

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
Land Division, Planning Branch
Honolulu, Hawaii

File No.: OA-2929B

September 10, 1999

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

- REGARDING: Conservation District Use Application for the
Kuhio Beach Improvements
- APPLICANT: Department of Land and Natural Resources
Division of Boating and Ocean Recreation
- LANDOWNER: State of Hawaii
- LOCATION: Waikiki, Oahu
- TMK: Submerged Land
- AREA OF USE: 1.5 Acres (Beach Nourishment)
0.39 Acres Net Additional Rock Structure
- SUBZONE: Resource
- BACKGROUND:

The State of Hawaii, Department of Land and Natural Resources (DLNR), Division of Boating and Ocean Recreation (DOBOR) plans to construct improvements to Kuhio Beach, located along the central portion of Waikiki Beach (Exhibit 1-3).

The proposed improvements are the result of the overall Waikiki Beach Improvement project, which included the area between Fort DeRussy and the Waikiki Aquarium (Exhibit 4). The project, which was initiated in the early 1990s, has been funded by monies appropriated by the Fifteen State Legislature for the planning and restoration of Sandy beaches in Waikiki. The Department of Transportation (DOT), Harbors Division, initiated this study. The project became the DLNR's responsibility when the DOT, Small Boat Harbors Division was transferred to the DLNR. The Kuhio Beach Improvement Project is the only element of the project that is being seriously pursued.

PROPOSED USE:

The proposed project involves reconstruction of the offshore crib wall system and nourishment of the beach area (Exhibit 5). Three sections of the wall will be reconstructed as breakwater segments using basalt stones in a rubble mound construction, similar to the wall segments that currently exist at the Ewa end of Kuhio Beach. Gaps between the new breakwater segments will be between 200 and 250 feet wide. The new breakwater segments would be approximately two (2) feet higher than much of the existing breakwater. The reason for this is to reduce wave overtopping which could accelerate sand loss. The area of dry beach will more than double from an existing area of about one (1) acre to a new beach area of about 2.5 acres. The footprint of the new breakwater segments will be wider than the existing walls because of the increased height and slope. However, the breakwater segments will not extend significantly seaward of the existing walls and will not impact surf sites.

The beach area will be nourished with between 10,000 to 20,000 cubic yards of sand. Potential sand sources are both onshore and offshore. Offshore sand sources are located approximately 2,000 feet offshore of Kuhio Beach. Extraction and delivery of this sand would involve suction dredging with a 10" to 12" portable dredge and delivery through a PVC pipe to shore. It would take approximately 20 days to pump 10,000 cubic yard of sand to shore. There is a plan to conduct a nearshore sand extraction and delivery investigation to evaluate the viability of this practice.

Land based sources of sand would typically come from inland excavation sites or former dunes. No particular land based sources have been identified at this time.

CONSTRUCTION METHODS:

Demolition of Existing Structures:

The existing offshore walls will be demolished and removed using a crane and loader. The quantity of materials to be removed is estimated to be about 300 cubic yards of concrete rubble and 500 cubic yards of rock material. Some of the rock material may be reused in the new breakwater construction.

Construction of New Breakwater Segments:

Work will be accomplished with a crane and loader. An estimated 2,400 cubic yards of material will be required for each breakwater segment. Total construction duration is approximately six (6) months.

Beach Nourishment:

The existing sand contained within the crib wall enclosure will be graded to restore the beach, using a crawler shovel to excavate the sand from the water areas and replace it on the beach slope. Additional sand will be added to the beach to achieve the final beach configuration. It has been estimated that approximately 10,000 to 20,000 cubic yards of sand would be required to achieve the desired beach configuration.

A potential sands source has been identified offshore of Kuhio Beach. This sand would be suction dredged using a 10" to 12" potable dredge and PVC pipe to transport the sand to Kuhio Beach.

DESCRIPTION OF SURROUNDING ENVIRONMENT

Landward Environment/Marine Environment:

Refer to Exhibit 6 for detailed discussion.

PROJECT IMPACTS

During construction, the project will have negative impacts on the marine environment, views, and public use of the beach and water in the immediate vicinity. Construction would likely result in closure of these areas.

However, long-term impacts would be positive. The beach area at Kuhio Beach would be doubled. The breakwaters would stabilize the

beach thus reducing future nourishment requirements. In addition, water quality within the basins would be substantially improved, as circulation would increase. Aesthetics within the east portion of the project would be substantially improved with the reconstructed breakwaters.

PROJECT ALTERNATIVES

1. No Improvements:

If no improvements are made to the offshore wall system, the existing problems will continue. The beach will continue to have stability problems and water quality within the basins will continue to be a problem. The slippery walls and scour holes near the narrow gaps in the existing offshore walls will continue to be public safety hazards.

2. Periodic Beach Nourishment:

Under this scenario, no work would be done on the existing offshore walls, but the beach would be nourished periodically. Although this would improve the beach, the same problems would persist as described under the "no improvements" scenario.

3. Alternative Sand Sources and Construction Methods:

Alternative sand sources involve upland sources from dunes or other coastal low lands. However, there are currently no large commercial sources of clean, natural, coarse sand available for beach nourishment projects, although small quantities can probably be obtained from inland excavation sites in former dunes or old beach ridges. Trucking costs and impacts are always an issue as with sand quality.

Deep-water submarine sources contain large quantities of sand, but it is not economically feasible for a beach nourishment project of this small scale to extract and deliver such material, mostly due to the high mobilization costs of dredging equipment.

4. Alternative Structural Methods:

Three general concepts were considered for improving the beach stability and enabling the provision of a wider beach (Exhibit 7). Concept 1 is the proposed improvement plan. Concept 2 involves reconstruction of the south end of the segmented

breakwater system and the building of a new wall at the north end. The offshore breakwaters would be removed completely and the new groin would stabilize the beach by allowing the beach to be oriented parallel to the wave crests. Concept 3 involves removing the offshore walls completely and extending the middle groin and north groin. However, extending the groin structures a significant distance seaward of the existing walls could potentially have a negative impact on near shore surf sites. Another shortcoming of the extended groin concept is the loss of the sheltered beach and waters that presently exist within the Kuhio Beach basins.

AGENCY COMMENTS:

The application was referred to agencies for review and comment: The State of Hawaii Department of Health; Office of Hawaiian Affairs; Department of Transportation; Office of Planning; Department of Land & Natural Resources, Divisions of Aquatic Resources, State Parks, Conservation and Resource Enforcement, Historic Preservation, Oahu District Land Agent; City and County of Honolulu, Department of Planning and Permitting, Department Parks and Recreation; U.S. Fish and Wildlife Service, Army Corps of Engineers and National Marine Fisheries Service.

Staff summarized all substantive comments and responses received on the CDU application and the EA, by topical area.

Marine Resources:

The Division of Aquatic Resources (DAR) notes that the project is adjacent to the Department's Waikiki Marine Like Conservation District (MLCD). The boundary of the MLCD extends seaward for a distance of 500 yards, where sand deposits exist. Specifically, the administrative rule prohibits the take, altering and the removal of sand, coral, rock or other geological features. The sand replenishment element may infringe upon the area within the MLCD so the rule provision must be taken into account. Also, any proposed construction activity offshore needs to take into account fishing activity that may occur there.

In addition, DAR notes that the marine assemblages inventory does not indicate the importance of sand biotopes as a functional habitat, serving various shelled mollusks, crustaceans, other marine invertebrates important to the marine food web and certain reef fishes. Any construction methods selected to dredge and transport sand landward should take entrapment into consideration

and try to avoid this.

Response:

With respect to sand biotopes, the project consultant notes that the sand deposits proposed to be used as a source of sand for Kuhio Beach restoration is truly depauperate of marine life. However, because it has been 9 years since the last survey, the project consultant conducted a biological and sediment infaunal survey of the sand deposits offshore from Kuhio Beach on February 11, 1999. The survey shows that the sand deposits are barren in terms of infaunal organisms. The report notes as follows:

The sand habitat does not appear to support sufficient biological resources to serve as an important feeding area for large invertebrates of fish. While the sand may be used as resting areas by certain species of fish, the removal of some portion of the sand is not expected to impact this use of the habitat.

The project consultant also noted that the removal of sand from deposits offshore of Kuhio Beach would be restricted to areas that are not within the MLCD.

Engineering:

The design of the new breakwater segments was questioned. Specifically, the impact on views of the higher wall elevation is a concern (approximately two feet higher).

Response

The project consultant notes that the breakwater height was designed to prevent wave overtopping and was determined after much coastal engineering analysis and testing. Keeping the breakwater height low, the same height as the crib wall segment next to the Kapahulu Storm Drain, reduces the potential problem of visual intrusion.

Public Safety/Recreation:

There was a concern by the City Parks Department that the new design would increase currents in the water basins, evidentially suggesting that this could be a threat to swimmers.

They note that the existing swimming and wading areas enjoyed by the elderly and very young would be diminished by this project and also that the improved access to surf sites for surfers may become a safety hazard to others using the shoreline/ocean areas. They feel that the project could result in more conflicts of activities between the surfers, swimmers and boogie-boarders.

Response

With respect to swimming/wading areas, the project consultant notes that there will still be ample sheltered water area to accommodate the users. With respect to conflict between users, although the EA notes that access to the open ocean will be enhanced for surfers, this will not necessarily increase the activity in landscaped and sand areas compared to present. The activity that presently occurs in Kuhio Beach Park and adjacent Kapiolani Beach Park may be redistributed slightly and there may be additional mixing in the areas within the crib walls. However, the EA states that such mixing would seem to be similar in interaction to that which occurs in other locations along Waikiki's beaches.

With respect to currents, the project consultant notes that the present situation is actually more hazardous because of the strong currents that flow through the narrow gaps. One of the objectives of the project is to remedy this hazard by providing a wider gap between the breakwater segments. The wider the gap, the lower the velocity of water flowing through it.

Surfing:

Based on comments from the project consultant, the Waikiki Surfing Ohana (WSO) is concerned about the impact of the project to reefs and to surfing sites. WSO seems to believe that sand from beach nourishment projects degrades surf breaks. They believe that if the surf breaks were treated like cultural resources that they would be afforded additional protection. They are concerned that the project consultant identified the surf sites as simply "recreation" areas.

WSO would like to know how they will benefit from the project and are concerned that the new breakwaters will create more backwash, thereby ruining surf breaks like "Queens", the "Wall", and "Canoes".

They feel that simply maintaining the existing alignment of the walls does not guarantee that the new walls won't adversely affect surf. They would also like to know what limits would be placed on surfers during the construction phase which could take upward of 40 days. They would like to know where the offshore sand pockets are located in relation to surf sites and how extraction will affect surf in the immediate area.

WSO would like to know what role this sand has in recharging existing sandbars and breaks up and down the coast.

They feel that the surfing community has not been adequately represented during early stages of the project planning and would like an additional meeting with a question and answer session.

In general, there is a concern over the level of detail provided with respect to the proposed dredging work.

Response

The project consultant notes that hundreds of thousands of cubic yards of sand have been used to artificially nourish Waikiki's beaches since the 1930s, in attempts to create and maintain a continuous sandy beach. The Kuhio Beach crib wall system was built so that the beach could be maintained along this section of shoreline adjacent to Kalakaua Avenue. The crib wall system has been marginally successful, but there are still problems.

The project consultant notes that beach nourishment activities along Waikiki's shoreline have potentially impacted the marine environment and surf sites. Sand that was placed on the beach from Kuhio Beach to the Natatorium between 1951 and 1960 eroded. It is expected that sand settles into pockets on the limestone reef platform offshore Kuhio Beach. The sand will be recycled back to Kuhio Beach as part of this project, mitigating any potential impacts that off site sand may have on the reef environment.

In response to WSO's comment that the surf sites should be considered cultural sites, the project consultant notes that the issue is beyond the scope of the proposed project.

The existing crib walls will be reconstructed as rubblemound structures, similar to the existing offshore wall in the Ewa Basin.

Even though the reconstructed walls will be about 2 feet higher than the existing walls, the new structures will absorb and dissipate wave energy much more effectively than the existing concrete crib walls. There should be less backwash than at present. Physical model studies demonstrated that the proposed project would not affect offshore surf sites.

The sand deposits offshore of Kuhio Beach are located in sand pockets and depressions in the limestone reef platform shoreward of the 20-foot contour. The sand layer is only about two feet thick. The higher spots on the reef, above the sandy bottom, define the locations of the surf sites, since it is the higher spots that focus the wave energy and cause the swells to crest and break. The removal of 10,000 to 20,000 cubic yards of sand will have no effect on surf sites. The sand pumping activity will be scheduled during the winter months when there is minimal south swell activity offshore of Waikiki.

Other:

Concern over the disruption of the project to the existing beach and beach use, the effect of sand on the reef, lack of funding for the project construction phase, etc.

APPLICABLE RULES AND PROCEDURES:

Following review and acceptance for processing, the applicant, by letter dated April 9, 1999, was notified that:

1. The proposed project is considered an identified public purpose use in the Conservation District, in accordance with Section 13-5-22(P-6) of the Administrative Rules;
2. A public hearing pursuant to Section 183C, Hawaii Revised Statutes (HRS) will be required in that the Chairperson has determined that the scope of the proposed use requires a public hearing; and
3. In conformance with Title 11, Chapter 200, of the Administrative Rules, a finding of no significant impact (FONSI) to the environment is anticipated.

A FONSI was issued by the Department of Land and Natural Resources in October 1998. The Final Environmental Assessment for the proposed project was submitted to the Office of Environmental

Quality Control for publication in the December 23, 1998
Environmental Notice.

The City and County of Honolulu, Department of Planning and Permitting has determined that the project is not within the Special Management Area.

The Office of Planning, Coastal Zone Management Program has determined that the project appears to be consistent with CZM objectives to protect beach resources and improve coastal recreational opportunities. The proposed mitigation measures are adequate to minimize adverse environmental impacts that may be caused by the proposed activity.

In addition, the U.S. Army Corps of Engineers has determined that a Department of the Army Permit will be required for the project.

PUBLIC HEARING SUMMARY:

A public hearing for the project was held on July 8, 1999 at 6:00 p.m., in Honolulu, Hawaii, before the Board of Land and Natural Resources (Board). The Chairperson opened the meeting and then Land Division staff summarized the project and agency comments to date. Questions and answers followed.

The Chairperson asked the consultant to identify the location of the offshore sand deposits.

The consultant said that the sand is located immediately offshore of Kuhio Beach in depressions surrounding the surf sites.

The Chairperson was concerned that the sand removal might affect surf sites by changing bottom contours.

The consultant noted that the deposits are thin (2-3 feet) and removal will not affect surf sites.

The Chairperson asked the consultant to explain where the sand that is now in the offshore areas, came from.

The consultant said that it probably came from prior beach nourishment projects.

The Chairperson was concerned about backwashing and asked what would happen to the wave energy if it didn't go over the wall.

The consultant stated that the wave energy would be absorbed by the rubble mound structures, better than the existing walls.

The Chairperson asked whether waves would wash directly into the proposed gaps in the walls, which could result in people surfing directly into the basins.

The consultant said that this was conceivable.

The Kauai Board member asked where the location of the Marine Life Conservation District (MLCD) was.

The consultant stated that the boundary goes offshore of the Kapahulu storm drain and Waikiki Natatorium.

The Board member asked whether there were maps showing the location of the sand sources offshore.

The consultant displayed maps and identified areas where sand would be reclaimed.

The Chairperson wondered how surf sites might be treated differently if they were considered cultural sites rather than recreational sites.

Staff noted that treatment would come directly through the Historic Preservation Division. Staff would certainly have to attach higher significance to surf sites if a specific group of people were specifically concerned with that issue, as opposed to more general concerns.

The Board member asked whether all of the sand in the source areas would be removed?

The consultant said that it would not. Just enough sand would be removed to create the desired beach configuration. More detailed survey work would need to be done during design to determine sand needs. The plan is to re-shape the beach with existing sand in the basins, and then augment it with more sand to create the final beach configuration.

The Board member asked whether this [sand pumping] had been done successfully in Hawaii.

The consultant said that it had. Sand was pumped at Keahole, Hawaii using a submersible sand mining system to demonstrate

feasibility of the system. The consultant stated that they are proposing a simpler system due to the shallow sand deposits. They will basically vacuum the sand.

The Board member asked whether there are companies that do this type of work.

The consultant stated that there are companies and that they were proposing a sand investigation project during the design phase to resolve some of the technical questions.

The Chairman asked whether they would examine the quality of the sand during this phase.

The consultant answered in the affirmative.

The Hawaii Board member wanted staff to clarify the issue of cultural recognition of the surf sites and why statements were made that the issue was beyond the scope of this project.

Staff explained that some feel that surf sites should be recognized as cultural sites rather than recreational sites. Staff followed that that whole argument would be outside of the scope of this process. However, if they were considered cultural sites, there is speculation that they would be treated differently.

The Board member asked that if they were to be treated differently, at what point would the Historic Preservation Division (HPD) look at it.

Staff said that he didn't know if they would ever look at it, because staff did not know to what extent HPD looks at cultural issues/sites.

The Chairman noted that we could discuss the issue of whether a surf site is a cultural or recreational resource, but the indications are that the sites are not going to be impacted by the project.

The Board member got the impression that what has been proposed is theoretical. Asked if there were examples we could look to somewhere else, to prove that sand pumping is feasible with no effect on other resources.

The consultant noted that sand pumping is done all over the east coast. However, the difference is that we have coral and they

don't. So turbidity is not a problem [for them]. In Waikiki, there is virtually no live coral. Surveys were done and no live coral was found. It is difficult for coral to establish in this type of environment where there is high wave energy and sand scour. This means that in the area off of Kuhio Beach there will be virtually no impact to marine areas.

The Chairman asked if we use sand suction technology when we dredge harbors.

Staff noted that this technology was used recently at Kihei Small Boat Harbor.

The Board member noted that much of the sand offshore of Waikiki came from prior sand nourishment efforts. The board member asked if any studies had been done before sand nourishment occurred?

The consultant stated that little data was available to establish conditions in the offshore areas prior to sand nourishment efforts, so it would be hard to say how much damage was done.

Dr. Charles Fletcher of the University of Hawaii testified on the proposed project. He stated at the on-set that he supports the project but noted that he hadn't read the environmental assessment.

Dr. Fletcher was concerned that the overall budget for the project was rather high and was concerned, that to some degree, it will set precedent for other beach renourishment projects that are relatively small. He hoped that we wouldn't view beach nourishment projects on the order of 10 to 20 thousand cubic yards as a million dollar endeavors. He felt that it could be done for much less. He also wasn't convinced that a full-scale physical model for this kind of project was warranted; that tends to drive up the cost. He furthermore noted that physical modeling is highly speculative in terms of translating the results from a scale model into the natural system.

He felt that removing sand from the reef might be a positive feature of this project. Also felt that the project is consistent with the Coastal Erosion Management Plan.

Mr. Rick Egged of the Waikiki Improvement Association testified in support of the project. Felt that the slippery wall was unsightly and not natural looking. Was also concerned about water quality in the basin and that this project would improve on that. Also concerned about public safety. Noted that people have sustained

injuries from falling on the slippery wall.

He noted that the state of Waikiki's beaches is an important part of the agenda that the businesses of Waikiki have identified for the overall improvement of the area. The beach is the signature attraction for Waikiki and it is critical that we maintain its competitiveness and safety. He encouraged the Board to approve the project and for the Department to implement the improvements.

He felt that the proposed design and wall configuration would not impact surf sites and that is why it was chosen.

The Kauai Board member asked about project costs.

Mr. Egged said that it was his understanding that construction estimates were about \$3 million and that design was about \$700 thousand. Noted that while the \$700 thousand had been approved that the \$3 million for construction had not yet been appropriated by the legislature.

He commended DLNR staff for sticking with this project and noted that it was exciting to actually get to this stage where it actually is a viable project that will get constructed.

Mr. George Downing testified on behalf of himself and Safe our Surf (SOS).

He noted that SOS has always been interested in seeing all things done in Waikiki that are positive in assisting the hotel industry and complementing the beaches as long as they did not intrude upon the surf sites.

Mr. Downing felt that the environmental assessment was inadequate because it fails to take into account the history of the construction that has taken place in the project area. He said that it touched upon it lightly but not enough to understand what has taken place, and what caused erosion in the area.

He noted that everything that we have done to our precious Waikiki has been influenced by man. He said that that's all good and well, that as long as we, in cutting this diamond don't chip it away and damage it. Said that Waikiki is our economic cell for Oahu. Take it away and it would be drastic what we would loose.

Said that the report doesn't address the subterranean ground in the area, as far as what it consists of. Said that had we drilled into

the sand areas, and found out what is polluting it - e.g., is it pollution coming from the surface, that has over the years penetrated down through the sand, or is it subterranean influences from the Ala Wai Canal and from the sewer system that has been in existence since 1930? Are there cracks in the sewer system that is causing pollution of the sand base?

Another area that he felt was not adequately covered was the test that was conducted regarding the model study. He wondered how you could scale down a sand grain, because if you were doing a test on water circulation and sand movement and you scale it down to 1:20, how could you scale down the sand grain?

Mr. Downing said that he started in Waikiki when he was about nine (9) years old. Said that he remembered the site. Said that the Kapahulu drain was built to essentially drain the Ala Wai Canal but the shorefront property owners fought it because draining the Ala Wai Canal into Waikiki would result in all the hotels getting the debris. He said that during this time they decided to put in a beach. Said that they dredged the area minus six feet and filled the area with sand. Within nine (9) months the sand eroded into the reef area and also built the beach in front of the Royal Hawaiian Hotel. Said that the idea came up to stop the sand loss and create a groin. So they took some sewer pipes and lined the edge of the dredged area and filled the areas with sand. Mr. Downing said that this helped but a problem they ran into was that because the pipes were not locked together wave action moved them. So they decided to cap the thing and this is what we have today.

He noted that the waves overtopping the existing wall structure caused the Diamond Head side of the Diamond Head basin to be scoured. This is why the wall is being raised to prevent wave overtopping and beach scouring.

He felt that the plan to open up the basins to get more water movement would result in beach erosion. He said that this area is unique because it has the deepest water closest to shore and it's a surf area called Punas. This means that high wave energy is focusing in on this cell and that is the reason why there is an erosion problem. Felt that a pump system should be developed to maintain better water quality but that the existing wall should be left alone.

He also was concerned over the center groin extending outside the existing wall because the area is considered a board recovery zone and boards could be damaged.

Felt that the proposed improvements on the Ewa side would be O.K. in the area of Queens Surf. Noted that there is a channel in front of the Ewa Basin and that most of the sand from the basin ended up in the channel and gradually worked its way over the reef and in front of Kuhio Beach and in front of the Royal Hawaiian.

He noted that there are 250,000 surf riders in the State and this is a valuable place to them. If you damage one site, people have to go somewhere else. Noted that we cannot afford to damage Waikiki because there is no place in the world like it.

Mr. Downing was concerned over the wide footprint of the breakwater and that it would consume valuable space. Felt that it is our responsibility to care for Waikiki because the State depends on it. Felt that some of these issues should be addressed.

Mr. Downing felt that the sand suction project would be beneficial to the surf sites. Noted that the Canoes surf site was affected by sand deposition.

Mr. Downing, in reference to previous beach nourishment efforts in the basins wondered why new sand was being put in the basins without airing the old sand. He said that someone told him the reason it was not aired was that it would smell terrible. Said that if you dig down past nine (9) inches you will find dark sand.

In general Mr. Downing agreed with some aspects of the project but did not agree with opening-up the basins.

The Kauai Board Member asked staff when would be the right time to look at alternatives to reduce costs.

Staff responded by saying that prior to spending a lot of money on something you want to be fairly certain that is what you want to do. Staff felt that a project modification at some point would not be a problem, as many of the basic requirements would have already been met. The only problem would be spending the money on design and then not doing it.

The Board member was concerned that having gone through the review process, that if the proposed suggestions are different enough, do we end up starting the whole process over again.

The Chairperson asked the consultant to comment on the possibility of value added engineering during the design process before you

come up with final construction drawings and specifications and construction monitoring.

The consultant noted that there would be ample opportunity to revise to the design. Noted that the design in the environmental assessment is a concept design. Minor adjustments can be made.

The Chairperson responded to Dr. Fletcher's earlier comment about project costs. He asked whether it was his [Dr. Fletcher's] point that most of the money, in the earlier estimate of \$2-3 million, was not so much for that portion of the project but in the stabilizing features?

The consultant did not recall the split between construction costs for the structures and the beach portion, but that she was inclined to say that it is about the same.

The Chairperson wondered why the cost of the project surprised Dr. Fletcher.

Dr. Fletcher noted that the Department commissioned a study by two coastal engineers and for less than \$1 million from initial scoping and design, letting contracts and final construction, for three different area on Oahu and Maui, which all consisted of T-Head designs, with equivalent amounts of sand. All three of the sites together came to less than \$1 million. He felt that, without having done a full economic analysis that there was a misfit and wanted to see a re-examination of the budget.

The consultant noted that more detailed costs estimates would be given during the design phase. She noted that this is done by someone that's in the business of preparing budgets for coastal engineering projects.

Written Testimony:

Written testimony has been included as Exhibit 8 of this report.

STAFF DISCUSSION:

Earlier Comments by CLP staff:

In comments to the consultant in March 1999, the Coastal Lands Program (CLP) staff expressed support for the project. While support has not waned, staff has identified various concerns over the past few months, which give reason to pause. Upon further and

more detailed review of this matter, costs considerations, numerous on-site evaluations, public testimony, and input from other coastal engineers and authorities, including the U.S. Army Corps of Engineers, staff believes that it would be prudent to delay further project work until a second professional opinion is provided on the proposed design. This project is a strong candidate for a "value engineering" study or independent technical review. This is a study that would need to be conducted by an independent qualified coastal engineer or engineering team. This is a common practice employed by the U.S. Army Corps of Engineers on many of their projects. Typically used for flood control/harbor improvement projects in Hawaii, and on beach restoration projects on the U.S. Mainland, the Corps design branch will seek an independent technical review of their preferred project design. They will assemble a team comprised of Corps experts from various disciplines and with many years of experience and this team will scrutinize the proposal. This is done prior to the initiation of final design work and commonly results in design improvements and/or cost savings.

Given the substantial sums of money already expended on this project, the substantial estimated future expenditures, and more importantly, the unparalleled need to succeed in the Waikiki shore area, staff believes that this project deserves a second and independent analysis by a coastal engineer with substantial experience in this specialized field. Further reasoning is provided.

It is critical that we understand and affirm the technical side of the problem as well as the consequences of pursuing a particular action, prior to the commitment of substantial monetary resources. The unparalleled importance of Waikiki as a resource to the State alone, gives us reason to pause before we commit the State's limited resources to an endeavor as important as this. There is a need to ensure a high level of confidence in the proposed solution and this is often done, as with the Corps through a consensus building process. More importantly, we must be assured that the project is necessary, beneficial and viable and not the result of our desire to "just do something", because we failed, momentarily, to achieve our larger goals. The Fifteenth Legislature's expected us to investigate restoration of all of Waikiki's beaches. This project must, therefore, be evaluated with respect that this broader goal. This is all the more reason to seek an independent analysis of the project.

While staff agrees with many of the consultant's technical assumptions regarding their analysis of the existing problems in the Kuhio Beach Basins, such as the potential water quality problems, staff questions other technical assumptions that have been posited. For instance, staff feels that the matter of sand losses has not been properly articulated. Also, staff questions whether the project will substantially improve public safety, or whether it will, in fact, create additional problems - e.g., bathers drifting into surf sites or people crawling on the higher breakwater segments. Staff feels that it is important to articulate solid technical assumptions, because these form the basis for future actions, underpin the project design, and help decision-makers consider the benefits and costs of alternatives. An independent analysis would if nothing else re-affirm the project design and would help complete the overall analysis that is in some areas, deficient.

The situation in Waikiki's shore environment is actually quite complicated. The wave patterns, with periodic high surf, currents and offshore bathymetry, and 70 years of human modifications in the Waikiki area, make predictions of project performance quite speculative, even after modeling. Staff feels that even the model parameters need to be evaluated to identify its strengths and weaknesses in predicting project performance.

For instance, a scale model was built at the Scripps Institute, in San Diego, for the Diamond Head, or South Basin, but not for the Ewa or North Basin. The performance of the South Basin, as observed in the model test, was extrapolated to perform similar to the North or Ewa Basin, to evaluate, most importantly, the effect of wave overtopping and the performance of the beach platform. However, the wave dynamics in front of the North basin breakwater (slippery wall) are quite different than in front of the South basin wall. Much more wave energy is focused on the South Basin wall due to the difference in bathymetry between the two sites. This phenomenon is easily observed at a higher tide with a moderate to large South swell. Wave energy is somewhat dissipated by the time it reaches the Ewa Basin breakwater, but at the Diamond Head Wall (slippery wall), waves strike the structure violently. While this is not a serious issue, staff would certainly appreciate a second opinion on the proposed design to increase the level of confidence. This could only be done through a value-added engineering analysis.

Technical Assumptions:

Proposed Project Design:

While the proposed project design does not appear to be inherently flawed, the overall effort to improve the basins needs to be put in its proper perspective. To avoid sand losses as a result of opening the basins to the open ocean, the offshore walls and breakwaters would be reconstructed and raised an additional two (2) feet. This would be done to avoid wave overtopping. Another major benefit would be to improve water quality and public safety. While the concept for Kuhio Beach appears to be sound from an engineering perspective, staff is still concerned over how well the system will actually function when nature's unpredictable forces begin acting upon it; forces which could not possibly be captured in modeling or arithmetic. Staff is reminded of the many Army Corps failures in this and other types of endeavors to protect land and beaches, failures that the Corps is beginning to correct through much higher-level interdisciplinary team oriented analyses of projects. Staff is also reminded of Hawaii's relative lack of experience in beach restoration, and feels that we need to seek national perspectives and engineering expertise on these complicated matters. In addition, given the State's current fiscal crisis, staff has concerns beyond all of this whether the Kuhio Beach project is necessary or whether there is a more economical way to achieve the same goals - e.g. improve water quality, sand stability and public safety, through another alternative.

The overall effect of opening-up the basins and filling/reshaping the beaches with sand would improve water quality. In addition, the beach configurations could be expected to perform according to the model, but there are no guarantees in terms of how long this situation is expected to last. [Note: the consultant should have calculated sand volumes and also recommended future renourishment requirements for this project to maintain the desired beach width and configuration.] Dr. Fletcher cautioned that physical modeling is highly speculative in terms of translating the results from a scale model into the natural system. Staff notes that the model test conditions can only capture and simulate natural conditions within a particular range. All of the model tests were performed with one water level = +3 feet MLLW (relatively high). Although these static features - e.g. tides, wave direction and height can be adjusted with mathematical models and other engineering assumptions, the technology is limited. There is really no substitute for real world experience. In essence, staff feels that there are no guarantees that the sand will remain in the basins

given the areas historical susceptibility to erosion and uncertainly of littoral processes in the project vicinity. Moreover, with the development of the County's Kuhio Beach Promenade and the demolition of the back beach walls, beach nourishment will be mandatory to protect the County's improvements from wave and/or erosion damages. Because there is always the possibility of failure, project designs must be rigorously reviewed by qualified coastal engineers.

Another issue relates to our responsibility to implement the Fifteenth State Legislature's will of fixing all of Waikiki's beaches, and how this project will enhance or detract from this broader goal. Because there has been no independent analysis, as far as staff knows, of the 1991 Waikiki Beach Improvement Project, we are, in essence accepting the idea of "compartmentalization". This is a style or philosophy expressed by the consultant, which effectively segments Waikiki into distinct compartments bounded by structures (see Exhibit 4). So if this project is built as planned, we may be limiting future options for Waikiki. For instance, one option might be fewer structures and more sand recycling to achieve similar goals. Staff must reiterate, that the importance of Waikiki as a locale for residents and international visitors, as Oahu's economic engine, and as a unique and irreplaceable feature of our Hawaiian culture and lore, that we cannot afford to err on this endeavor. That is also why staff feels that the situation warrants for an independent value added study.

Other Technical Assumptions:

Sand Loss

The technical/environmental document for the project assumes that sand losses will be reduced with the new-segmented breakwater system in place and the new beach will be stabilized. Beach stabilization and sand loss to the offshore reef system are major underlying reasons to do something. Although a physical model was done for the project from which conclusions have been drawn, empirical observations suggest that something else might be happening in the basins. For instance, to suggest that sand is currently escaping the basins fails to recognize the fact that the basins are nearly closed on all sides by walls. In the Diamond Head (South) basin, which is almost entirely enclosed, staff observed a misshapen beach (this is also clear from the aerial photographs of the basins), but this does not suggest that sand escaped the basin. In fact, it appears that large quantities of

sand moved from the dry beach into the basin bottom, forming a shallow sand bar or shoal. A wide healthy beach still remains on the Ewa side of the Diamond Head Basin. If sand were escaping the basins, fairly substantial sand deposits should be located at the gap entrances, but this is not the case. In the Kapahulu side of the Diamond Head Basin, the beach has eroded due to more serious wave overtopping on this wall segment. Greater incident of wave overtopping on this side of the basin seems to be due to the nature of the bottom contours just outside the wall and possibly with some effect caused by wave refraction off the Kapahulu Storm Drain. In the Ewa Basin (North), sand has also been redistributed to the basin bottom. The consultant should have calculated the actual amount of sand within the basins for comparative purposes and to determine whether or not offshore sand pumping would even be necessary at this stage of the process. Staff believes sand scraping may be adequate at this time to improve beaches within the basins. Once again, further analysis may provide additional information to verify or conversely to question project assumptions.

Public Safety:

The consultant brings attention to public safety issues - e.g., slippery walls and potholes. However, staff is uncertain whether the project will result in net improvements to public safety. While people do currently walk on top of the existing walls, they would also walk on top of the proposed walls, which would be two feet higher and of rubblemound construction. The consequences of falling off a higher rubblemound revetment, or lodging a leg in one of the open crevasses, would be far more serious than falling off of the existing slippery wall within the Diamond Head basin. Staff does not feel that public safety should be used to help justify the proposed changes. Neither is staff certain whether the issue of scour holes, is enough in of itself, to justify the changes. The hole issue could be addressed without rebuilding the entire breakwater field.

Visual Impacts:

The new breakwater segments, although reduced in height, will cause an intrusion on views, especially at lower tides, when the base of the massive structures will be exposed.

Offshore Sand Investigation:

Staff feels that this project has been characterized and oversimplified. Sand extraction can be complicated. It is staff's understanding, after speaking with one of the individuals familiar with a sand recovery project done by a contractor in Kona in the '70s, that it was very complicated. Another project discussed during the public hearing for this project was the in Kihei Small Boat Harbor dredging project, which used suction dredging technology. This project also ran into serious technical difficulties.

The process of extracting and delivering sand in Waikiki will not be easy and will require specialized expertise, creativity and technology. In addition, the consultant has not investigated sand quantities or quality in the near shore reef area nor within the basins, a task that should have been completed given the large budget for this project. So, in effect, it is currently not known if this is a viable sand source. Staff feels that these sources should be probed and mapped prior to our considering a dredging contract. These tasks could easily be accomplished with minimal expenditure.

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

Is the Proposed Land Use Consistent with the Purpose of the Conservation District?

The purpose of the Conservation District is to regulate land use for the purpose of conserving, protecting, and preserving 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.

While there are significant technical questions surrounding this project, staff has determined that the intent of the project is consistent with these criteria.

The beach nourishment and erosion control aspects of the project are consistent with preservation of important resources of the State - i.e., beaches.

Is the Proposed Land Use Consistent with the Objectives of the Resource Subzone?

The objective of the Resource Subzone is to develop, with proper management, areas to ensure sustained use of the natural resources of those areas. The sand nourishment and erosion control elements are consistent with the purposes of the resource subzone. Almost all submerged lands in the State are designated Resource subzone. Development of these areas is anticipated in some cases. However, all develop must conserve and protect existing resource values or enhance those values. Staff believes that a project of this kind will enhance these values, if planned and constructed properly. Although there will be short-term impacts, long-term impact are considered to be beneficial.

The Proposed Land Use Complies with Provisions and Guidelines Contained in Chapter 205A, HRS, entitled "Coastal Zone Management."

According to DOBOR, the project complies with the provisions set forth in the Coastal Zone Management program objectives and polices related to the recreational resources of the area.

The Office of Planning, Coastal Zone Management Program has determined that the project appears to be consistent with CZM objectives to protect beach resources and improve coastal recreational opportunities. The proposed mitigation measures are adequate to minimize adverse environmental impacts that may be caused by the proposed activity.

The Proposed Land Use Will Not Cause Substantial Adverse Impact to Existing Natural Resources Within the Surrounding Area, Community or Region.

According to the consultant, impacts are not expected to have any long-term impacts on the surrounding environment. Sand used to nourish the beach will be clean and uncontaminated.

The Division of Aquatic Resources reviewed the project and determined that no long-term impacts to aquatic resources are anticipated. However, staff notes that the new breakwater segments, especially the center structure will cover existing marine biota and substrate.

The Proposed Land Use, Including Buildings, Structures, and Facilities, Shall Be Compatible With the Locality and Surrounding Areas, and Appropriate to the Physical Conditions and Capabilities of the Specific Parcel.

Redevelopment of the Kuhio Beach area will not degrade existing

natural resource values since the area has undergone significant alterations over the past 70 years. Kuhio Beach is entirely manmade. However, as noted in this report, some technical issues need to be revisited to ensure that the project design is viable.

The Existing Physical and Environmental Aspects of the Land, such as Natural Beauty and Open Space Characteristics, Will Be Preserved or Improved Upon.

See previous discussion.

Subdivision of Land Will Not Be Utilized to Increase the Intensity of Land Uses in the Conservation District.

The proposed use does not involve the subdivision of land.

The Proposed Land Use Will Not Be Materially Detrimental to the Public Health, Safety, and Welfare.

The purpose of the project is to improve Kuhio Beach as a viable recreational resource. Beach restoration, if conducted properly should improve the overall public health, safety and welfare.

DISCUSSION OF PUBLIC TESTIMONY:

The following issues were raised during the public hearing that are worth noting in this section: 1) impact of sand removal on surf sites, 2) backwashing and impact to surf sites, 3) waves washing directly into the basins, people surfing into the basins, 4) current sand suction technology; 5) project budget; 6) adequacy of the environmental assessment; 7) sand pollution; and 8) sand loss.

Staff has considered these matters and has the following comments.

1. Sand removal will not adversely affect surf sites.
2. Better-engineered breakwaters should reduce backwashing and improve surfing conditions.
3. Waves will wash directly into the basins. While this would improve water quality it could increase use conflicts.
4. Staff believes that sand suction is complicated, especially in Waikiki.
5. Staff believes that the project is over budgeted.
6. Staff believes that the project assessment could be improved with an independent analysis.
7. Staff notes that finding gray sand below the surface is common on south shore beaches. This does not suggest that

it is polluted. It might be due to the fact that the material is buried in an anaerobic environment (no oxygen). The sand can be mixed with the more pristine surface material. Also, this material may bleach when exposed to air and washing.

8. Staff feels that sand losses would tend to be greater over the long run with the development of the new breaker design, although the beach would be expected to maintain its profile over the short term.

This all being said, staff has drawn the following conclusions.

CONCLUSION:

Staff believes that the beach improvements can be accomplished without any adverse long-term environmental impacts to aquatic resources and surf sites. Mr. Downing who represents Save our Surf has raised many concerns. Some of his concerns have merit. For instance, the quantity and quality of the sand within the basins needs to be evaluated. The fact that the project will incorporate sand scraping begs the question to be answered. Mr. Downing's concerns over opening up the basins and then losing the sand may also have merit, although the models and arithmetic suggest otherwise.

Staff has concerns over the proposed project design in terms of the actual benefits that will be added vs. the costs and the potential for project failure. Given the economic constraints currently facing the State, and the unparalleled importance of Waikiki, staff feels that it is imperative to achieve project success, and to do it in a fiscally responsible manner. This suggests the need for an independent value added engineering study.

The study might result in cost savings and project improvements. For instance, there is a healthy beach in Ewa or North basin and water quality is not a significant issue since flushing is constant. Perhaps we should consider minor adjustments and actions to this area, such as sand scraping, and improvements to the existing rubble mound breakwater, which appears to be quite solid and not unattractive. Minor work done in this basin could be monitored to collect project performance data over a period a two or three years. However, this would mean that the entire project design would have to be reconsidered. This should be done by an independent qualified entity.

Staff feels that there are more serious problems in the Diamond Head Basin, including water quality, wave overtopping and aesthetics. But staff is not entirely confident with the proposed solution, based on the comments in this report.

The following is a list of concerns that taken together give staff reason to consider the need for a second opinion.

1. The State has expended over \$1 million and will spend another \$700 thousand on design. Staff believes that the project budget can be significantly reduced, with potential design improvements, with an independent value added engineering study.
2. Staff wonders whether the Ewa Basin can be improved without major changes/expenditures.
3. Staff believes that the Kuhio Beach Project needs to be evaluated within the context of future beach improvements in the Waikiki area. An excellent way to do this would be through an independent evaluation of the Waikiki Beach Improvements study and the Kuhio Beach Improvements Project.
4. Staff is not convinced by the consultant's technical assumptions concerning (a) sand dynamics and the benefit of the project on sand retention, and (b) current public safety problems and the net improvements in public safety, when the project is completed.
5. The importance of Waikiki in of itself warrants an independent value added engineering or technical study. As mentioned in this report, this is now standard practice by the Corps on complicated/important projects.

Towards this end, staff feels that the Department should solicit fee proposals from additional qualified firms to conduct a value-engineering study; i.e., a study of the proposed design to elicit qualified engineering analysis of (a) its potential effectiveness, (b) alternate geometries and construction details that would result in a potentially more effective solution and cost savings, and (c) evaluation of the project or alternatives relative to the whole Waikiki littoral cell. Such a study need not take a lot of time and money. In addition, this may be the right time to evaluate the project design as it relates and/or affects the larger decisions to be made within the whole of Waikiki.

Staff believes that this final effort will yield significant net benefits in terms of cost reductions and/or, at the least, an independent review of the proposed design. The latter will help State, County and other interested entities achieve more confidence in the project design that is ultimately selected. While the Corps has offered to begin assisting the Department with these types of projects in the future, they would not be able to do so on this project due to the lack of a formal agreement with the Department. At this point, the Department would need to hire a private consultant with experience in beach restoration projects. This might cost \$50,000 and take several months to complete.

Staff finds no imminent need to begin final project design work immediately. The situation at Kuhio Beach is not imminently dangerous and visitors and residents enjoy the area daily. As an interim measure, the State or County might consider reforming the beaches within the basins by scraping sand from the basin bottoms to reform the dry beach. As noted in this submittal, much of the sand that has been placed within the basins is still there. In addition, staff feels that the proposed offshore sand investigation requires some specialized expertise and assistance as any type of procedure may have long-term implications for the whole of Waikiki. In this regard, staff recommends that the Board give the Coastal Lands Program oversight of this investigation, including oversight of the contractor selection process.

RECOMMENDATION:

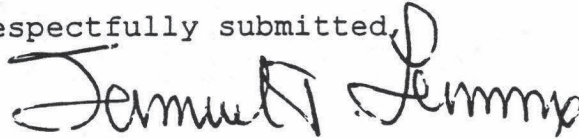
Because staff feels that the Kuhio Beach Improvements project has merit and is necessary, staff recommends approval of the concept of improvements under the following conditions:

1. That the Division of Boating and Ocean Recreation work closely with the Land Division, Coastal Lands Program and Engineering Branch to develop an acceptable scope of work and solicit fee proposals from qualified firms to conduct a value-engineering study; i.e., a study of the proposed design to elicit qualified engineering analysis of (a) its potential effectiveness, (b) alternate geometries and construction details that would result in a potentially more effective solution and cost savings, and (c) evaluation of the project or alternatives relative to the whole Waikiki littoral cell;

That no design work begins until the value added engineering study is completed, the results of which will be presented to the Board within four (4) months of the date of the Board's approval of this project;

2. That the Board give the Coastal Lands Program oversight of the near shore sand investigation, including oversight of the contractor selection process;
3. That the Board reserves the right to adjust the contract design specifications and budget based on the results of the value engineering study;
4. That this approval is subject to all standard conditions pursuant to Section 13-5-42 of the Hawaii Administrative Rules; and
5. That the Board may impose additional special conditions as necessary, when it considers the results of the value engineering study;

Respectfully submitted,

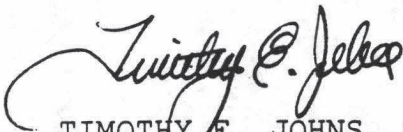


SAMUEL J. LEMMO
Staff Planner

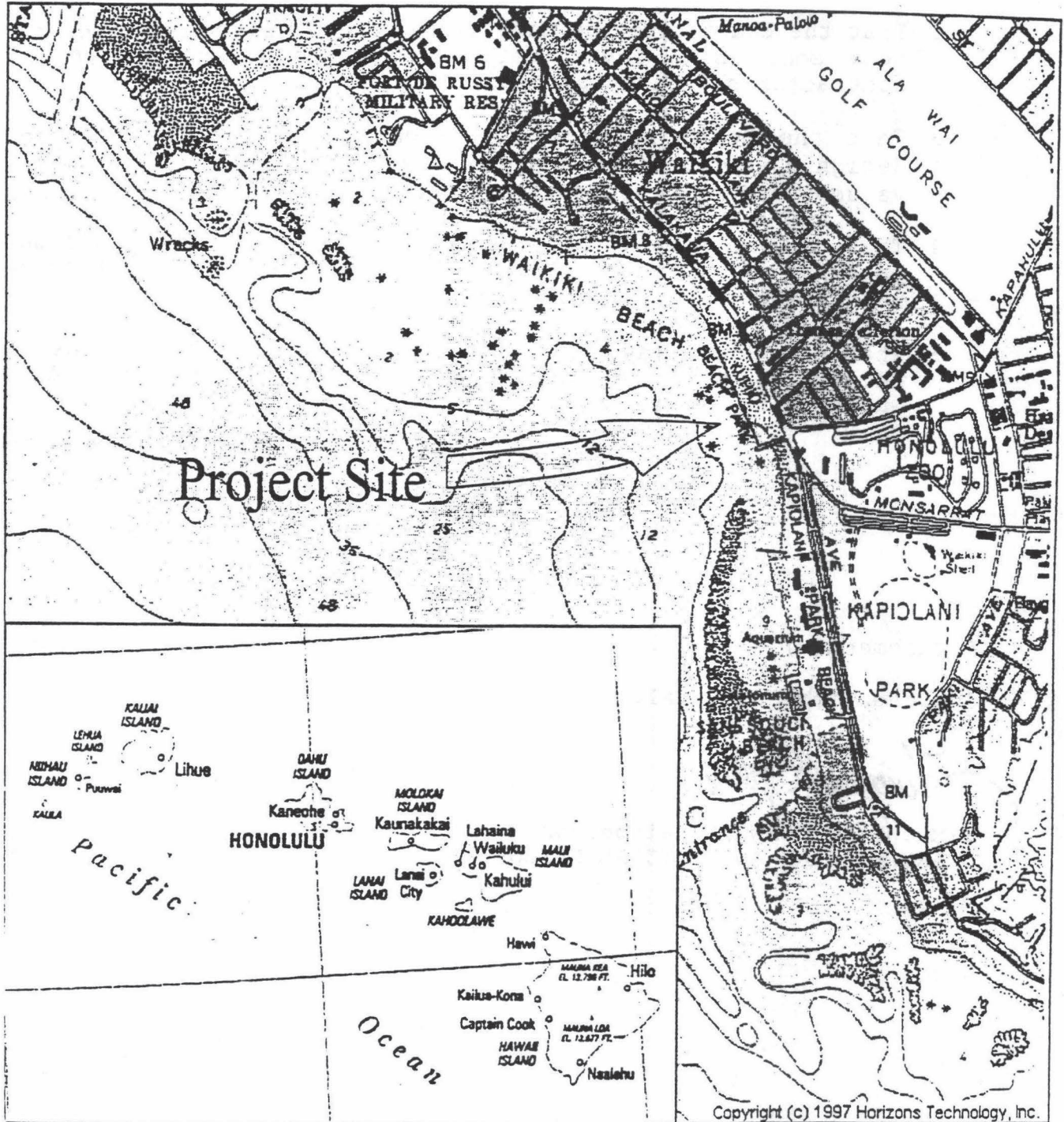


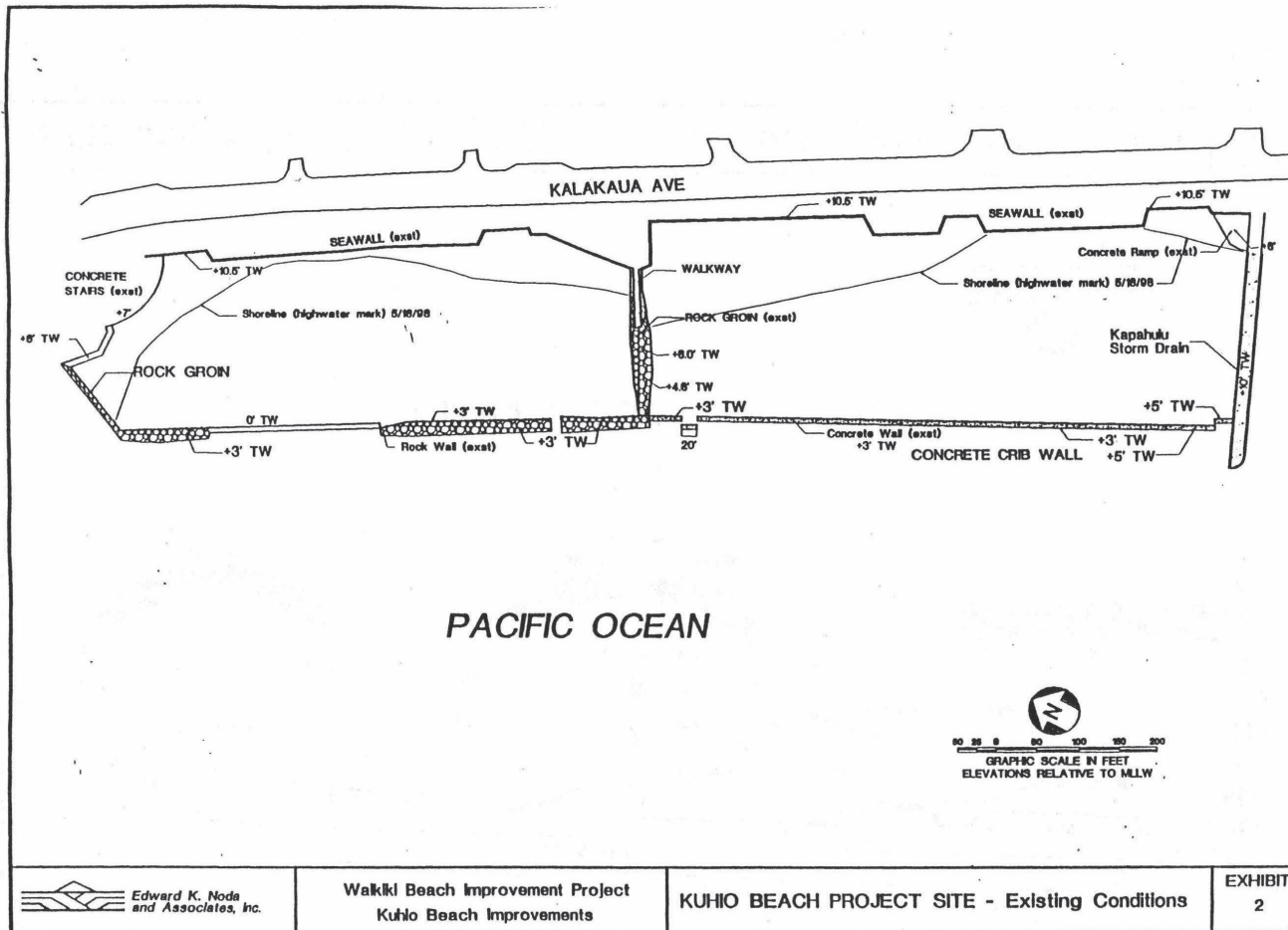
Attachment(s)

Approved for Submittal:



TIMOTHY E. JOHNS, Chairperson
BOARD OF LAND AND NATURAL RESOURCES



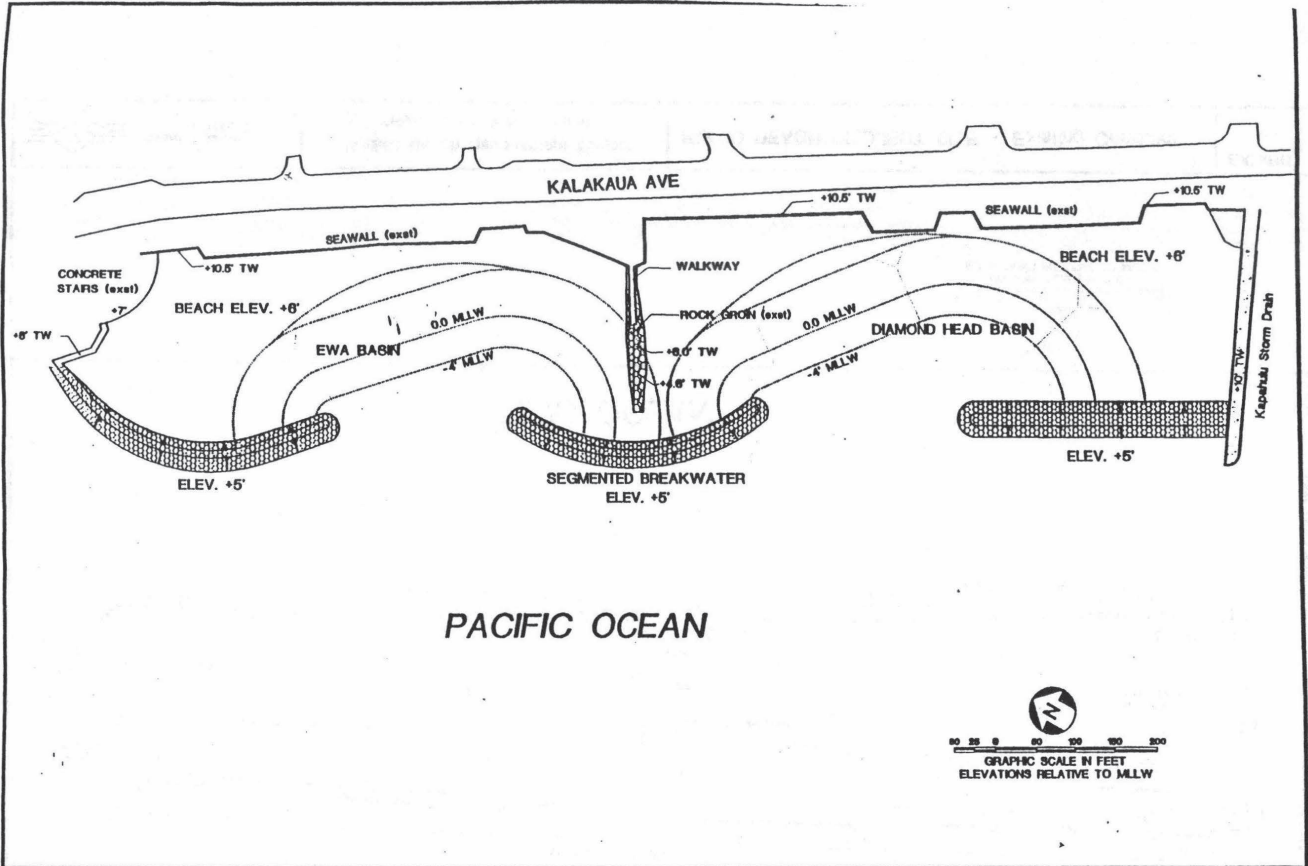



Edward K. Noda
and Associates, Inc.

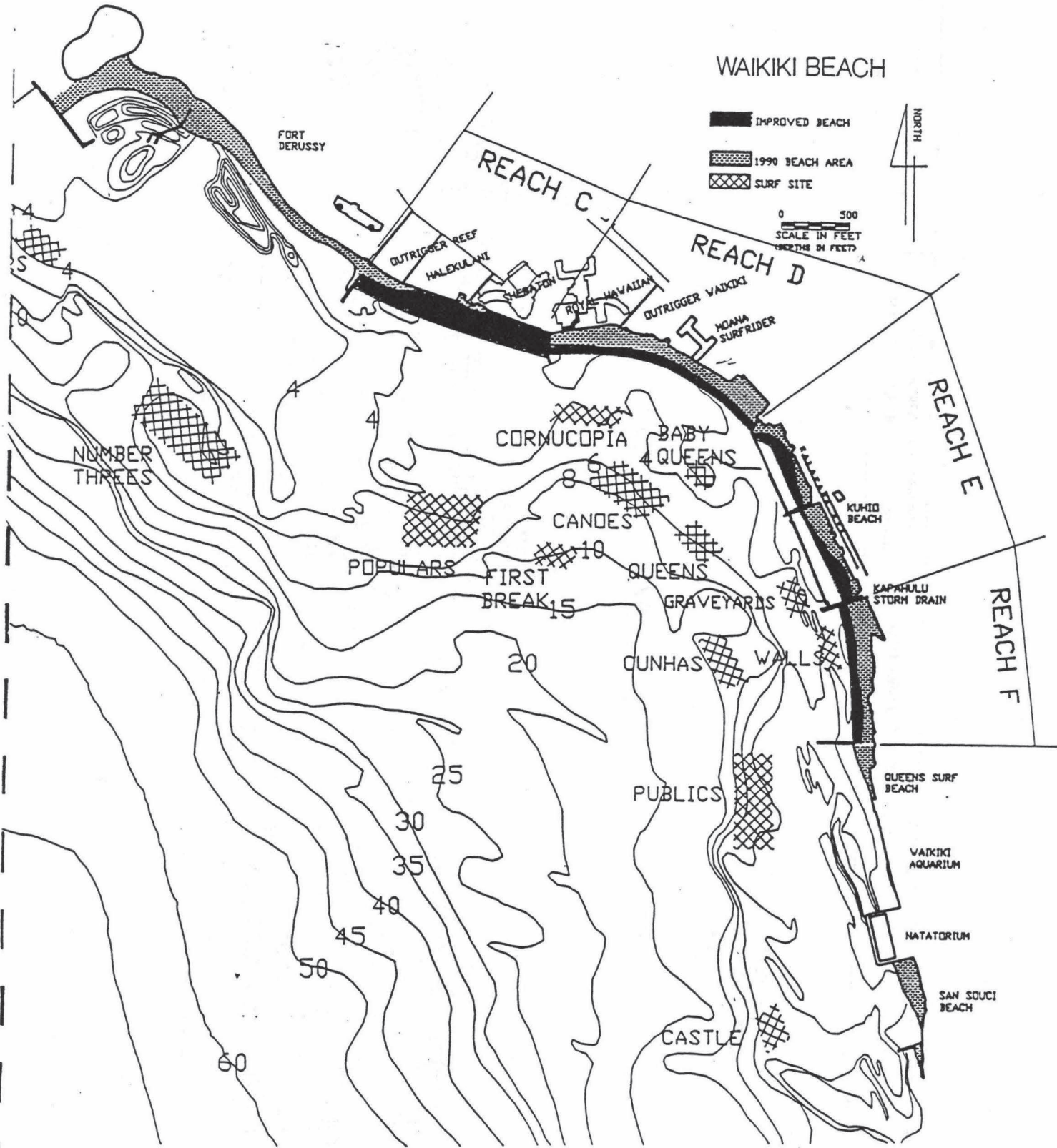
Waikiki Beach Improvement Project
Kuhio Beach Improvements

KUHIO BEACH PROJECT SITE - Existing Conditions

EXHIBIT
2



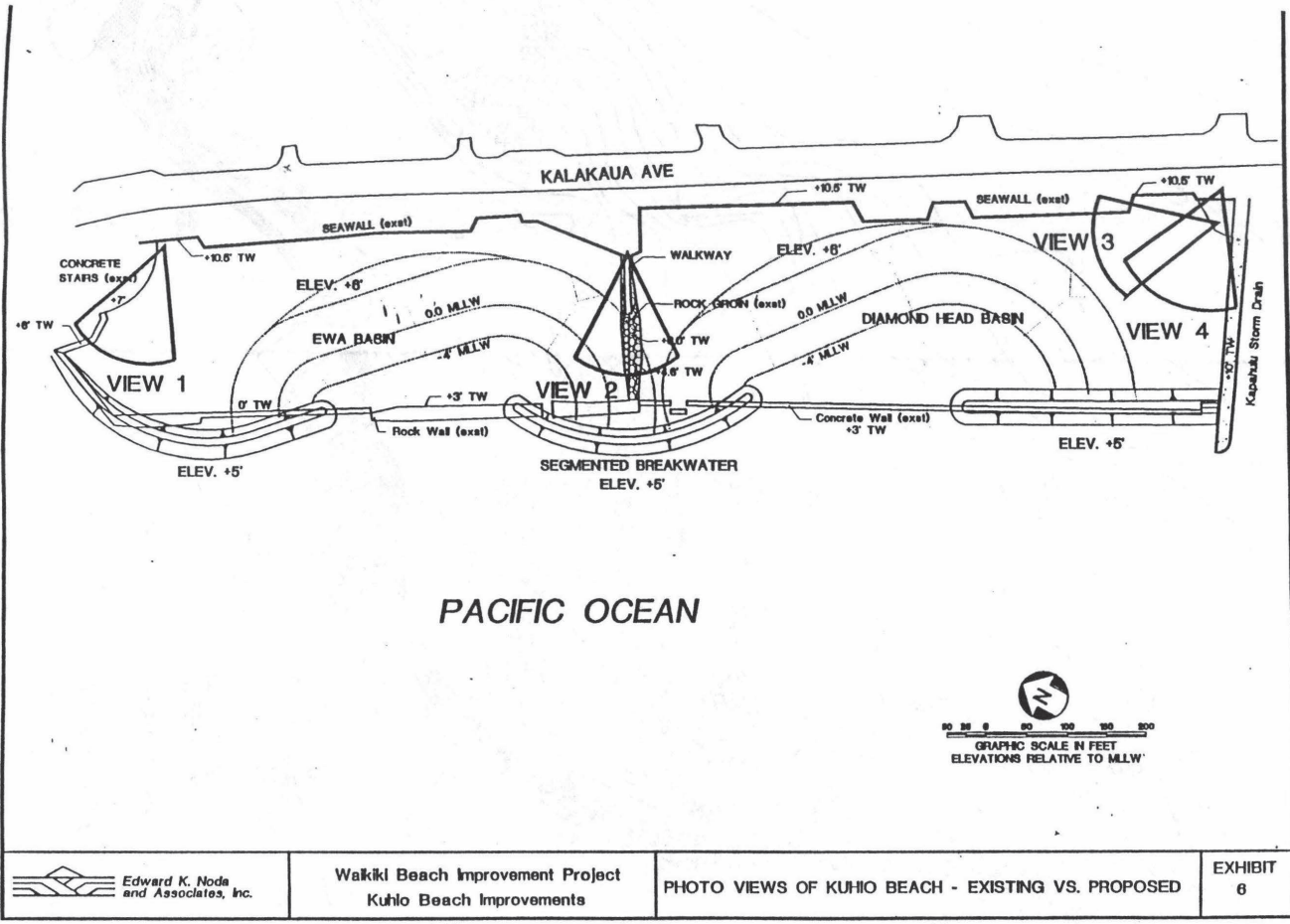
 Edward K. Noda and Associates, Inc.	Waikiki Beach Improvement Project Kuhio Beach Improvements	KUHIO BEACH - PROPOSED PLAN OF IMPROVEMENT	EXHIBIT 3
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EDWARD K. NODA & ASSOC., INC. HARBORS DIVISION STATE OF HAWAII, DOT	WAIKIKI BEACH IMPROVEMENT PROJECT PROPOSED REACHES FOR BEACH NOURISHMENT	12/91 FIGURE 2-1
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EXHIBIT 4

Ps. 1 of 1

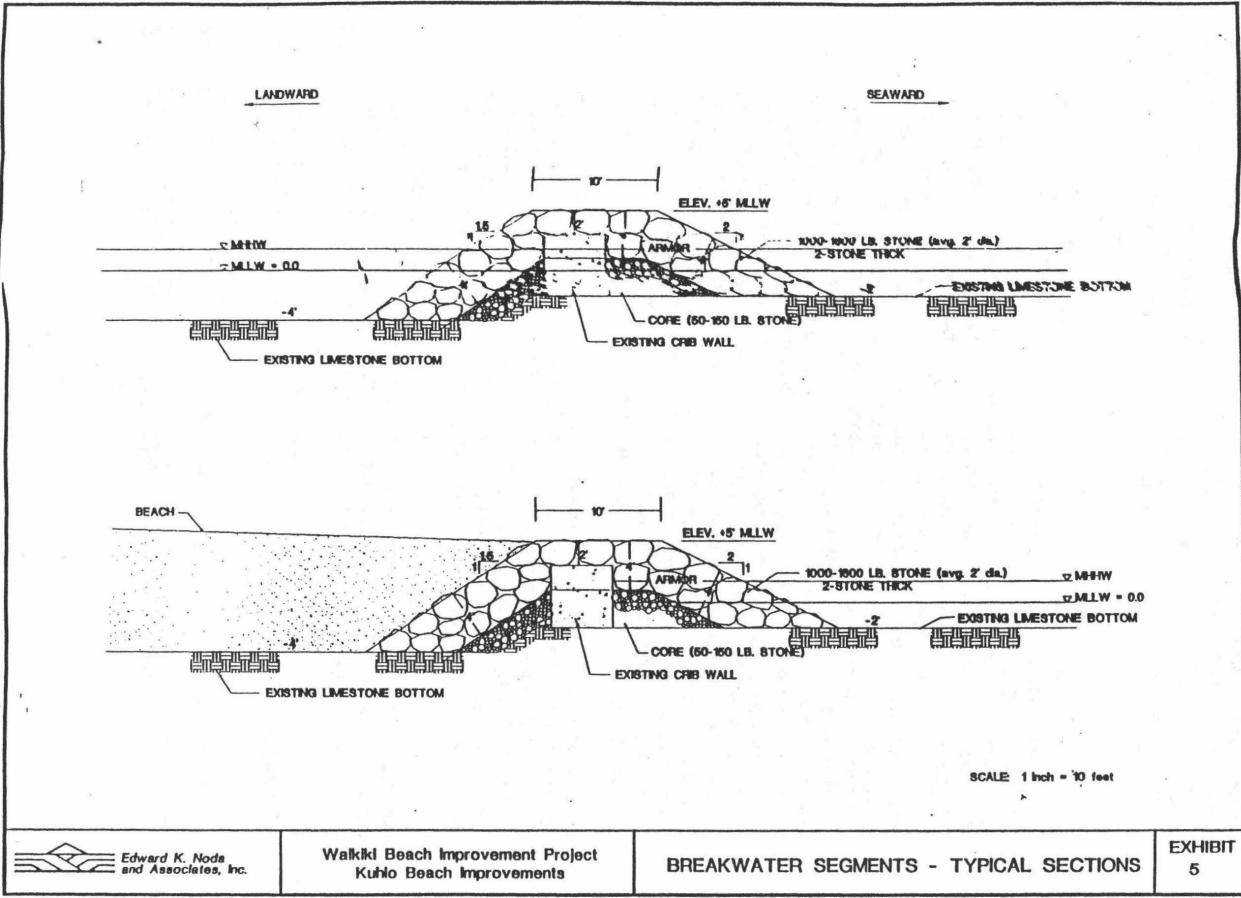


Edward K. Noda and Associates, Inc.

Waikiki Beach Improvement Project
Kuhio Beach Improvements

PHOTO VIEWS OF KUHIO BEACH - EXISTING VS. PROPOSED

EXHIBIT
6



Edward K. Noda
and Associates, Inc.

Waikiki Beach Improvement Project
Kuhio Beach Improvements

BREAKWATER SEGMENTS - TYPICAL SECTIONS

EXHIBIT
5

2 Description of the Affected Environment

- 2.1 **Location.** The proposed project is located at Kūhiō Beach Park in Waikiki, Honolulu, Oahu. Tax Map Key: 2-6-01:19.
- 2.2 **Land ownership and tenancy.** The land is owned by the State of Hawaii and managed (via life guard and cleaning services) by the City and County of Honolulu.
- 2.3 **County Zoning, State Land Use District.** The proposed project is in a State Conservation District and subject to review and approval under the Conservation District Use Application process by the State Department of Land and Natural Resources, Land Division, Planning Branch.
- 2.4 **Special Management Area, Coastal Zone Management Consistency.** The proposed project is seaward of the boundary of the SMA (Special Management Area) and is not subject to regulatory authority of the City and County of Honolulu. The project will be subject to review and approval by the Hawaii Coastal Zone Management (CZM) Program for consistency with CZM objectives as part of the federal requirements which will be imposed by the U.S. Army Corps of Engineers for issuance of their permit.
- 2.5 **Land, beach and water use.** The proposed project site consists of a sand beach, protected nearshore water, and protective concrete and rock offshore cribwalls. Use at the site is by beachgoers. Counts of beach-goers at Kūhiō Beach were made on two different dates in 1990. On a very crowded July 4th (Sunday) holiday when outrigger canoe races were being held also, the estimated number of persons on the beach and wading totaled 2,597 with a density of about 2.5 persons per 100 square feet of dry beach. In comparison, on a weekday (September 6th) the estimated total number of beach-goers was 768 with a density of about 0.75 persons per 100 square feet of dry beach. People interviewed during these beach counts stated that on the average they tended to stay at the beach about two hours. These field counts are independent of beach-goers counts made by City lifeguards who make three estimates daily using a sector-estimating technique similar to that used by the contractors in preparation for this environmental assessment. The lifeguards' counts are somewhat higher¹ because they include all people in the water (surfers, swimmers and paddlers) whereas the independent counts were only of beach-users and persons wading. It is worth noting that the field counts show the number of beach-goers on the fourth of July to be nearly four times the number of beach-goers on the weekday. Most of the beach-goers on the weekday appeared to be generally visitors and not residents. This finding implies that residents make intensive and heavy use of Waikiki's Beaches, at least on selective occasions (for example, canoe races on a fourth of July), see Edward K. Noda and

¹Lifeguard count data for 1989, aggregated and summarized by month and for the entire study area, was obtained from the City for this investigation. The data was aggregated by month, and for the entire beach area between the Moana Hotel and Queens Surf. For the month of July (1989), Lifeguard data totaled an instantaneous average count of about 14,000 daily compared to the field count (July 4, 1990) of 10,400. Again, the lifeguard estimates include people in the water, not only people on the beach whereas the field count included only people on the beach. For the month of September (1989) the Lifeguard data totaled an instantaneous average count of about 9,800 daily compared to the field count (September 6, 1990) of 3,800.

- c) **Primary Urban Center (PUC) Development Plan.** This plan (January 1999) as described in the Policy Evaluation Report, provides guidance on growth, protection of resources, maintenance of communities, housing and community development, viability of military and transportation centers, visitor industry activities, and regional transportation issues. Specifically, the proposed project assists the City in meeting the economic objectives of the PUC Development Plan by making a significant segment of the public beach at Waikiki more attractive and of higher quality than at present., the PUC plan states:

Economic Activity: Tourism is supported, particularly in Waikiki (Obj. B), through a number of policies:

- a. *Provide for the long-term viability of Waikiki as Oahu's primary resort area by giving the area priority in visitor industry related public expenditures (Policy 1).*
- b. *Provide for a high quality and safe environment for visitors and residents in Waikiki (Policy 2).²*

2.6.2 **State of Hawaii.** State plans for this location are described in "Waikiki: Hawaii's Premier Visitor Attraction" (Waikiki Working Planning Group, March 1998). The Kūhiō Beach Improvement project is included as one of the components in the overall support which the State is providing to the Waikiki District in order to enhance it as a visitor destination area, and as a place where residents can enjoy the natural environment. The proposed Kūhiō Beach Improvement project contributes to these goals to benefit the recreational experiences of both visitors and residents.

The Waikiki Working Planning Group has been superseded by another group established by the Legislature through Senate Concurrent Resolution 191, CD1, called the Joint Waikiki Task Force. This Task Force is responsible for coordinating governmental and private activities in the Waikiki area and developing recommendations to the 2000 Hawaii State Legislature. The proposed project is supported by the Joint Waikiki Task Force.

A key state objective is to: "Address the problem of saturation of the capacity of beach parks and nearshore waters." (State Recreation Functional Plan, December 1990, Page 63.) The proposed project addresses the problem of saturation by increasing the public beach area from about 1 acre to 2.5 acres.

2.6.3 **Federal.** There are no federal plans for the area.

2.7 **Flora.** None. The site consists of beach sand.

2.8 **Coastal Setting and Beach Stability.** Kūhiō Beach, and the greater part of Waikiki Beach, is man-made. Existing shoreline structures effectively "compartmentalize" the beach segments along the Waikiki shoreline. Some structures have performed well in stabilizing certain beach areas, such as the groin between the Sheraton Waikiki and

²Department of Planning and Permitting, City and County of Honolulu, *Primary Urban Center Development Plan*. January 1999.

Associates, December 1991b, for the complete study, prepared by Eugene P. Dashiell, AICP, Planning Services).

Observations and counts of persons using Kūhiō Beach and the water area enclosed by the crib walls were made on December 20, 1998. In general, the lowest number of people using the beach and water area was observed in the Diamond Head basin adjacent to the Kapahulu Storm Drain/groin (0.5 persons per 100 square feet of beach) and a slightly higher frequency of use was observed in the Ewa basin near the curved steps and the banyan tree (0.6 persons per 100 square feet). A higher density of use was observed at Kūhiō Beach outside the crib walled area, fronting the Duke Kahanamoku Statue and areas towards Fort DeRussy (1.0 persons per 100 square feet). This implies that the beach area protected by the crib walls is used less than the areas of the beach exposed to the open ocean. In terms of water use in the area protected by the crib wall, the least use occurred nearest the Kapahulu Avenue Storm Drain (about 0.1 persons per 100 square feet) and the water area near the curved stairs was used slightly more intensively (about 0.2 persons per 100 square feet). The water is shallow, less than two to four feet in the areas behind the crib wall, and most persons using the water area appeared to be children.

The proposed project will have some effect on patterns of beach and water use. It is likely that more people will begin to use Kūhiō Beach itself after the beach sand has been restored and there is a larger area to use. Because there will be a reduction in enclosed water areas from the present condition, there may be some slight reduced opportunity for bathing in the areas now protected by the crib walls.

To summarize, the impact of the proposed project will be increased beach area and increased water access. There will also be a protected water area in the lee of the segmented breakwaters structures.

2.6 **Land and related water use plans.** Following is a discussion of land and water use plans which are related to the proposed plan.

2.6.1 **City and County of Honolulu.**

- a) **Kūhiō Beach Park Expansion & Kalakaua Avenue Promenade.** This plan is described in an environmental assessment (included as Appendix D, City and County of Honolulu, August 1998). In their plan, the City would close the seaward-most lane of Kalakaua Avenue and make improvements to the beach park which adjoins the sand beach, the present proposed project. The herein proposed Kūhiō Beach Improvement project would enhance and improve the City's Kūhiō Beach Park Expansion & Kalakaua Avenue Promenade by providing a continuous and more stable beach seaward of the City's project.
- b) **Waikiki Master Plan.** This plan (City and County of Honolulu, May 15, 1992) describes a long-range set of objectives to improve Waikiki. The plan includes components such as a Waikiki Beachwalk (page 43) to include access to the beaches for the disabled and where people could walk out on the beach via a "pier lanai" to look back at views of Waikiki. The proposed Kūhiō Beach Improvement project includes two components to assist in achieving these goals: access for disabled and access on a groin extending from the shore into the ocean so that people could go out on it and look back.

Royal Hawaiian Hotels. Other structures, such as the crib wall system at Kūhiō Beach, have been only marginally successful. Analysis of historical aerial photographs from 1952 to 1990 indicated that, for the most part, there was a net increase in total beach area for the entire Waikiki shoreline, due largely to artificial beach nourishment and improvement projects (Edward K. Noda and Associates, 1991). Major additions to the recreational beach area were the artificial beach creation fronting the Hilton Hawaiian Village and Fort DeRussy. The Hilton Lagoon was created by filling around an existing water area, effectively landlocking the lagoon. Sand has been periodically placed on Waikiki Beach to restore and maintain the dry beach areas. Siltation and infilling of nearshore reef areas from sand eroded off the beaches may have caused detrimental impacts to the reef life and surfing sites.

Nearshore wave patterns in the Kūhiō Beach sector of Waikiki are relatively consistent because of the bathymetry contours. Wave refraction effects cause both sea and swell waves to approach nearly perpendicular to bathymetry contours, which is from the southwest direction for Kūhiō Beach (Edward K. Noda and Associates, 1992). Wave approach is more south-southwesterly fronting the adjacent beach to the north, and more from the west-southwesterly direction fronting the adjacent beach to the south. Aerial photographs were also analyzed to determine the wave approach patterns across the surf zone. Exhibit 11 shows a composite of all wave fronts that could be discerned from aerial photographs dating from 1952. Note that the wave fronts approach Kūhiō Beach not parallel to the shoreline, but at an angle to the crib walls. This is the reason that it has been difficult to stabilize the beach in this sector. The adjacent beaches on the northwest and southeast sides of Kūhiō Beach are oriented nearly parallel with the wave fronts, which is the reason for the relatively greater stability of these beach areas compared to Kūhiō Beach.

Waves and wave-generated currents are the primary forces that move sediment along the coast. Sediment transport in the littoral zone occurs as longshore transport or cross-shore (onshore-offshore) transport. In most cases, both types of transport will occur because of the seasonal and storm wave characteristics. Longshore transport occurs because waves approach at an angle to the beach, moving sediment in the direction of wave breaking. For Kūhiō Beach, this results in sand transport towards the northerly direction. Cross-shore transport is the movement of sediment perpendicular to the beach. Low, long period swell waves can rebuild beaches by transporting sediment shoreward. High, steep waves can erode the beach and deposit the beach material offshore. Although Kūhiō Beach is protected by the offshore crib wall system, the walls are low and much wave overtopping energy can still reach the beach. The nearly continuous walls also result in superelevation of the water level within the basin during periods of wave overtopping, which causes wave erosion at higher elevations on the beach and which also results in strong seaward-flowing currents through the narrow gaps in the wall. The proposed reconstruction of the offshore walls and the new restored beach will mitigate the existing problems of beach stability. The breakwater segments will be high enough to prevent longshore transport of beach sediments beyond the confines of these structures. Cross-shore transport will still occur, but the wide gaps will allow swell waves to rebuild the beach, similar to the adjacent beaches on either side of the project site.

The possible removal of between 10,000 and 20,000 cubic yards of sand from the pockets on the nearshore reef directly fronting Kūhiō Beach will not alter or impact the littoral processes at the site or adjacent beaches. It is estimated that about 140,000 cubic yards of sand suitable for beach nourishment are available in vast sand patches

on the nearshore reef between the Halekulani Channel and the Waikiki Aquarium (Exhibits 12 and 13). This does not include the sand resource in the Halekulani Channel, which is estimated to contain about 500,000 cubic yards of sand. Directly offshore Kūhiō Beach within about 2,000 feet from shore is an estimated 40,000+ cubic yards of sand. Much of the sand that has settled in depressions on the reef came from erosion of the beaches that were artificially nourished. The U.S. Army Corps of Engineers' 1963 report on the Cooperative Waikiki Beach Erosion Control Study suggests that about 157,000 cubic yards of sand artificially placed on the shoreline from Kuhio Beach to the Natatorium had eroded between 1951 and 1960. This sand has smothered the nearshore reef area and causes scouring of the reef because of the high wave energy environment. Recycling of this sand back to the beach will help to restore the reef habitat as well as prevent the introduction of additional "offsite" sand into the aquatic system. The sand that has settled into the pockets on the reef cannot easily be transported back to the beaches naturally because of the irregular reef bottom.

- 2.9. **Benthic and Fish Communities.** A marine biological survey conducted on 3 August 1990 (OI Consultants, Inc., 1990; Appendix D) examined benthic and fish communities in the nearshore Waikiki area. In general, the marine environment offshore of Waikiki can be characterized into two major zones. A nearshore zone, extending from the shoreline to approximately the 25-foot depth contour, is characterized by expansive sand plains. Owing to the nearly constant movement of the sand by waves, few attached or epibenthic organisms occupy this biotope. Between the sandy areas in the nearshore zone are numerous limestone (calcium carbonate) projections that could be described as "finger knolls". These structures are elongated ridges, generally oriented parallel to the shoreline, that rise several feet off the sandy bottom. The sides of the knolls are generally gently sloping rather than vertical. As a result of their elevation above the sand flats and the solid substratum they provide, the surfaces of the finger knolls serve as preferred settling sites for attached benthos.

The second major zone, occurring in water depths from approximately 25 feet to the limits of the qualitative survey (approximately 80 feet), can be described as a "hardpan" bottom. This region consists of an extremely flat, calcium carbonate surface covered by a veneer of sandy sediment and rubble fragments. Vertical relief in this zone is restricted to shallow indentations and channels lined with sand. Colonization by attached benthos is uniformly low over the hardpan surface, and is generally restricted to small corals and benthic algae. In the few locations having structural relief, solid substratum that extended above the surrounding reef surface was colonized by comparatively dense aggregations of attached benthos and fish.

The predominant macrobenthic (bottom-dwelling) fauna throughout the reef zones off Waikiki are reef-building corals, sea urchins, and encrusting sponges. Other benthic taxa were also observed, but were substantially less abundant. Nine species of "stony" corals and one "soft coral" were encountered on transects, and the number of coral species at a singled sampling station ranged from two to six. Two species of corals (*Pavona varians* and *Cyphastrea ocellina*) were observed in the study area but did not occur on any transects. The dominant coral species at all of the Waikiki stations were *Porites lobata* and *Pocillopora meandrina*. *P. lobata* accounted for about 49% of the coral coverage measured on transects and *P. meandrina* accounted for about 45%. Thus, the eight remaining species totaled accounted for only about 6% of coral cover.

Coral community structure was related to depth zones and north-south location. With respect to coral cover, several patterns are evident. Overall coral cover is higher at

the northwest end of Waikiki than at the southeast end. In the northern areas offshore the Hilton Hawaiian and Halekulani Hotels, cover is highest at the middle stations (20 and 40 feet in depth), and lowest at the deep (60 foot) stations. In the southern area offshore the Moana Hotel to the Waikiki Aquarium, there are no such relationships, and coral cover is comparatively low (less than 15%) at all areas. The number and diversity of coral species do not show the same spatial trends as do coral coverage. The highest species number (6) and the highest diversity (1.25), however, were observed near the Hilton Hawaiian Pier channel.

The higher coral coverage and diversity along the northwest transects apparently relates to the greater area of solid substratum available in these areas. The finger knolls that predominate in the northwest area are not as abundant in the southeast area. Coral colonization was clearly greater on these structures, owing to the protection offered from sand scour. In areas with less vertical relief, coral colonization and growth appears to be severely restricted. Coral cover was uniformly low at all of the 60-foot stations, and the sea bottom consisted of carbonate hardpan covered with fine sediment.

Thus, it appears that the major factor controlling coral community structure at Waikiki is the degree of protection from shifting sand. In areas of high sand cover (low relief) corals are very limited; in areas where vertical relief provides settling surfaces above the level of sand movement, coral communities are moderately well-established.

It is evident from survey results that reef fish community structure off Waikiki is largely a function of topographical relief of the bottom. Areas with little structural relief in the vertical dimension were poor habitats for reef fish. In such areas, few fish were noted and most of these were species such as triggerfishes (humuhumu, *Balistidae*) which inhabit barren areas and take shelter in small crevices in the bottom. In contrast, areas with low rock ledges or finger knolls harbored substantial numbers of fish consisting of a variety of species. The fish in such areas can be grouped into four general categories: juveniles, planktivores, herbivores, and rubble-dwelling fish.

Juvenile fish belonged mostly to the family *Acanthuridae* (surgeon fish), with representatives from the families *Labridae* (wrasses), *Mullidae* (goat fish) and *Chaetodontidae* (butterfly fish). The predominant planktivorous fish were the blackfin chromis (*Chromis vanderbilti*) and the milletseed butterflyfish (lau-wiliwili, *Chaetodon milliaris*). The primary herbivore was the brown surgeonfish (ma'i'i'i, *Acanthurus nigrofuscus*). Other common herbivores were goldring surgeonfish (kole, *Ctenochaetus strigosus*), convict tangs (manini, *A. triostegus*) and small unicornfish (kala, *Naso unicornis*). The primary rubble dwelling fish were the saddle wrasse (hinalea lau-wili, *Thalassoma duperrey*) and manybar goatfish (moano, *Parupeneus multifasciatus*).

A few species of "food fish" (those preferred by commercial and/or recreational fishermen) were observed during the survey. A school of approximately 2,000 juvenile blue-lined snapper (taape, *Lutjanus kasmira*) were observed at one site. Several grand-eyed porgeys (mu, *Monotaxis grandoculis*) were also observed. Rocky ledges and large coral heads sheltered occasional squirrelfish (u'u, *Myripristes berndti*). Other food fish included parrotfish (uhu, *Scarus* spp.), and goatfish (moana kea and malu, *Parupeneus cyclostomus* and *P. bifasciatus*). Overall, however, such fish were quite rare, tended to be small, and avoided divers. In general, the entire survey area appeared to be subjected to substantial fishing pressure which has noticeably impacted the abundance, size and behavior of sought-after species.

A biological and sediment infaunal survey was conducted of the sand deposits offshore Kuhio Beach on 11 February 1999 (Oceanic Institute, letter report dated 3

March 1999; Appendix D). The purpose was to assess the importance of these sand deposits as a functional habitat for marine invertebrates and fish. The survey revealed that the sand deposits were barren in terms of infaunal organisms. Also, no large benthic invertebrates or bottom-feeding fish were observed in the sand habitats. The sand habitat does not appear to support sufficient biological resources to serve as an important feeding area for large invertebrates or fish. While the sand habitat may be used as resting areas by certain species of fish, the removal of some portion of the sand is not expected to impact this use of the habitat.

- 2.10 **Water Quality.** A water quality survey conducted on 3 August 1990 (OI Consultants, Inc., 1990; Appendix D) identified several general trends in water quality within the Waikiki study area. Levels of many water quality parameters (e.g., temperature, pigments, and nutrients) were generally higher at the shallower stations. However, lower levels were observed near shore along transect C, where channels cut through the offshore reefs and deeper water lies closer to the beach.

Water quality near shore along transect D in the vicinity of the project site appears to be affected by a source of nutrient-rich fresh water, perhaps the Kapahulu storm drain. The salinity and temperature data also suggest that the nearshore waters between the Royal Hawaiian Hotel and Kapahulu Avenue are more actively mixed with water from offshore, perhaps due to the presence of the deep channels described above. Chave et al. (1973) observed a net seaward current flow near Kapahulu and near the Natatorium during low-wave conditions. During large waves, they observed a strong seaward flow originating nearshore between the Royal Hawaiian Hotel and Kūhiō Beach.

Surface water quality in nearshore samples along the northeastern transects (A and B) appeared to be strongly influenced by a water mass having lower salinity and elevated concentrations of nutrients, pigments, and suspended materials. The most likely source of this water is the Ala Wai Canal and Harbor. However, other sources cannot be ruled out.

In general, the deeper, offshore samples had low levels of TFS, turbidity, nutrients, and pigments, probably reflecting a greater influence of oceanic water. However, anomalously high levels of some parameters (e.g. turbidity, nitrate, silicate) were observed in mid-depth and bottom samples at some offshore stations, especially along transects D and E. Presumably, these anomalies result from mixing of offshore and nearshore waters, perhaps transported from the Diamond Head area. However, the overall trends in water quality from the mid-depth and bottom samples are complex and difficult to assess.

The State Department of Health has reported high bacterial counts in the water area enclosed by the crib walls (Honolulu Advertiser, June 7, 1993)³. A study by the University of Hawai'i's Water Resources Research Center (March 1994) which explored this issue in depth reported that the levels of Fecal coliform bacteria within the two basins enclosed by the crib walls at Kūhiō Beach consistently exceeded state water quality standards for recreational swimming areas. ("Impact of Kapahulu Storm Drain

³Environmental elements and storm drain runoff, not human sewage are apparently the cause of high bacteria counts measured at Kūhiō Beach. According to Dr. Bruce Anderson (then Deputy Director of the state Department of Health), "Birds in the Waikiki area seem the likely suspect since there is no evidence of a sewage spill." (Quoted in an article by Loma W.S. Lim, Honolulu Advertiser, June 7, 1993)

System on Water Quality at Kuhio Beach: A Multi-Phasic Study", UH-WRRC, March 1994, Page 1-12, Table 1). However, the UH team concluded that there was little if any health risk based on their epidemiological investigation which queried 2,556 Kūhiō Beach subjects and which found that there was little evidence of illness due to swimming at Kūhiō Beach according to responses to questions.

- 2.11 **Historical, archeological and cultural sites.** At this location, there are no historic sites within the boundaries of the proposed projects. There is one historic site adjacent to the proposed project, within the boundaries of the City's Kūhiō Beach Park. This site is known as the Wizard Stones. The State Department of Land and Natural Resources, Historic Preservation Division, has concurred that this site will not be affected by the project, and has issued a determination of "no effect" on historic sites.

This area of Waikiki is rich in history as discussed in "The View from Diamond Head: Royal Residence to Urban Resort" (Hibbard and Franzen, 1986). Prior to construction of the crib wall in the 1950's, there was little if any sand beach adjacent to Kalakaua Avenue in the vicinity of the project location. Rather, the surf washed directly against retaining walls adjacent to the sidewalk. Construction of the crib walls permitted creation of a beach in this area. However, the design of the crib walls was such that forceful wave overtopping continued to occur under high surf conditions which provided enough energy to stir up beach sand and to wash it away. During high surf conditions some sand would be transported within the crib walls and other sand would actually be conveyed outside the crib walls onto adjacent reef flats, an adverse impact of the existing condition of crib-walls and sand replenishment.

Kuhio Beach and surrounding land and ocean areas have a rich history. Surf breaks and the Kuhio Beach area may be viewed as cultural resources and traditional cultural properties in the sense that Hawaiians prior to western contact may have surfed the breaks and used the beach area for staging, both of surfing and of canoe launching. Prior to western contact and the development of Waikiki Kuhio Beach did not exist as it is at present. Rather, Kalākaua Avenue, sidewalks and structures were constructed on the beach and its backshore, and a variety of seawalls, groins and other hardened structures were built over the years. At present, the beach provides a staging area for use of the water and surf by beachgoers including surfers, and the placement of the statue of Duke Kahanamoku was intended to invite people to enjoy these activities at this location.

According to Kanahele (Kanahele, George S., 1995), Chief Kahekili led an invasion of Oahu from Maui numbering perhaps thousands of men and hundreds of canoes. The invaders landed at Waikiki between Diamond Head and the halekulani Hotel (Kanahele, p. 79).⁴

According to Clark (Clark, John R. K., 1977), the land (named Hamohamo) adjacent to Kuhio Beach Park originally was owned by Queen Lili'uokalani and Prince Kuhio's home was at Pualeilani, on the seashore of Hamohamo. "On July 22, 1918, the prince removed the high board fence around his property and opened this section of beach to the public (Clark, p. 52)." Though the Park was already named Kuhio, when

⁴Kanahele, George S., *Waikiki 100 B.C. TO 1900 A.D. An Untold Story*, The Queen Emma Foundation, Honolulu, 1995.

the prince died in 1922, Pualeilani went to the City. The park was officially dedicated in 1940 and a plaque is still there today (Clark, p. 52)⁵.

Hemmings (Hemmings, Fred, 1997) has written about the importance of Waikiki's surf sites while growing up and the role played of the surf both in history and in modern society. For example, he writes that the surf site known as "Tonggs" was named after a family who lived on the beach and that Rice Bowl, next to Tonggs, was: "...hottest tube in town. (Hemmings, p. 60.)"⁶.

- 2.12 **Sensitive habitats or bodies of water adjacent to the proposed project.** Surveys of the marine habitat off Waikiki indicate that coral coverage and diversity are relatively low, particularly offshore Kūhiō Beach where the highest coral coverage was less than 12% at 20-foot depth along the transect. Coral coverage was 0% at the 10-foot depth and only about 2% at the 40-foot and 60-foot depths. The major factor controlling coral community structure is the degree of protection from shifting sand. In areas of high sand cover (low relief), corals are very limited. In areas where vertical relief provides settling surfaces above the level of sand movement, coral communities are moderately well-established.

Coral coverage offshore the Waikiki Aquarium was slightly higher, but still lower than offshore the Halekulani and Hilton Hawaiian Hotels. However, at the 10-foot depth, coral coverage offshore the Aquarium was almost 15%, which was the second highest coverage at this depth compared to the other transects. The beach sector fronting the Aquarium, between the Natatorium and the groin at Queen's Surf beach, has been artificially nourished in the past in attempts to maintain a dry beach along this sector. A 1958 aerial photo shows a fairly uniform dry beach extending along this entire shoreline reach. Prior to artificial nourishment, there was no dry beach along this reach north of the Natatorium. Progressive erosion has resulted in no dry beach fronting the Aquarium and only a small triangular fillet beach next to the Queen's Surf groin. There is a general perception that the shallow nearshore reef has "recovered" over the years as the beach within this reach diminished. A Marine Life Conservation District (MLCD) has been established by the Department of Land and Natural Resources in the waters offshore the Waikiki Aquarium. Exhibit 13 shows the MLCD boundaries, extending from the Kapahulu Storm Drain to the Natatorium, and offshore for a distance of 500 yards. Within the MLCD, prohibited activities include the taking, altering, or removing of any sand, coral, rock, or other geological features. Therefore, portions of the sand deposits located within the MLCD will not be used for the proposed beach replenishment.

Sand transport along this sector of the coastline is northward, towards Kūhiō Beach. Therefore any erosion of sand from the Kūhiō Beach project site will not impact the nearshore reef areas fronting the Aquarium.

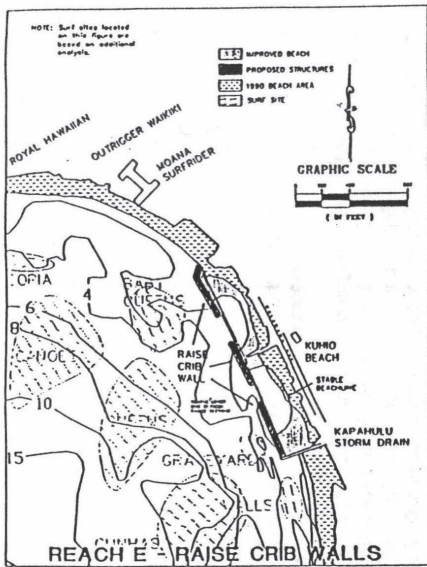
The proposed dredging of sand from the shallow pockets in the reef offshore Kūhiō Beach will not detrimentally affect adjacent coral reef areas. The sand will be removed from the reef using a small hydraulic suction dredge, which will pump the sand slurry to shore through PVC pipe. Turbidity generated during the dredging activity will be very localized and minor compared to the area-wide turbidity naturally occurring during high swell activity. Because coral coverage on the reef is limited by the scouring

⁵Clark, John R. K., *The Beaches of O'ahu*, University of Hawaii Press, Honolulu, 1977.

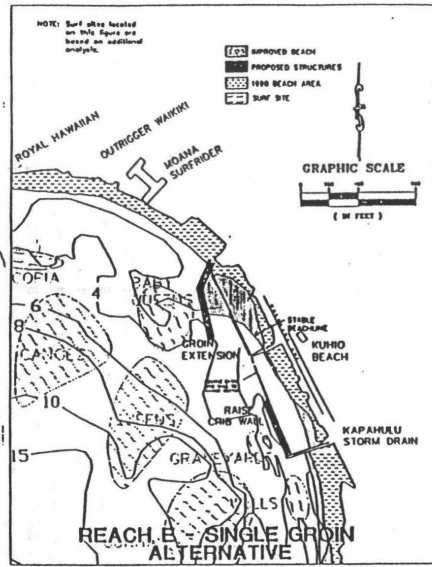
⁶Hemmings, Fred, *The Soul of Surfing is Hawaiian*, Sports Enterprises, Inc., Maunawili, 1997.

action of the sand, there would be beneficial impacts due to the removal of sand from the nearshore reefs.

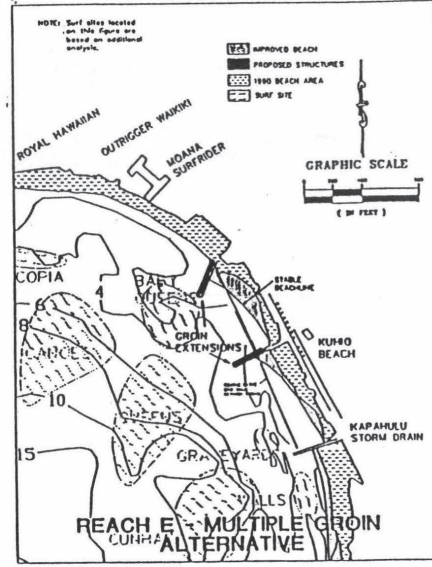
- 2.13 **Flooding and Tsunami.** According to the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps (FIRM Panels 150001 0120C and 0125B, September 4, 1987), portions of the Kūhiō Beach shoreline seaward of Kalakaua Avenue are located within a coastal flood hazard zone designated Zone AE, with base flood elevation between 8 and 9 feet above mean sea level. The designated flood elevations apply landward of the shoreline. The proposed project will be constructed seaward of the shoreline, and the beach and reconstructed offshore walls will be at finish elevations much lower than the BFEs and Kalakaua Avenue. Therefore, there will be little, if any impact on the coastal flood hazard characteristics. However, extending the shoreline farther seaward by restoration of the dry beach area should mitigate potential storm wave overtopping impacts to the present shoreline areas landward of the existing beach.



CONCEPT 1




CONCEPT 2



CONCEPT 3

From Edward K. Noda and Associates, Waikiki Beach Improvement Project, Alternatives and Economic Feasibility Evaluation", December 1991.

Report prepared for State of Hawaii, Department of transportation, Harbors Division.

 <p>Edward K. Noda and Associates, Inc.</p>	<p>Waikiki Beach Improvement Project Kuhio Beach Improvements</p>	<p>ALTERNATIVE STRUCTURAL MEASURES</p>	<p>EXHIBIT 14</p>
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RECEIVED
DIVISION OF
LAND MANAGEMENT
AUG 2 1 40 PM '99

GEORGE DOWNING
3021 Waiialae Avenue
Honolulu, HI 96816

July 28, 1999

Elaine Tamaye (V.P.)
Edward K. Noda and Associates
615 Piikoi, Suite 300
Honolulu, HI

Re: Waikiki and Kuhio Beach Improvement Projects

Dear Elaine,

Thank you for taking the time to walk and talk the Kuhio Beach project regarding the Diamond Head and Ewa basins, swimming and the sand beach.

I shared with you over 50 years of my personal experiences and observations which were generated by my interest in Waikiki and knowledge of this area.

You were appraised of my concerns regarding the Environmental Assessment report proposed by your company of which you personally contributed a great part.

As I advised, the surfing committee members represented by our Save Our Surf (SOS) organization are concerned regarding any intrusion of this project into the surfing and board recovery areas of Waikiki.

This is why we are recommending that any changes done in this area of Kuhio Beach — the Diamond Head and Ewa Beach sections — DO NOT extend outside of the present breakwater and crib wall!

In reviewing your E.A. you have also proposed three alternative plans:

We recommend that Aiternative Plan #1 be adopted: the raising of present breakwater and crib walls.

We also recommend that consideration be given to the use of a "wave absorption wall" which model has been shown to you, and explained in detail at our meeting on Tuesday 7-27--99 at the "Kapahulu Groin" in Waikiki.

I believe that something of this design could solve the problem in the area by allowing for water circulation with minimum disturbance to swimmers and sand erosion.

Sand mining out of Mamala Bay, especially in the surfing areas, we believe, is an excellent plan. This will improve our surfing areas "back to normal" and also allow coral to receive more sunlight which should improve the food chain and therefore increase the small fish population.

EXHIBIT 8

Pg. 1 of 3

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& NATURAL RESOURCES
STATE OF HAWAII

Please keep us informed as to whether you plan to go forward with your present plan or if you are considering alternate changes.

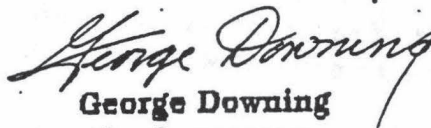
We understand that funding must be approved through next year's Legislature.

Our organization, representing 250,000 surfers in Hawaii, supports alternate Plan #1 that provides the raising of the present breakwater and crib wall as long as it maintains the present width of five (5) feet.

We will support modification to alternate Plan #1 if the wave absorption wall is incorporated as long as it doesn't exceed ten feet in width at the base measuring from the shore seaward.

Thank you, and

Best regards,



George Downing
Spokesperson
Save Our Surf (SOS)
3021 Waiialae Avenue
Honolulu, HI 96816

EXHIBIT 8

pg. 2 of 3



W A I K I K I
I M P R O V E M E N T
A S S O C I A T I O N

2270 Kalia Avenue
Suite 700
Honolulu, Hawaii 96815
608.923.1094
Fax 608.923.2622
e mail wa@aloha.net

Rick Egged
President

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Charlton Wright
Marketing Director, Royal Hawaiian Shopping Center, Inc.
Louis Xigouanis
Waikiki Residents Association
Daisy C. Yamada, CPM
General Manager, Waikiki Trade Center
Donald Yannell
Vice President & Manager, Waikiki, Bank of Hawaii

Emeritus
Robert M. Midkiff
Consultant

DATE: July 8, 1999

TO: Timothy Johns, Chair
Board of Land and Natural Resources

RE: DLNR Public Hearing (July 8, 1999)
Kuhio Beach Improvements
Waikiki Beach Improvement Project

Chair Johns:

I am Rick Egged, President of the Waikiki Improvement Association. WIA is a nonprofit organization of more than 250 businesses and individuals focusing on physical improvements for Waikiki.

The Waikiki Improvement Association has long championed a wider, more attractive beach for Waikiki. The state's project to reconstruct the crib walls and restore the beach will help achieve this goal. Improving Kuhio Beach—Waikiki's only open expanse of beach—serves both our visitors and the resident community. WIA members made beach widening a major part of their agenda at their recent Waikiki planning charette. We urge the state to move forward with this project, and to look at improving and nourishing the rest of Waikiki Beach as well.

Thank you for the opportunity to testify.

WAIKIKI IMPROVEMENT ASSOCIATION

Rick Egged
President

EXHIBIT 8

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