increasing the volume of water flowing through the lagoon, reducing the volume of water in the lagoon, substituting saline groundwater for the existing ocean water source, and changing the bottom of the lagoon from silt to sand.

The new water circulation system will turn over the water in the lagoon more than five times faster than present. The proposed decrease in the volume of water in the lagoon will in itself decrease algal in combination with mechanical disturbance of the bottom will prevent a substantial buildup of organic detritus in the lagoon.

The supply of water from the wells, together with the short residence time within the lagoon will lead to much lower bacterial levels in the lagoon than are currently present. In addition, the applicant is working with the Department of Health to insure water quality.

Geotextile Fabric/Buried Stone Reinforcement

Restoration of the lagoon will involve installation of a geotextile fabric over the existing lagoon sediments and placement of a minimum of 2' of sand (and in almost all cases much more than that) over the fabric. This will bury everything that has been left on the bottom. It is unlikely that many of the *Cassiopea* will survive this treatment. The regular maintenance of the lagoon that is planned is expected to make the future lagoon bottom a far different and less inviting place for the species to grow than the low-energy/never-disturbed environment of the existing lagoon.

The buried stone reinforcement that is planned under the existing beach berm on the seaward side of the lagoon would prevent the berm from washing away, and any water that comes over its top would have a relatively low velocity and limited erosive force as it flow down the inland side of the beach berm. Because of the substantial amount of sand fill that is being placed in this area, there is little chance that the water would reach the geotextile fabric anchor. According to the applicant, the geotextile fabric is very unlikely to fail and release the sediment that is buried beneath it.

All of the work that is planned for the proposed project is inland of the 40-foot shoreline setback. The proposed design that uses rocks placed below the existing grade of the berm maintains the existing shape of the shoreline berm and is outside the area that is affected by normal shoreline processes. Consequently, it does not have the potential to affect adjacent beach sites and is not expected to interact with or impact littoral processes.

There will be regular inspections of the sand cover over the buried shoreline berm to ensure that a minimum of 0.5' of sand cover remains in place on the top of the berm and 1.0' of sand cover remains on the sloping sides of the berm. Should the cover fall below these minimums, HHC will push sand from adjacent areas back atop the berm.

Although the OCCL would like the makai-Ewa portion of the shoreline to be renourished to improve the recreational value of the area, such improvements are outside of the limits of the proposed project area and would require analyses and permits that would add uncertainty and demand additional time.

Whether the lagoon gets restored or filled in, the General Public will benefit from either action. Either water quality is improved to provide a safe and sanitary body of water or the State fills in the area and creates a larger beach area. Both actions may improve the existing recreational uses of the area. Staff notes, the need to take action to restore the lagoon has been recognized for a number of years, proposals from dredging to remove the accumulated silt to creating a swim-through attraction have been put forward since the 1980's. Approvals were obtained however proposals did not move forward.

The proposed work within the Conservation District will improve water quality and preserve the lagoon as an important shoreline resource. This, together with the planned landscaping and walkway improvements around the perimeter of the lagoon will increase

its recreational value making the area more attractive and substantially improve public access and safety.

RECOMMENDATION:

Based on the preceding analysis, Staff recommends that the Board of Land and Natural Resources APPROVE this application for the Duke Kahanamoku Lagoon Restoration Project located at Kalia, Waikiki, island of Oahu, portion of TMK: (1) 2-3-037:021 subject to the following conditions:

1. The applicant shall comply with all applicable statutes, ordinances, rules, regulations, and conditions of the Federal, State, and County governments, and applicable parts of the Hawaii Administrative Rules, Chapter 13-5;
2. The applicant shall comply with all applicable Department off Health Administrative Rules;
3. The applicant, its successors and assigns, shall indemnify and hold the State of Hawaii harmless from and against any loss, liability, claim or demand for property damage, personal injury or death arising out of any act or omission of the applicant, its successors, assigns, officers, employees, contractors and agents under this permit or relating to or connected with the granting of this permit;
4. The applicant and their contractors shall coordinate construction activities with the Division of Boating and Recreation to minimize disruption of public use and shall not preclude vehicular or pedestrian access to the Harbor facilities and shoreline areas;
5. The applicant shall obtain the appropriate authorization from the Land Division, Department off land and Natural Resources, for the use of State Lands;
6. All conditions imposed under all required permits for this project shall be observed by the applicants;
7. Before proceeding with any work authorized by the Board, the applicant shall submit four (4) copies of the construction and grading plans and specifications to the Chairperson or his authorized representative for approval for consistency with the conditions of the permit and the declarations set forth in the permit application. Three (3) of the copies will be returned to the applicant. Plan approval by the Chairperson does not constitute approval required from other agencies;
8. Any work done or construction to be done on the land shall be initiated within one year of the approval of such use, in accordance with construction plans that have been signed by the Chairperson, and, unless otherwise authorized, shall be completed within three (3) years of the approval. The applicant shall notify the

- Department in writing when construction activity is initiated and when it is completed;
9. All representations relative to mitigation set forth in the accepted environmental assessment or impact statement for the proposed use are incorporated as conditions of the permit;
 10. The applicant understands and agrees that this permit does not convey any vested rights or exclusive privilege;
 11. In issuing this permit, the Department and Board have relied on the information and data that the applicant has provided in connection with this permit application. If, subsequent to the issuance of this permit, such information and data prove to be false, incomplete or inaccurate, this permit may be modified, suspended or revoked, in whole or in part, and/or the Department may, in addition, institute appropriate legal proceedings;
 12. Where any interference, nuisance, or harm may be caused, or hazard established by the use, the applicant shall be required to take the measures to minimize or eliminate the interference, nuisance, harm, or hazard;
 13. The applicant shall submit an Alien Aquatic Management Plan and obtain the Division of Aquatic Resources approval of the plan within 180 days of this permit approval;
 14. Should historic remains such as artifacts, burials or concentration of charcoal be encountered during construction activities, work shall cease immediately in the vicinity of the find, and the find shall be protected from further damage. The contractor shall immediately contact HPD (692-8015), which will assess the significance of the find and recommend an appropriate mitigation measure, if necessary;
 15. The applicant shall plan to minimize the amount of dust generating materials and activities. Material transfer points and on-site vehicular traffic routes shall be centralized. Dusty equipment shall be located in areas of least impact. Dust control measures shall be provided during weekends, after hours and prior to daily start-up of project activities. Dust from debris being hauled away from the project site shall be controlled;
 16. Where any polluted run-off, interference, nuisance, or harm may be caused, or hazard established by the use, the applicant shall be required to take measures to minimize or eliminate the polluted run-off, interference, nuisance, harm, or hazard;

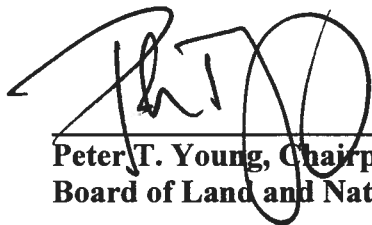
17. During construction, appropriate mitigation measures shall be implemented to minimize impacts to the marine environment, off-site roadways, utilities, and public facilities;
18. The applicant shall conduct at a minimum weekly inspections of the sand cover over the buried armored berm to ensure that a minimum of 0.5' of sand cover remains in place on the top of the berm and a minimum of 1.0' of sand remains in place on the sloping sides of the berm;
19. The applicant shall monitor pipes left in place in the ocean and shall take corrective action should any pipes become exposed;
20. The applicant shall conduct daily inspections of the lagoon, weekly or more frequent cleaning of the exposed portion of the beach sand and agitation of the lagoon bottom sand;
21. The applicant shall maintain a minimum of 2' of sand cover over the geotextile fabric within the lagoon;
22. During construction and completion of the proposed project, access and traditional and customary uses (surfing, canoeing, swimming) of the ocean and shoreline shall not be hampered, impeded, or limited;
23. The sand source for the project shall be approved by the Department of Land and Natural Resources;
24. Other terms and conditions as may be prescribed by the Chairperson; and
25. Failure to comply with any of these conditions shall render this Conservation District Use Permit null and void.

Respectfully submitted,



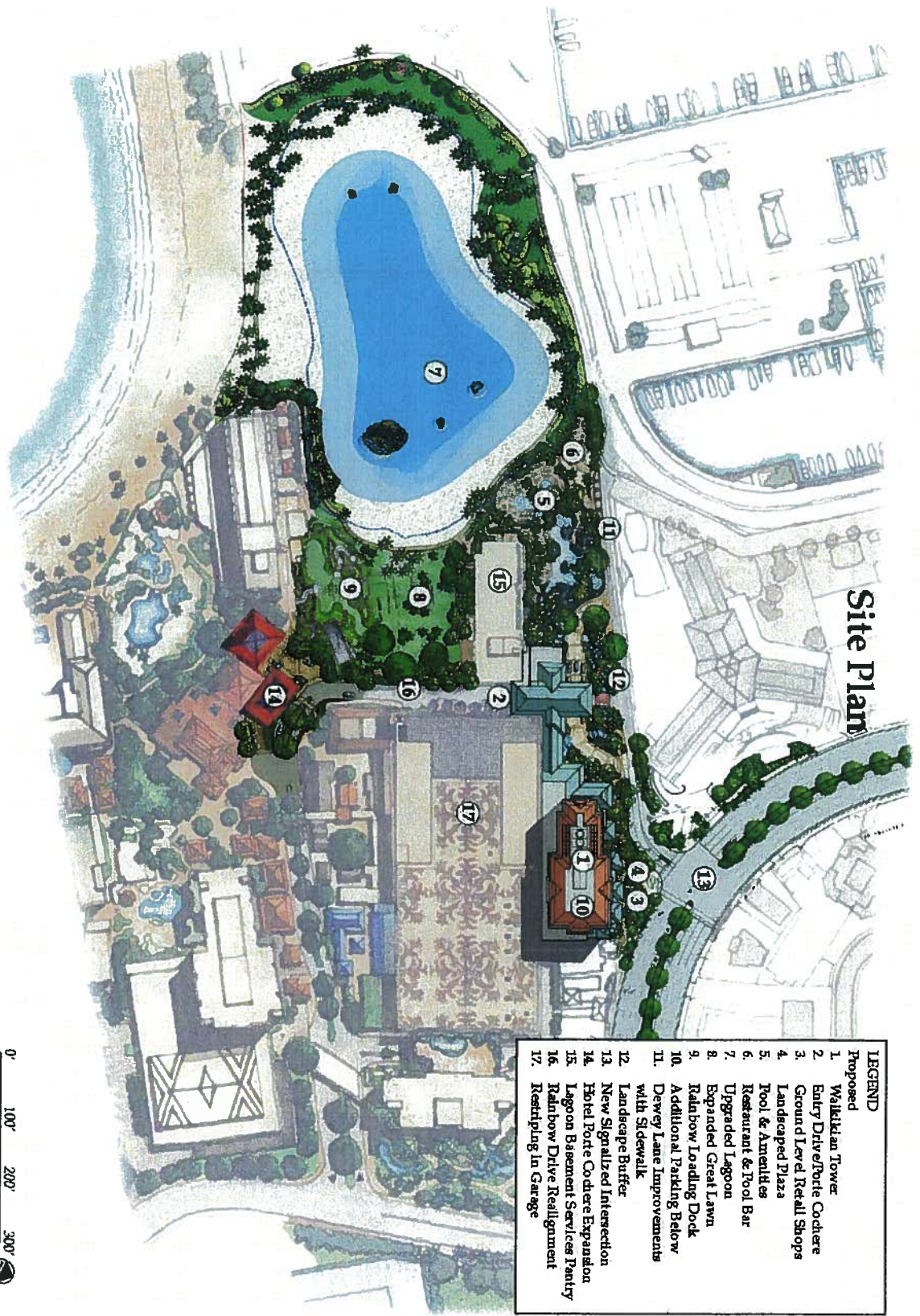
K. Tiger Mills, Staff Planner
Office of Conservation & Coastal Lands

Approved for submittal:



Peter T. Young, Chairperson
Board of Land and Natural Resources

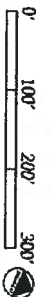
Site Plan



| LEGEND | |
|----------|---------------------------------------|
| Proposed | |
| 1 | Waikikian Tower |
| 2 | Entry Drive/Porte Cochere |
| 3 | Ground Level Retail Shops |
| 4 | Landscaped Plaza |
| 5 | Pool & Amenities |
| 6 | Restaurant & Tiki Bar |
| 7 | Upgraded Lagoon |
| 8 | Expanded Great Lawn |
| 9 | Rainbow Loading Dock |
| 10 | Additional Parking Below |
| 11 | Dewey Lane Improvements with Sidewalk |
| 12 | Landscaped Buffer |
| 13 | New Signalized Intersection |
| 14 | Hotel Porte Cochere Expansion |
| 15 | Lagoon Basement Services Plant |
| 16 | Rainbow Drive Realignment |
| 17 | Restripling in Garage |

Hilton  **Hawaiian Village**
Waikikian Development

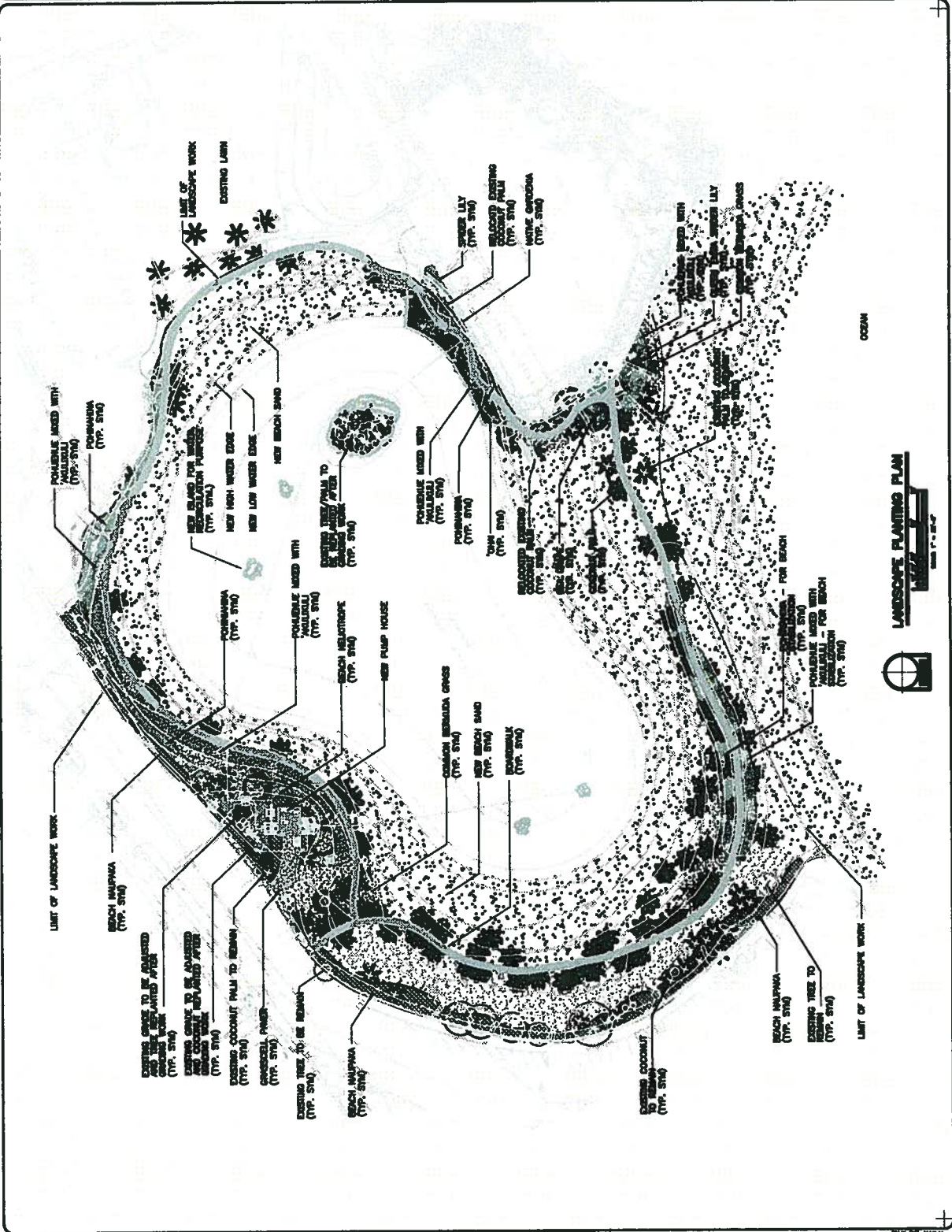
Exhibit "A"



GROUP 70
INTERNATIONAL
November 2005

EXHIBIT

| | | | | | | |
|---|---|---|--|--|---|--|
|  <p>Dell Collins Landscape Architects</p> |  <p>Hilton Hotels</p> |  <p>Hilton Hawaiian Village</p> |  <p>Lagoon Restoration</p> |  <p>Landscape Planning</p> | <p>Designed by: S. Drawn by: [Name] Project: [Name] Date: [Date] Scale: [Scale]</p> | <p>SHEET LP-1 OF [Number]</p> |
|---|---|---|--|--|---|--|



LANDSCAPE PLANTING PLAN
SCALE: 1" = 20'-0"



THINK PAPER

DEPARTMENT OF PLANNING AND PERMITTING
CITY AND COUNTY OF HONOLULU

650 SOUTH KING STREET • HONOLULU, HAWAII 96813
TELEPHONE: (808) 523-4414 • FAX: (808) 527-6743 • INTERNET: www.co.honolulu.hi.us

JEREMY HARRIS
MAYOR



ERIC G. CRISPIN, AIA
DIRECTOR

BARBARA KIM STANTON
DEPUTY DIRECTOR

October 8, 2004

2004/ELOG-1723 (eym)

Mr. Peter H. Schall
Senior Vice President & Managing Director
Hilton Hawaiian Village
Beach Resort & Spa
2005 Kalia Road
Honolulu, Hawaii 96815-1999

Dear Mr. Schall:

Plan for Fulfilling Conditions Relating to the Hawaiian
Village Lagoon
Hilton Hawaiian Village - Waikikian Project
Special Management Area Permit (SMA) No. 2002/SMA-19

This is to confirm the Hilton Hawaiian Village's fulfillment of the requirements of Condition C of Resolution 02-225, CD1, the Special Management Area Permit for the Waikikian Project. Condition C requires, in part:

"Within 2 years from the date of approval of this SMA permit, the Applicant shall submit a detailed plan and timetable for the restoration of the lagoon to a safe and sanitary body of water, and shall include a detailed maintenance plan, to ensure that the lagoon will remain in compliance with State water quality requirements."

Resolution 02-225, CD1 was adopted by the Honolulu City Council on August 7, 2002. The Department of Planning and Permitting (DPP) received review copies of the June 17, 2004 "Plan for Fulfilling Lagoon-Related Conditions" by Planning Solutions on July 27, 2004. The document describes the system proposed to be installed to upgrade the water quality of the lagoon, as well as the expected ongoing operation and maintenance program for the proposed system. A supplemental September 16, 2004 letter received on September 20, 2004 outlines an internal timeline for implementing the plan. As such, we confirm that Condition C of Resolution 02-225, CD1 has been fulfilled.

EXHIBIT 2

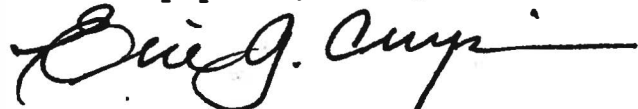
Mr. Peter H. Schall
Page 2
October 8, 2004

We are pleased to note that you have initiated consultation with the State Department of Land and Natural Resources (DLNR) prior to the submission of the lagoon improvement plan. In its September 21, 2004 letter, the Office of Conservation and Coastal Lands of the DLNR confirmed its intention to work directly with you to provide guidance and review on the project for purposes of processing the required Conservation District Use Application for the work.

We understand, through informal consultation with public agencies, that the project may be subject to other permit requirements, including additional DLNR permits administered by the Division of Aquatic Resources and Commission on Water Resource Management, as well as permits administered by the State Department of Health's Clean Water Branch and the Honolulu Engineer District of the Army Corps of Engineers. We encourage you to continue to work with these agencies to address relevant environmental issues and obtain all necessary permits to complete the upgrade of the lagoon in a timely manner.

We look forward to continuing to work with you on this important project. Should you have any questions, please feel free to contact me at 523-4432.

Sincerely yours,

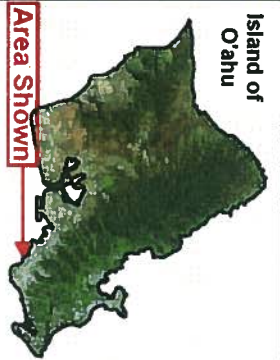
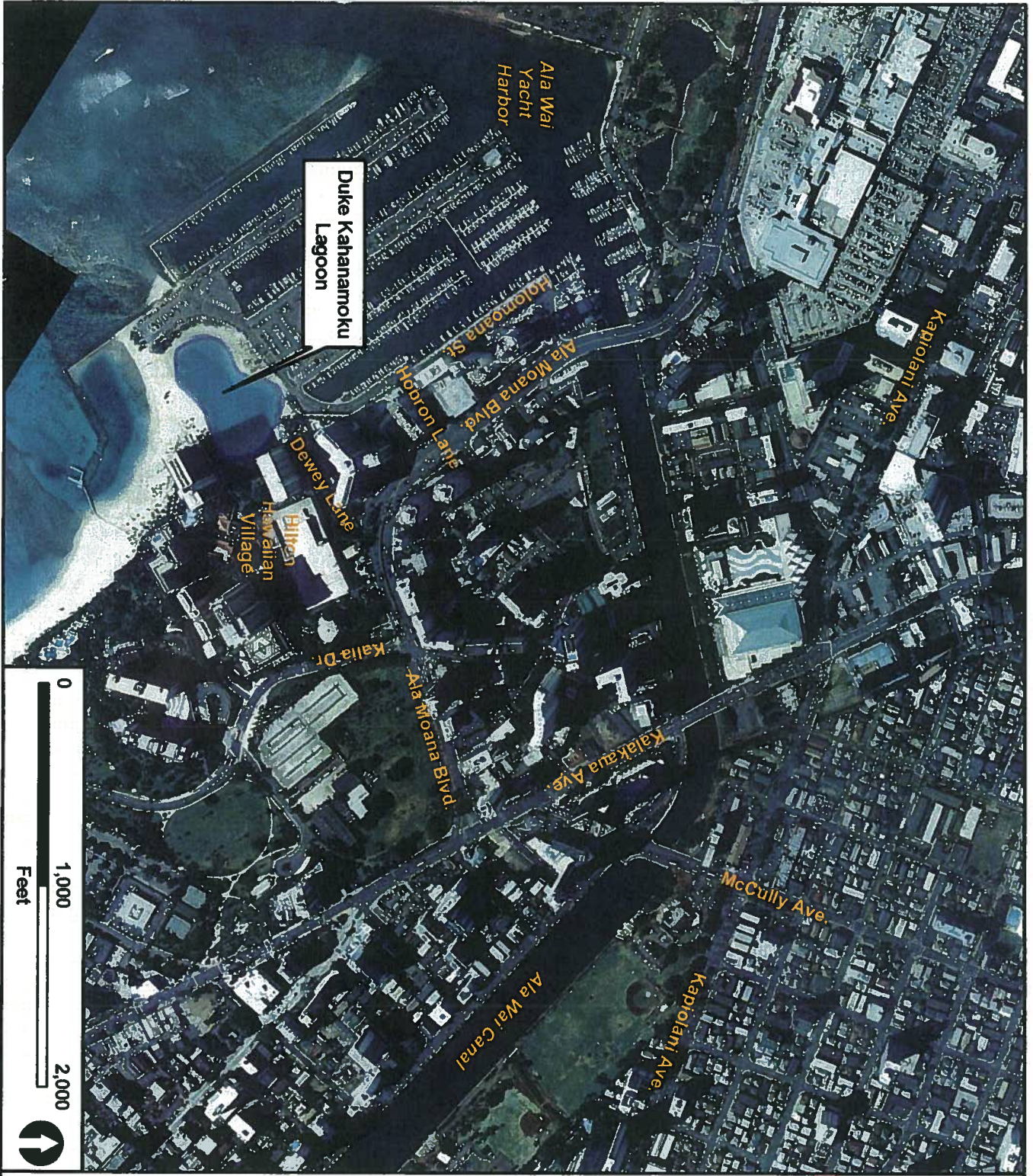


ERIC G. CRISPIN, AIA
Director of Planning
and Permitting

EGC:cs

cc: DLNR/Office of Conservation and Coastal Lands

G:\LandUse\MiscCorrespondence\Eileen\schall.doc



Island of O'ahu

Area Shown

Prepared For:

Hilton Hotels Corp.

Prepared By:



Sources:

City & County of Honolulu GIS
Hilton Hotels Corporation

Figure 1-1:

Location Map

Hilton Hawaiian
Village Lagoon Restoration

Figure 1-1 Location Map 2005-06-21.mxd

1.0 PURPOSE AND NEED

1.1 INTRODUCTION AND OVERVIEW

The Hilton Hotels Corporation (HHC) has obtained a Special Management Area Use Permit (SMP) and Planned Development-Resort (PD-R) approval for construction of the new Waikikian Tower and associated facilities and landscaping on its Hilton Hawaiian Village (HHV) property in Waikīkī. Among other things, the SMP (File No. 2002/SDD-33) requires HHC to attain and maintain the water quality of the adjacent Duke Kahanamoku (Hilton) Lagoon at acceptable levels as specified by the State Department of Health. The PD-R (City Council Resolution No. 02-226, CD 1, FD 1) establishes requirements for recreational and public facilities around the lagoon that HHC must fulfill during the redevelopment of the property.

This EA covers the lagoon-related activities that Hilton Hotels Corporation is proposing in order to fulfill the conditions of its SMP and PD-R approvals for the Waikikian Project. Specifically, HHC is proposing to improve water quality in the lagoon by increasing the water turnover rate, reducing its volume, switching its source from ocean water to saline groundwater, and rerouting stormwater runoff away from the lagoon. It has also developed plans for extending the Waikīkī Promenade around the lagoon, adding landscaping, and installing public amenities (e.g., drinking fountains, benches) in accordance with the PD-R design program requirements. These actions entail work within the Conservation District and therefore will require HHC to obtain a Conservation District Use Permit. In addition, the City and County Department of Planning and Permitting has determined that a major SMP will be required.

1.2 LOCATION AND EXISTING USE

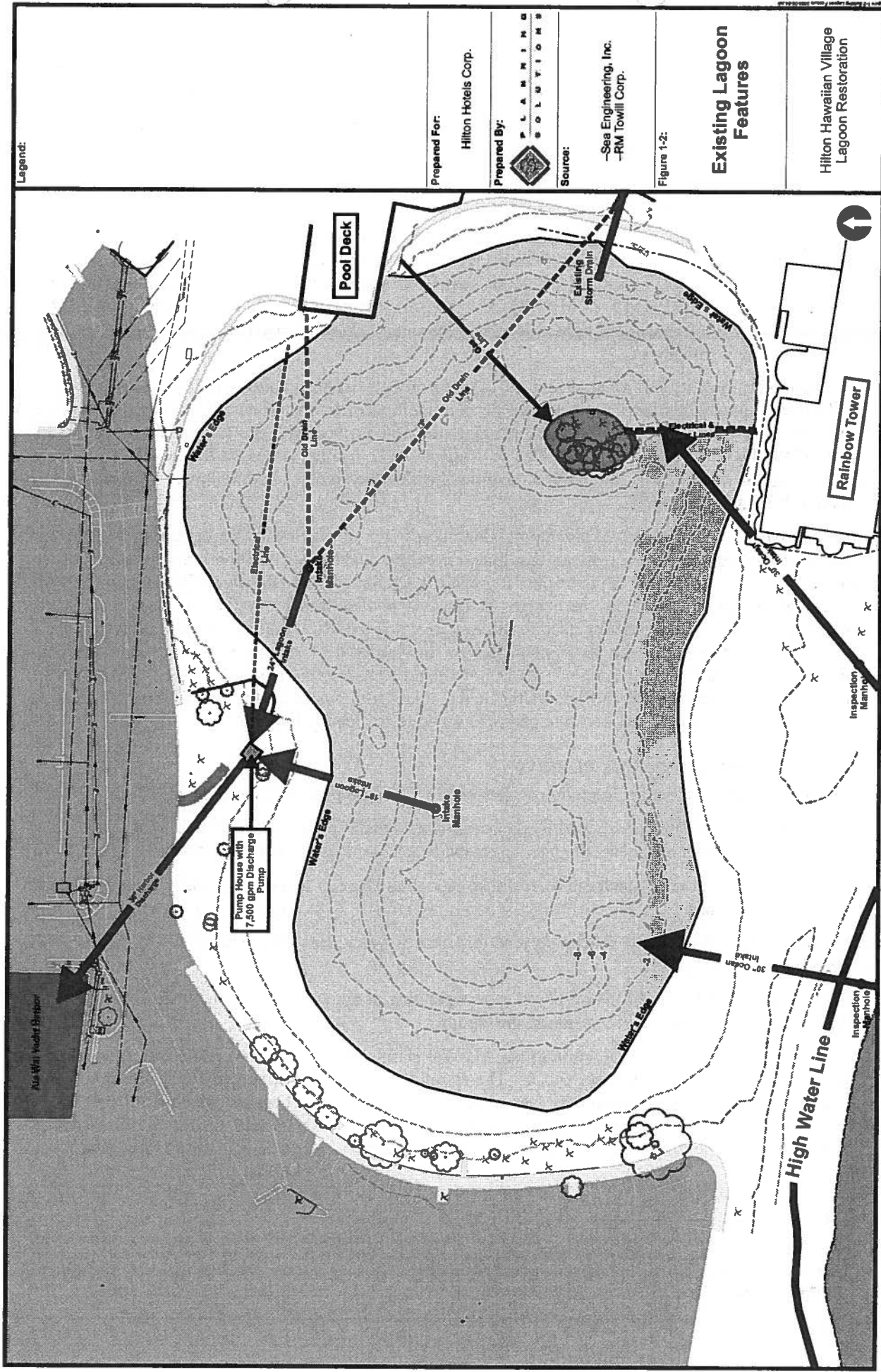
The HHV is located at the western end of Waikīkī Beach (see Figure 1.1), and the Duke Kahanamoku Lagoon is situated adjacent to the southwestern boundary of the resort property. The lagoon is bordered by public beach to the east and south, by Ala Wai Harbor to the west, and by the HHV property on the northeast. The Duke Kahanamoku Lagoon was created by a combination of excavation and fill along the shoreline in 1956 when the Hilton Hawaiian Village was originally developed. The State of Hawai‘i owns all of the property on which the 4.64-acre lagoon is located, but the terms of the September 22, 1955 Indenture and Deed from the Territory of Hawai‘i gave the Hilton Hawaiian Village the right to construct and use (and the obligation to maintain) the lagoon.¹

The lagoon’s current uses are scenic and recreational, although recreational uses are limited by poor water quality and undesirable conditions within the lagoon and on the adjacent beach. The lagoon water is turbid and circulates slowly; the lagoon bottom is covered with soft, anaerobic sediment that emits an unpleasant odor when disturbed. The sand once covering the lagoon shore has eroded in many areas to expose hard coral and gravel substrate. No lights, benches, or other pedestrian amenities exist along the lagoon shore, in marked contrast to the Waikīkī Promenade to the east. Moreover, the lagoon is host to stinging jellyfish that have entered through the ocean intake pipes and now complete their entire life cycle within the lagoon. Thus, recreational uses are largely limited to pedestrians walking along the *makai* and ‘Ewa shorelines of the lagoon. It is impossible to walk completely around the lagoon shoreline because the concrete retaining wall that supports the swimming pool on the *makai* side of the existing HHV Lagoon Tower extends into the water.

¹ Henry J. Kaiser constructed the lagoon in accordance with a design created by the (then) Territorial Harbors Commission. Lagoon construction was part of a littoral rights exchange between the abutting property owners (Kaiser and the Paoa Estate) and the Territory of Hawai‘i. It was only a part of a planned significant enlargement of “Crescent Beach”, but the other beach improvements were never made. Ownership of the lagoon passed to the Territory of Hawaii, under deed covenants specifying, for the Paoa property, that the Territory would preserve the lagoon as a “safe and sanitary” body of water and that Hilton maintain the lagoon for as long as economically practical. If HHC determines that this is impractical and notifies the State of its intent to discontinue maintenance of the lagoon, the State must fill the lagoon in to make a flat land area, provide an easement to Hilton, and create a “no buildings” zone.



EXHIBIT 4



Legend:

Prepared For:

Hilton Hotels Corp.

Prepared By:

PLANNING SOLUTIONS

Source:

-Sea Engineering, Inc.
-RM Towill Corp.

Figure 1-2:

Existing Lagoon Features

Hilton Hawaiian Village Lagoon Restoration

Unlike conditions when it was first constructed, few people now use the lagoon shoreline for sunbathing or picnicking. People occasionally wade in the lagoon, but it is largely avoided by swimmers, who typically use the nearby ocean.

1.3 NEED FOR LAGOON RESTORATION

Both HHC and the City and County of Honolulu recognize that the lagoon has greater potential as a scenic and recreational resource than is currently being realized. HHC's approvals from the City for constructing the new Waikikian Tower within the HHV require that HHC propose and execute plans for restoration of the lagoon.² Moreover, the terms of the September 22, 1955 Indenture and Deed from the Territory of Hawai'i obligate the HHV to maintain water quality within the lagoon at a level that is better than now exists.

The approvals the City has granted require: (1) restoration of water quality within the lagoon to safe and sanitary conditions for recreation and (2) the addition of land-side amenities along the lagoon shore to encourage recreational use and integrate the lagoon area with the surrounding recreational area of Waikīkī. In developing the plan to address water quality issues, HHC examined the root causes of poor water quality and bottom conditions within the lagoon. Its findings are summarized in Section 1.3.1 and Section 1.3.2.

As discussed in Section 2.2.3 of this report, Condition C.1.c. of the Special Management Area permit for the Waikikian Project recognized that that restoration could prove to be infeasible and provided that if HHC determined this to be the case it prepare a detailed plan to DPP (including a timetable) for filling the lagoon and widening the beach. Because HHC determined that the plan described in this report is physically and economically feasible, it is not presently pursuing that alternative. DPP's October 2004 approval of the conceptual plan for the lagoon restoration reflects the same opinion. Should the City fail to grant the SMA permit, or should HHC be unable to obtain the other approvals that are required from State and Federal agencies, then HHC would be forced to prepare a detailed plan for filling the lagoon and seek the permits needed to implement that plan.

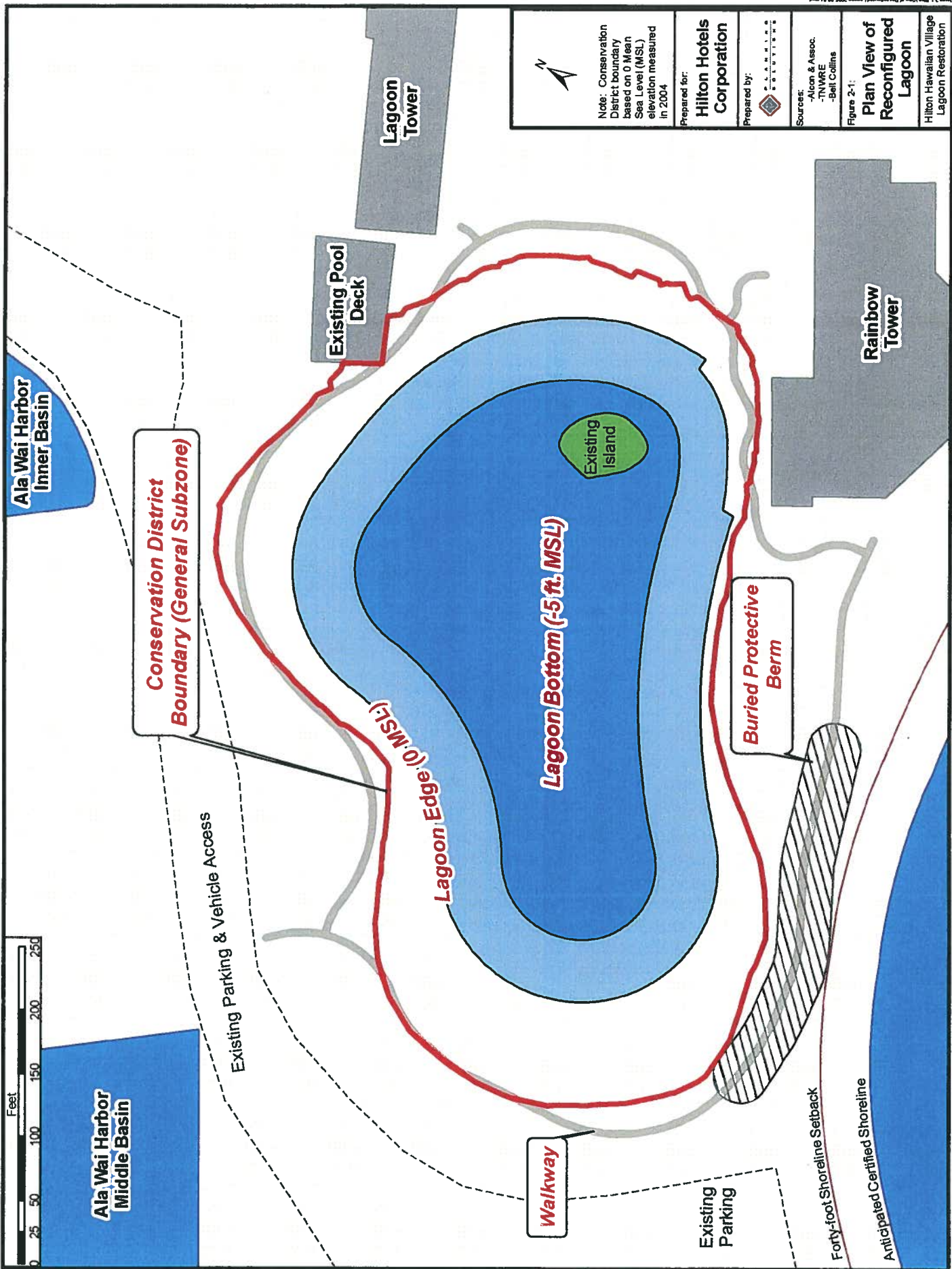
1.3.1 LAGOON WATER CIRCULATION

The lagoon's existing water circulation system as illustrated on Figure 1.2 consists of:

- Two 30-inch diameter corrugated-metal ocean-water intake pipes that originate in shallow water immediately *makai* of the lagoon, pass under the beach berm, and discharge into the lagoon.
- One 24-inch and one 18-inch diameter intake pipe in the lagoon that convey water from the lagoon to the pump house.
- A single 36-inch diameter discharge pipe that carries water from the pump house to the Ala Wai Harbor.
- A nominal 7,500 gpm discharge pump (now operating at about 5,300 gpm), which is located in a small pump house on the 'Ewa side of the lagoon.

By pumping water from the lagoon into the Ala Wai Harbor, the system lowers the water level in the lagoon below that in the adjacent ocean. The resulting difference in water surface elevation causes water to flow from the ocean into the lagoon at all times. However, because the head difference is a function of the level of the water in the ocean, which fluctuates with the tide, the rate of inflow varies over time, while the discharge into the harbor remains relatively constant. As a result, the water level

² If the restoration is determined infeasible, the terms of the indenture and deed under which the lagoon was constructed require the State (as successor to the Territory) to fill the Lagoon and beach to the elevation of the surrounding properties and to maintain them in open space. Both parties to the agreement prefer that this not occur. Instead, they wish the lagoon retained as a unique landmark and recreational resource.



Note: Conservation District boundary based on 0 Mean Sea Level (MSL) elevation measured in 2004.

Prepared for:
Hilton Hotels Corporation

Prepared by:
ECOLOGICAL RESTORATION

Sources:
-Alcon & Assoc.
-TNWRE
-Bell Collins

Figure 2-1:
Plan View of Reconfigured Lagoon

Hilton Hawaiian Village Lagoon Restoration

EXHIBIT 6

Figure 2-1 Plan View of the Proposed Lagoon, 2025-04-01

- **PD-R-4 (part).** The Applicant, at its own expense, shall construct, in coordination with and in compliance with the requirements of all applicable public agencies, the following: ... (4) pedestrian walkways and associated areas along Dewey Lane and around the Hilton Lagoon.
- **PD-R-5 (part).** The Applicant shall be responsible for the maintenance of all constructed improvements not otherwise accepted by the City/State for maintenance.
- **PD-R-6.b.** Prior to submitting any building permit applications, the Applicant shall submit Revised Plans for DPP review and approval, which include the following:
 - b. Provide preliminary plans for an extension of the Waikīkī Promenade that encircles the Hilton Lagoon and connects the walkway of the Rainbow Tower to the Ala Wai Boat Harbor parking lot. (The promenade shall contain amenities, i.e., seating areas, drinking fountains, lighting, and landscaped planting strips with irrigation, shade trees, coconut palms, shrubs, and groundcover. The promenade also shall include, and the Applicant shall grant, public access to a restroom facility to be located at the swimming pool or restaurant area along the promenade.); and
 - c. Provide preliminary plans for signage for public parking at reduced rates and public beach access fronting and along the Dewey Lane pedestrian walkway.

2.3 PROPOSED ACTION: HHV LAGOON RESTORATION PROJECT

Through analysis, review, and consultation with government agencies, HHC developed a plan for restoring the lagoon restoration which they believe best satisfies the objectives outlined in Section 2.1. The Department of Planning and Permitting has reviewed the plan and confirmed that it would satisfy the requirements of the SMA and PD-R approvals mentioned above. Consequently, it represents the action proposed in this EA. The following sections describe the proposed action in detail, separating the water quality restoration and land side improvements for convenience.

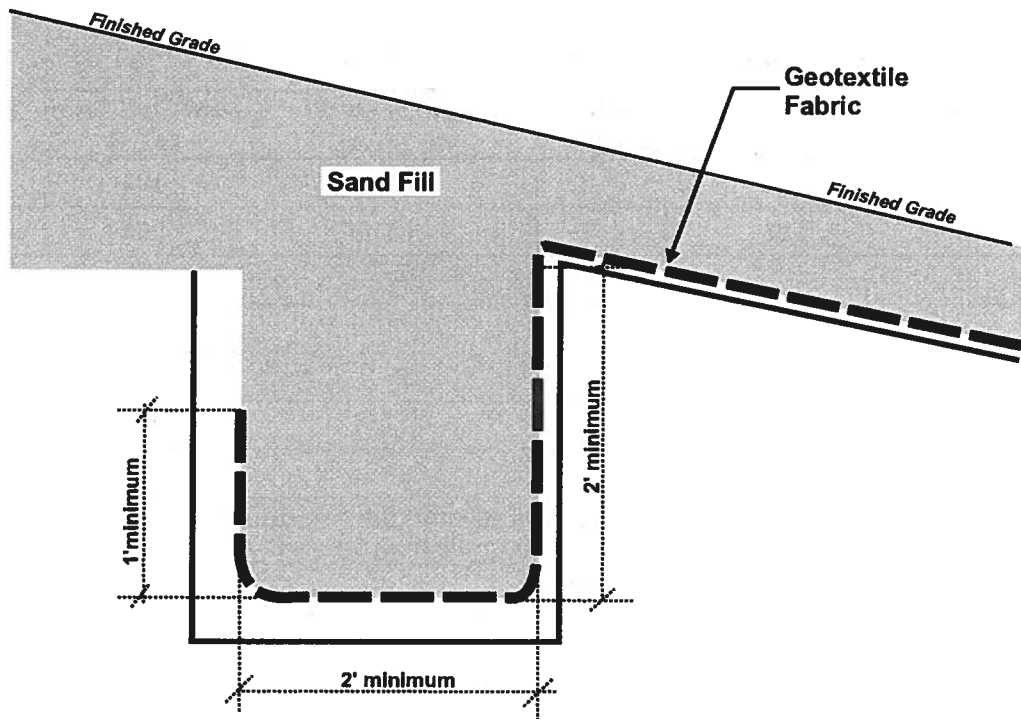
2.3.1 WATER QUALITY-RELATED IMPROVEMENTS

2.3.1.1 Description of the Proposed Improvements


The proposed plan for improving water quality in the Hilton Hawaiian Village consists of the following key components selected from the alternatives that were evaluated. The system is illustrated in Figure 2.1, Figure 2.2, and Figure 2.3.

- The volume of water in the lagoon will be reduced by about 50 percent. This will be achieved by reducing the maximum depth of the lagoon to 5.0 feet below mean sea level (MSL), creating gently sloping lagoon sides (1 foot vertical to 10 feet horizontal), and shrinking the surface area by about a quarter (from 4.64 acres to 3.43 acres). The soft, anaerobic bottom sediments would be sealed in place using an impermeable geotextile fabric covered by an overburden of 15,000-20,000 cubic yards of sand.⁴ This will eliminate the need to remove and dispose of the bottom sediments. The sand will come from approved on-land sources. Figure 2.4 illustrates the manner in which the geotextile fabric will be secured along the side of the lagoon.
- HHC will seal the existing ocean intakes, eliminating the major source of the sediment that has accumulated in the lagoon and which contributes to its turbid appearance. Substituting the groundwater source for the existing ocean water source will also greatly reduce colonization by jellyfish and contamination by other pollutants found in nearshore waters.

⁴ The geotextile layer provides separation between the very soft sediments and the sandy/gravelly fill above. This will prevent sand loss into the soft sediments and prevent the mud and fine soil particles from contaminating the sand fill.



Prepared For:
Hilton Hotels Corp.

Prepared By:

 PLANNING
SOLUTIONS

Source:
TNWRE

Legend:

Figure 2-4:

Schematic Diagram of Geotextile Fabric Anchoring System

Hilton Hawaiian Village
Lagoon Restoration

Geotextile Fabric Anchor 2005-06-24.cdr

PROJECT DESCRIPTION & ALTERNATIVES CONSIDERED

- HHC will develop the seven exploratory wells it has drilled alongside the northwestern side of the lagoon.⁵ As constructed, the wells will draw saline groundwater from between 77 and 251 feet below sea level. Each well will have a capacity of at least 2,500 gallons per minute (gpm). Together, they will deliver a minimum of 15,000 gpm of water into the lagoon, about three times the present rate. Its first 82 to 97 feet consists of a 24-inch borehole, 14-inch diameter Schedule 80 solid PVC well casing, and a grout seal. The exact length of each well's upper section is shown in Table 2.1 below. Each was adjusted so that the bottom of the solid casing was in firm, non-caving material. Below the solid casing, each of the wells has 13-inch diameter open holes to depths between 194 and 250 feet below sea level. The specific depth for each well was varied to maximize the well's yield while producing water warm enough for comfortable swimming in the lagoon. This design avoids drawing the relatively poor quality shallow groundwater and it also avoids structural foundation problems that might be caused by dewatering the shallow groundwater. A prototype supply well was drilled and pump tested in 2003. Results showed that water could be drawn from the strata at depth without affecting the shallower, near surface groundwater.

Table 2.1. Finished Dimensions of the Saltwater Supply Wells

| <i>Well No.</i> | <i>Ground Elevation (Feet MSL)</i> | <i>Length of Solid Casing (Feet)</i> | <i>Length of Open Hole (Feet)</i> | <i>Total Well Depth (Feet)</i> |
|-----------------|------------------------------------|--------------------------------------|-----------------------------------|--------------------------------|
| 1 | 5 | 87 | 107 | 194 |
| 2 | 5 | 83 | 165 | 248 |
| 3 | 5 | 97 | 153 | 250 |
| 4 | 3 | 83 | 172 | 255 |
| 5 | 2 | 83 | 159 | 242 |
| 6 | 2 | 82 | 123 | 205 |
| 7 | 2 | 82 | 164 | 246 |

Note: All depths are relative to the existing ground as of April 22, 2005, the date that all seven wells were completed.

Source: Tom Nance Water Resource Engineering (2005).

- HHC will remove the existing 50 year-old pipes within the lagoon and replace them with a new circulation system within the lagoon for inflow and outflow. The circulation system will be located within a new pump house next to the existing one (which will be demolished). The proposed design of the new pump house is depicted in Figure 2.5. The existing lagoon water circulation system uses pumps only to discharge water from the lagoon into the Ala Wai Harbor. As a result, the inflow is only by gravity, and the resulting water level in the lagoon is below sea level. The proposed new system uses pumps for both the inflow and outflow from the lagoon. This gives operators much greater control over the system, and it also allows the average water level in the lagoon to remain closer to sea level.

⁵ The bore holes for the wells were drilled and pump-tested during the first half of 2005 to determine their yield and operating characteristics and to confirm that the quality of the water that they would supply would be adequate for the proposed recreational use. The wells will be completed and the other equipment needed to complete the system installed if approvals are granted for the overall lagoon restoration program.

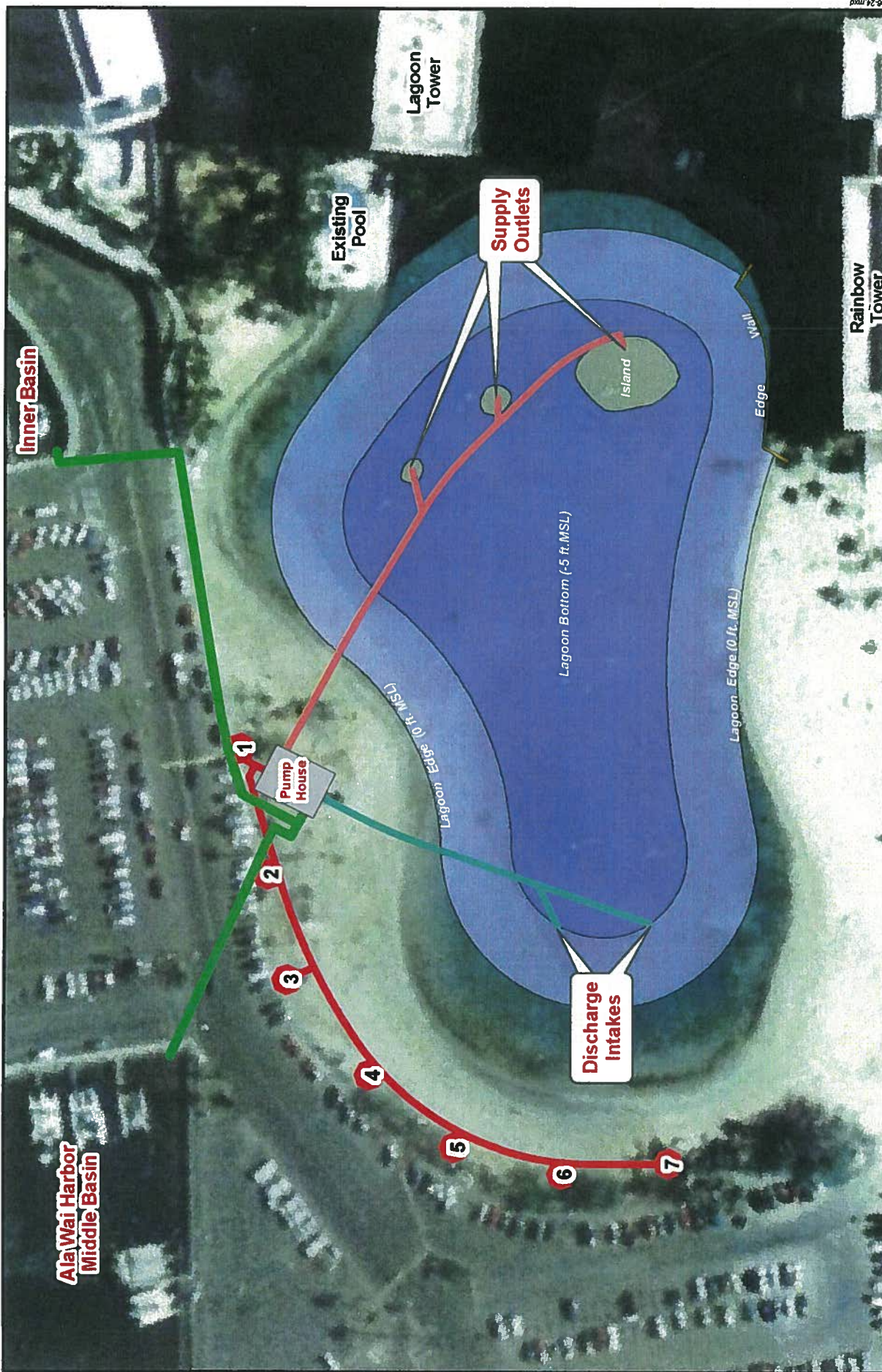


Figure 2-2:
Water Circulation System
 Hilton Hawaiian Village
 Lagoon Restoration

Legend:

- Harbor Discharge Pipes
- Lagoon Supply Pipes
- Discharge Intake Pipes
- ① Supply Wells & Well #
- Well-Water Collection Pipes

Scale: 0 50 100 200 Feet

Prepared For: Hilton Hotels Corp.
 Prepared By: PLANNING SOLUTIONS
 Sources: -City & County of Honolulu GIS
 -TNMRE

Figure 2-2 Water Circulation System 2005-08-24.mxd

Note: Vertical Exaggeration 10X

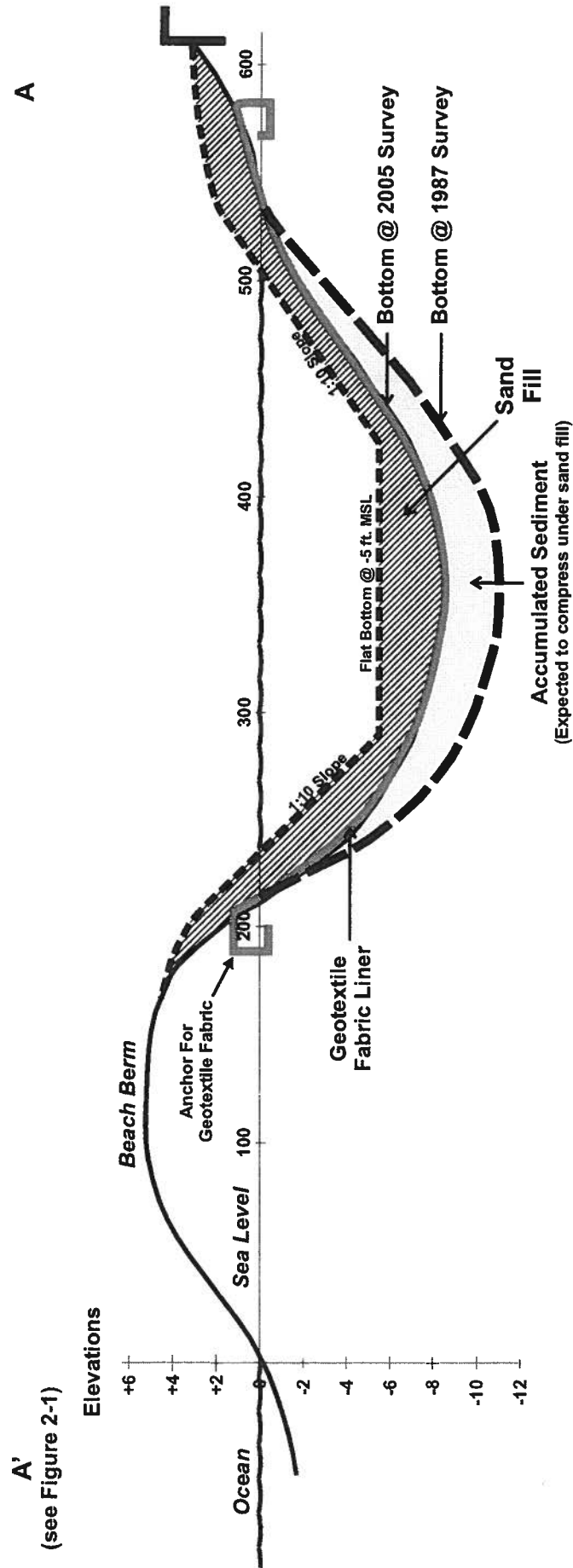

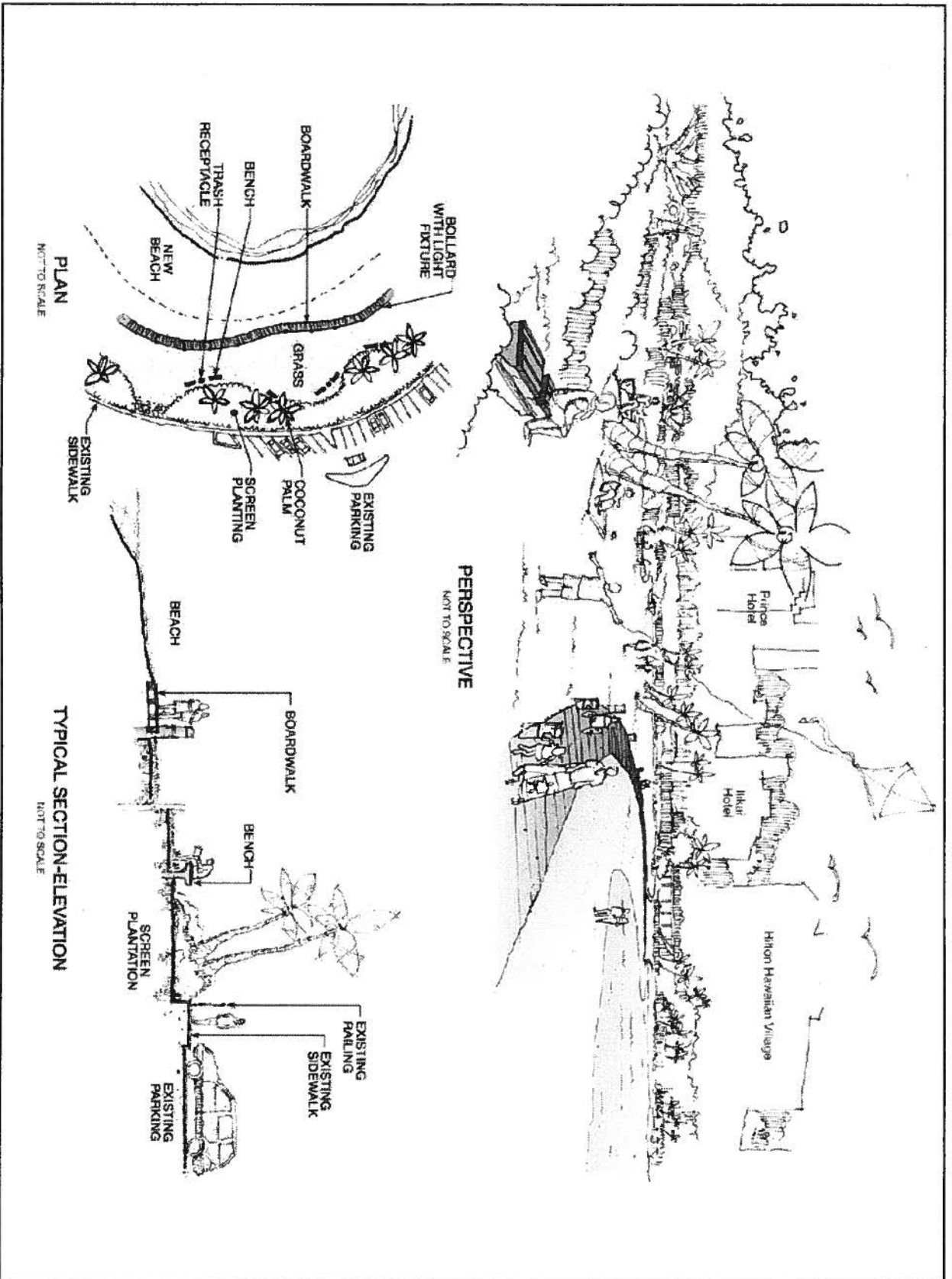


Figure 2-3:
Conceptual Lagoon Cross Section
 Hilton Hawaiian Village Lagoon Restoration

Prepared For: Hilton Hotels Corp.
 Prepared By:  PLANNING SOLUTIONS
 Source: TNWIRE



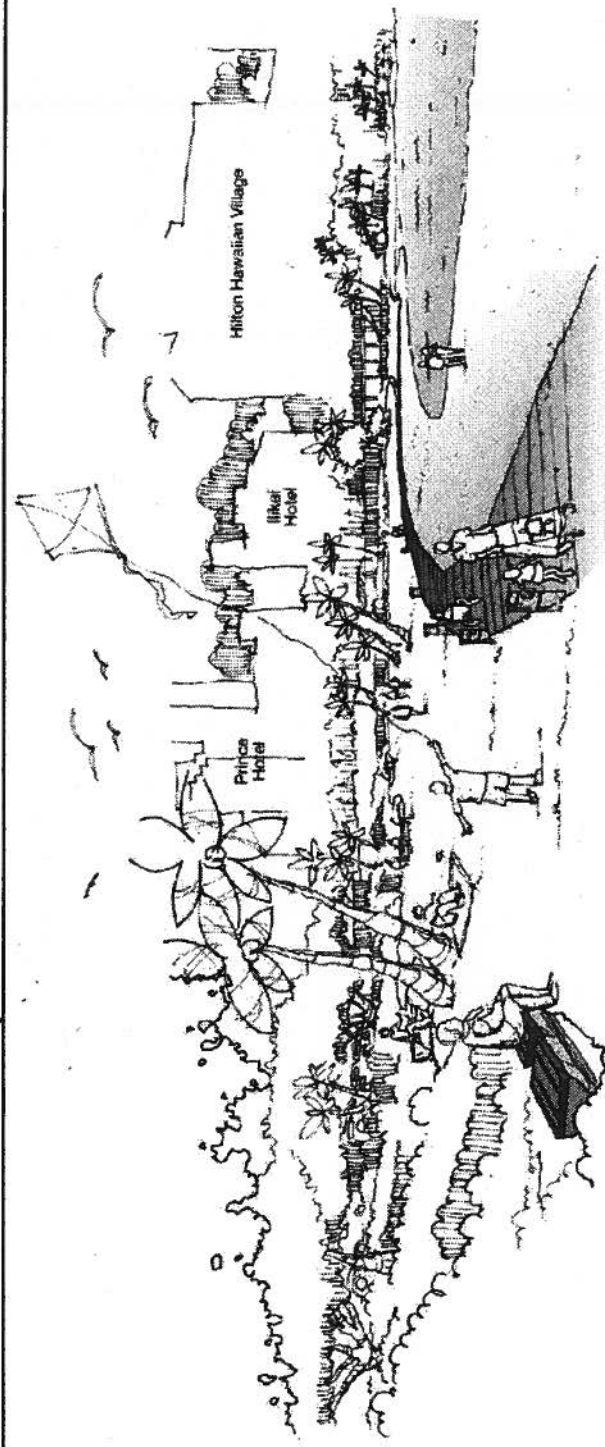
Prepared For:
Hilton Hotels Corp.

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PLANNING SOLUTIONS

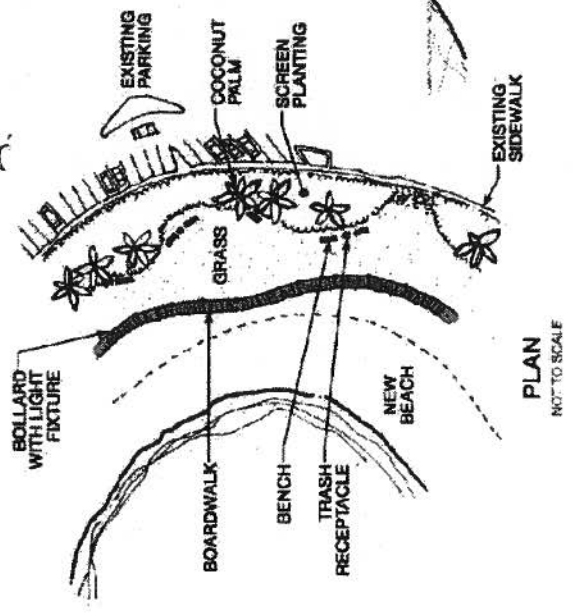
Sources:
 -City & County of Honolulu GIS
 -Belt Collins Hawaii

Figure 2-9:
Plan, Perspective, & Section Elevation
 Hilton Hawaiian Village Lagoon Restoration

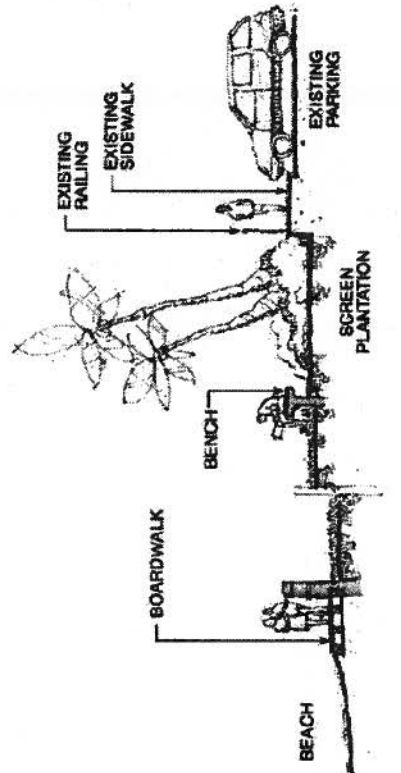
Figure 2-9 Plan Perspective & Section Elevation 2005-11-11.dwg



PERSPECTIVE
NOT TO SCALE



PLAN
NOT TO SCALE



TYPICAL SECTION-ELEVATION
NOT TO SCALE

Prepared For:
Hilton Hotels Corp.

Prepared By:
P L A N N I N G
S O L U T I O N S

Sources:
-City & County of Honolulu GIS
-Belt Collins Hawaii

Figure 2-6:

Plan, Perspective, & Section Elevation

Hilton Hawaiian Village Lagoon Restoration

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Hilton Hotels Corp.

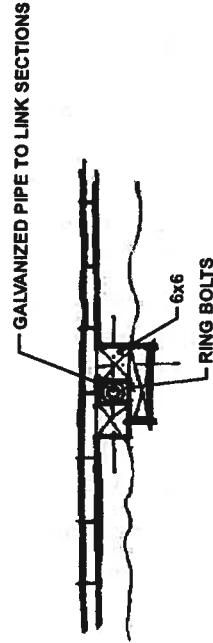
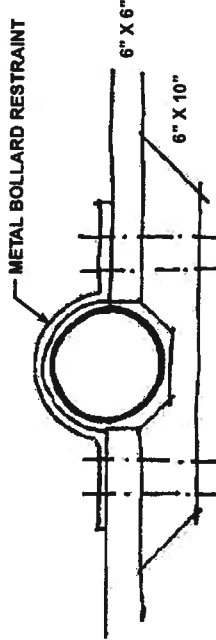
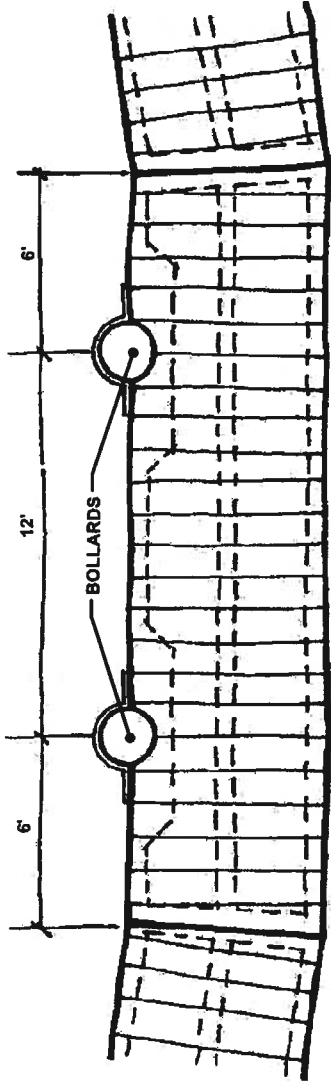
Prepared By:
 P L A N N I N G
S O L U T I O N S

Sources:
--City & County of Honolulu GIS
--Bert Collins Hawai'i

Figure 2-10:

Boardwalk Conceptual Details

Hilton Hawaiian
Village Lagoon
Restoration



2.3.2.2.2 Waikīkī Promenade Design: General

After considering a range of options, including a continuation of the poured concrete walkway that is used for the Waikīkī Promenade along the Hilton Hawaiian Village's beach frontage and elsewhere, Hilton has concluded that a hybrid boardwalk design would provide the best combination of functionality and attractiveness. As sketched in Figure 2.10, the proposed design uses textured boards made of weather-resistant material as the walking surface. The walkway would be approximately eight feet wide, the same width as the existing concrete walkway fronting the Hilton Hawaiian Village. Bollards (posts on the order of 9 to 12 inches in diameter) would be located at 12-foot intervals along the ocean side of the boardwalk. In order to simplify construction and maintenance of the boardwalk, the design uses a series of short, straight sections between the anchoring posts to form a curved path.

2.3.2.2.3 Promenade Design: Shoreline Berm⁷

The easternmost 400 feet of the proposed Waikīkī Promenade extension would be situated atop the beach berm separating the lagoon basin from Kahanamoku Beach (see Figure 2.1). The berm is composed of a raised coral substrate with a thin veneer of sand. Once every year or two, on average, storm waves over-top the lowest portion of this berm, spilling ocean water into the lagoon. While the over-topping is infrequent and generally no more than a few inches deep, it is not so rare that it can be ignored. The need to accommodate this natural occurrence constrains the walkway design and has led HHC to establish the following design objectives for it:

- The boardwalk must accommodate movement in the sand under and adjacent to the boardwalk due to rain and wind.
- The portion of the boardwalk across the lowest-lying segment of the beach berm must be portable so that the walkway sections can be moved to higher ground when forecasts call for waves that have the potential to overtop the berm.
- The boardwalk and berm must be designed to minimize washout by relatively frequent storm waves and to be reinstalled quickly on the infrequent occasions when waves overtopping the berm cause some washout of the sand.
- The boardwalk must not form a tripping hazard. Therefore, it should stand out of the sand at least six inches (i.e., one step up).
- It must be possible to maintain low-intensity lighting along the boardwalk.

The proposed design achieves these objectives by anchoring the walkway using bollard posts grouted into holes bored into the coral. In this approach the boardwalk itself floats on top of the sand on two or three 6' x 6' stringer frames. These would be constructed in something like 6-foot increments. The stringer frames would be attached to the posts via brass slip rings similar to floating dock details. This arrangement would allow the boardwalk segments to move vertically to accommodate sand movement. If the stringers began to sink into the sand, four or five men could easily lift and re-level each stringer section. If particularly large waves are forecast, hotel staff will lift the boardwalk sections off the posts and place them on hotel property in areas that will not be affected by the waves.⁸

⁷ Additional information on the berm design may be found in Section 2.3.2.4.2.

⁸ While the design is expected to work effectively for most storm events, extreme events, such as waves and storm surge produced by Hurricane Iniki in September 1992, produce overtopping of such a magnitude that it is not practical to protect the walkway from damage during such infrequent occurrences. Hence, in all likelihood major portions of the walkway would need to be replaced following such an event.

Prepared For:
Hilton Hotels Corp.

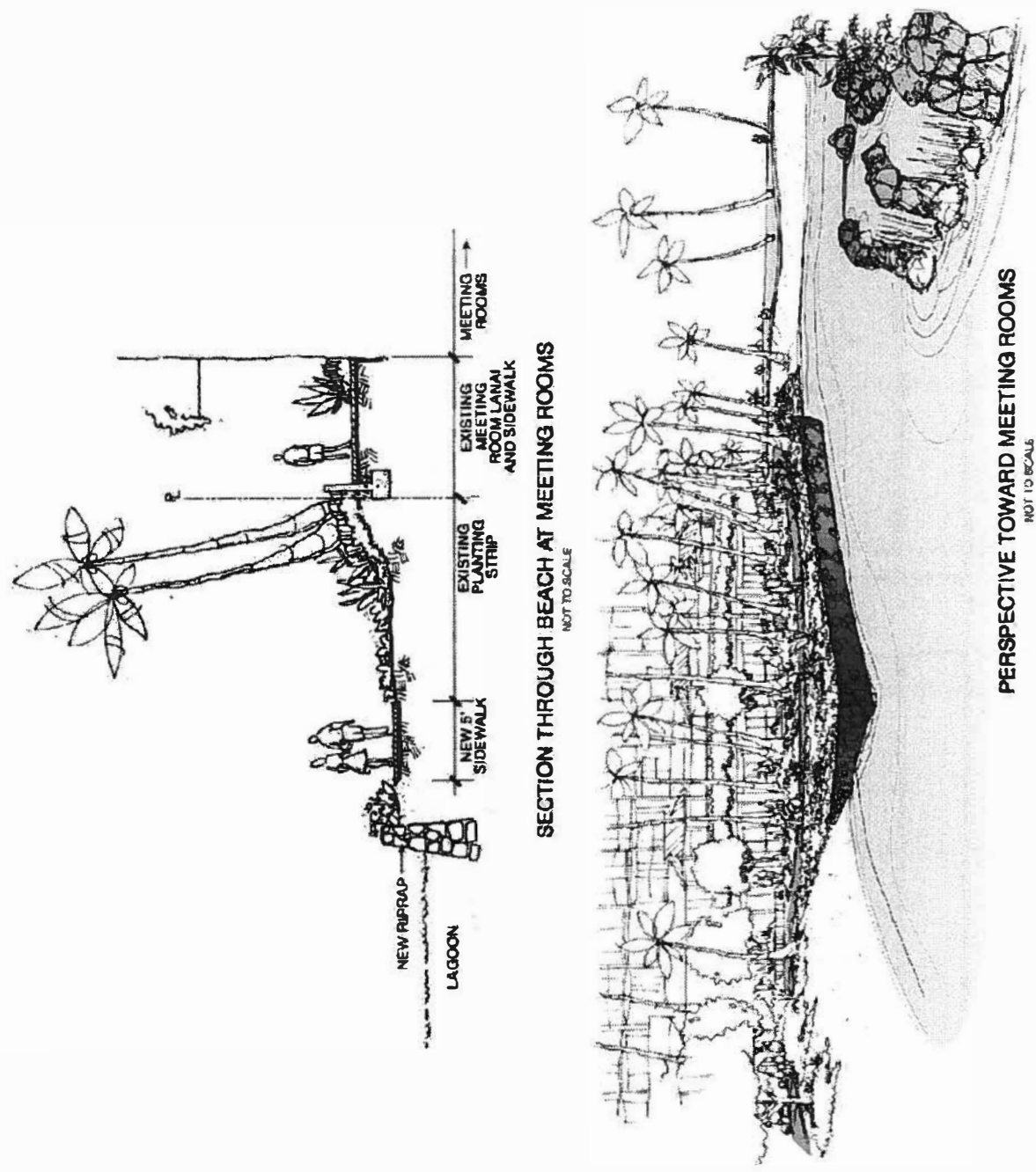
Prepared By:
**P L A N N I N G
S O L U T I O N S**

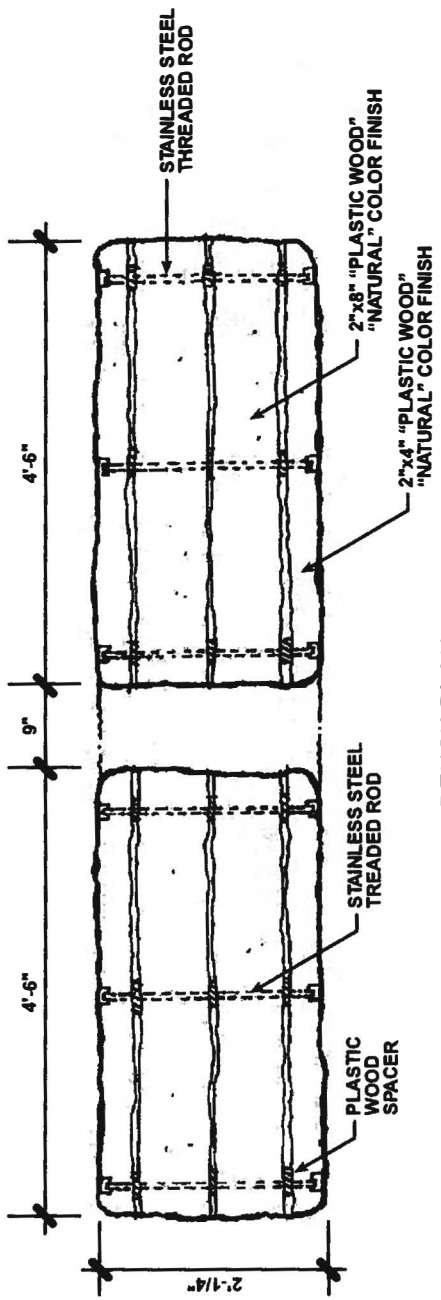
Sources:
-City & County of Honolulu GIS
-Beit Collins Hawai'i

Figure 2-12:

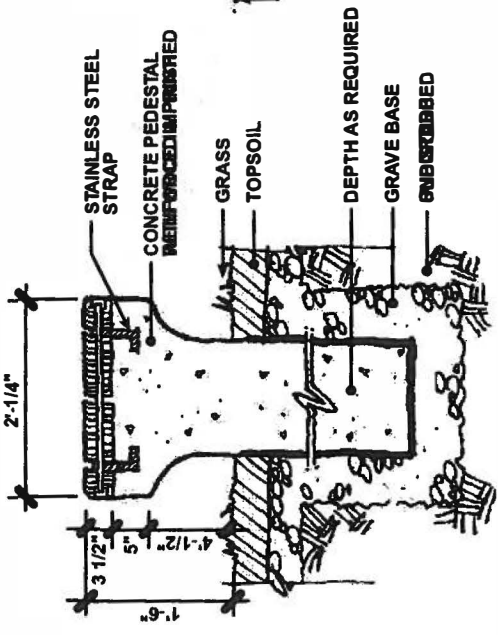
Secondary Walkway In Front Of Meeting Rooms

Hilton Hawaiian Village Lagoon Restoration

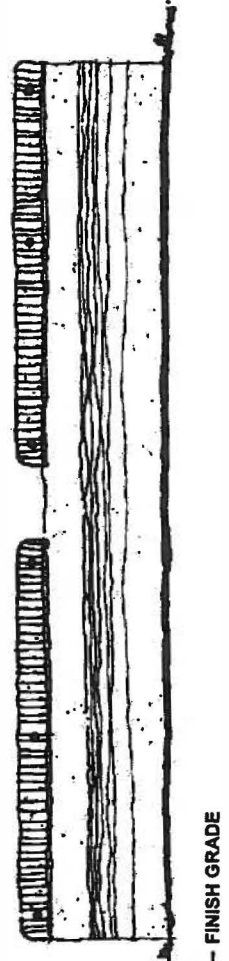




BENCH PLAN
NOT TO SCALE



BENCH SECTION
NOT TO SCALE



BENCH ELEVATION
NOT TO SCALE

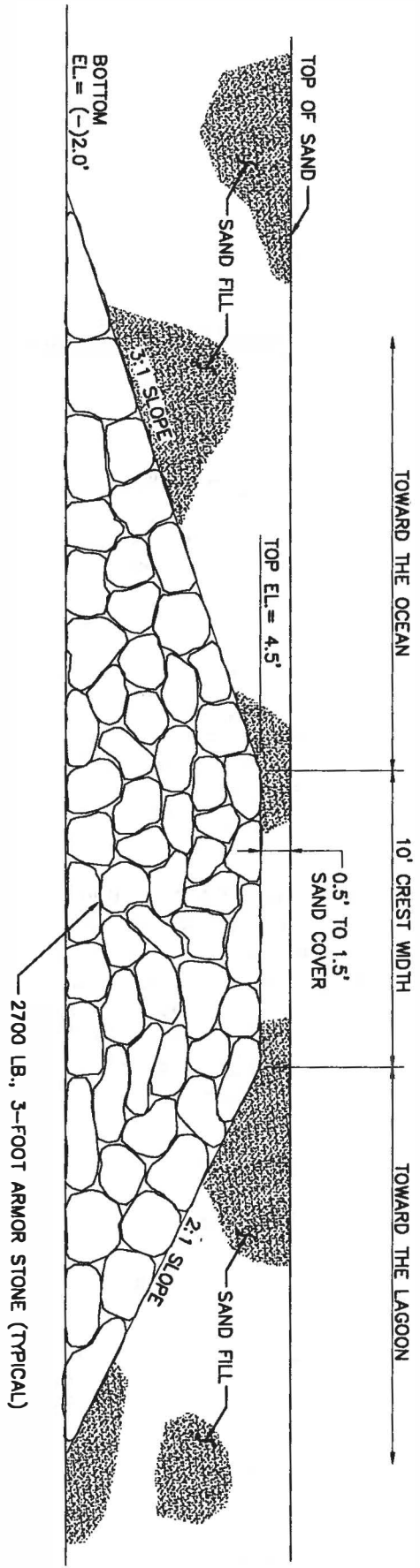
Prepared For:
Hilton Hotels Corp.

Prepared By:
P L A N I M O
S O L U T I O N S

Source:
Belt Collins Hawaii'i

Figure 2-13:
Typical Bench Details

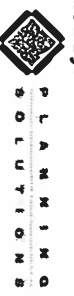
Hilton Hawaiian
Village Lagoon
Restoration



Prepared For:

Hilton Hotels Corp.

Prepared By:



Source:

TNWRE

Figure 2-14:

**Conceptual Design of
Shoreline Berm
Reinforcement**

Duke Kahanamoku Lagoon
Restoration Project

Figure 2-14 Conceptual Design of Shoreline Berm Reinforcement 2005-11-11.cdr

2.3.2.4.2 Beach Stabilization

As previously noted, waves periodically overtop the shoreline berm that separates the lagoon from the ocean. The most severe example of this occurred during Hurricane Iniki, when the entire parking lot and shoreline berm were under water as a result of the wave setup from the storm. However, the over-topping occurs on a more limited basis once every few years. The water sweeping across the beach washes the loose sand on top of the berm into the lagoon, leaving only the relatively hard substrate. It also carries ocean organisms into the lagoon.

The use of the geotextile fabric to seal the existing lagoon sediments in place adds an additional concern to the over-topping. While the geotextile fabric would be well-secured, the anchoring could fail if the berm were overtopped by sufficiently energetic waves. Such a failure would expose the underlying sediment to wave action and could allow them to be spread within the lagoon, eventually settling on the bottom and degrading the recreational values that the lagoon restoration project is intended to promote.

To reduce the likelihood that this would occur, HHC proposes to emplace a buried rubble mound structure beneath the existing berm to increase its stability in the face of a large storm event. The conceptual design of the buried structure is depicted in Figure 2.13. Once constructed, the berm would be completely covered with sand and would blend in with the surrounding beach. The design shown is based on the following "conservative" design assumptions: (i) the use of basalt armor stones with a density of 150 pounds per cubic foot; (ii) all the sand that would normally bury the structure could be eroded by storm waves; and (iii) that a 6-foot design wave could break directly on the structure. These conservative assumptions would be refined in the final design process and could lead to a smaller structure than shown.

The proposed plan for the lagoon restoration calls for the shoreline sand berm to be +5- to +6-feet msl and to follow the alignment depicted in Figure 2.1. For the structure to provide the greatest protection for the lagoon but remain buried under normal conditions, the top of the stone structure would be set at an elevation of +4.5-feet msl. Putting the base of the structure 2.0 feet below sea level and selecting a 3:1 slope for the seaward (*makai*) side, the required armor stone size (assuming random placement of the stones) is nominally three feet or about 2,700 pounds per stone.⁹ The crest would be at least three stones wide (or about 10 feet across) and, at 2:1, the slope of the shoreward (*mauka*) side would be slightly steeper. Under the proposed alignment the berm will more than 40 feet inland of the shoreline that DLNR has proposed for certification, and therefore entirely inland of the Shoreline Setback Area defined by the City and County of Honolulu.¹⁰ If the shoreline that is eventually certified is substantially inland of the line for which certification has been requested, HHC will either shift the location of the berm inland sufficiently to keep work outside the 40-foot shoreline setback area or will submit a Shoreline Setback Variance application.

2.3.2.5 Operation and Maintenance

HHV is responsible for operating and maintaining the land-side improvements to the lagoon area for use by the public. HHV staff will be assigned to the task of ensuring that the landscaping public amenities around the lagoon are maintained. Their specific duties will involve:

- Daily security inspection of the lagoon public recreation area and walkway.
- Daily visual inspection of the walkway and associated amenities to identify any needed repairs and pick up debris and litter.

⁹ Because the dimensions of the structure are relatively small compared to the size of the armor stone, creating a multi-layered structure with under-layers of smaller stone would not be appropriate. The entire structure would be comprised of similar-sized 2,700 pound stones.

¹⁰ Notice of the proposed Shoreline Certification was published in the November 8, 2005 issue of OEQC's *Environmental Notice*. If no appeal is filed within 20 calendar days of the publication date, the proposed shoreline will be certified.