INDIVIDUALS

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February 6, 2007

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Comments on the Kona Kai Ola Environmental Impact Statement (EIS)

I am a professional marine biologist with expertise in the area of the effects of noise on marine animals. I did my graduate research work at the University of Hawai'i at Manoa between 1984 and 1994, and I continue to conduct marine mammal and acoustic research in Hawai'i, mostly on the Big Island. Because I have expertise in several of the subjects addressed within this EIS and its appendices, I am compelled to comment on them.

First, with regard to the underwater noise study (Appendix Q), the author does not properly use the unit 'decibel' or dB. Decibels are defined as a ratio of pressures (or intensities) relative to a reference. If the reference level is not specified, then the unit "dB" is meaningless. For example, consider if one were to say that the temperature outside is 30 degrees. Without knowing if that measure is Celsius or Fahrenheit, it could be very cold or very warm. Thus the simple use of 'decibels' or 'dB' without

specifying the reference level or the bandwidth of that measurement indicates a fundamental lack of understanding of acoustics on the part of the author.

This concern is made evident on page 5 of Appendix Q, where the author misinterprets my work (Clark and Frankel, 1997). Specifically, the author states that there was no biologically significant response to the playback of ATOC signals. That assertion is correct, but the author then states "adverse impacts of lower intensity noise, such as from small boat engines have been even more difficult to quantify." This seems to say that if the playbacks had no biologically significant effects, then other sources of noise are of no concern.

This interpretation is incorrect and incomplete and indicates a lack of understanding of how animals respond to sound. First, the source level of the playback was 172 dB re 1 μPa at 1 meter (rms broadband). Source levels of outboard motors can be greater than the playback. Larger vessels are typically even louder. Next, there is the issue of movement of a sound source. The playback speaker was stationary, whereas vessels are moving. It has been shown that differences in the "style" of operation of a vessel can affect the level of response (e.g. Richardson, 1985). Richardson (1985) found that vessels with a higher speed and more erratic course produced a greater response. One needs to consider the movement of acoustic sources as well as their loudness.

Furthermore, one needs to take into account the duration of the noise exposure. This has not been done in the document's comparison of playback and vessel activity. The playbacks lasted 25 minutes, whereas vessels (and their noise) are likely to come and go all day long. Thus, the total acoustic exposure for an animal may be greater, and this will affect the level of impact.

All of these concerns indicate to me that the conclusions of Appendix Q are not valid and do not represent the best available science.

I am also concerned about the breadth of the Environmental Impact Statement (EIS) for the Kona Kai Ola project. It is worth noting that the Hawai'i Revised Statutes Chapter 343-2 defines an EIS as:

> "Environmental impact statement" or "statement" means an informational document prepared in compliance with the rules adopted under section 343-6 and which discloses the environmental effects of a proposed action, effects of a proposed action on the economic welfare, social welfare, and cultural practices of the community and State, effects of the economic activities arising out of the proposed action, ***measures proposed to minimize adverse effects, and alternatives to the action and their environmental effects***. (emphasis added).

In general, I find that the measures proposed in the EIS to minimize adverse effects of the project on the undersea environment are markedly insufficient. Furthermore, no alternatives are proposed. Therefore, I must conclude that this document does not meet the definition of an Environmental Impact Statement as defined in Chapter 343 Section 2.

In addition to this overall concern, I would like to offer several specific comments on the documents' following sections:

Section 3.9.4.1 The document accurately portrays the symptoms of a declining population of blue marlin, as shown in the decrease of catch weight and catch per unit effort (CPUE). At the same time, the proposed action will undoubtedly increase fishing pressure, likely leading to further reductions in fish populations off Kona.

Paradoxically, Section 3.9.4.2 states that despite the data provided in the previous section, there will be no effect on the Pacific wide fishery. That statement does not appear to be relevant since this document is addressing the impact on the local environment, not the entire Pacific Ocean. The data provided in Section 3.9.4.1 indicate that the Kona population health is decreasing. There is no meaningful mitigation action nor any alternatives provided in Section 3.9.4.2.

Section 3.9.5.1. This section states "monk seals are air breathing and spend the majority of their time above water where they are easily observed". This may be true when considering the time that monk seals are hauled out onto the beach. However, monk seals spend considerable amount of time at sea, where they are usually submerged and hard to detect when at the surface. This description of monk seal detectability does not accurately represent the behavior of the animal, and could be seen as misleading.

Section 3.9.5.2. In considering the impact of blasting and pile driving, the document offers an undefined "program to monitor sound levels and the presence of marine mammals and sea turtles" that will "adjust" the construction schedule when marine animals are present. However, the document provides insufficient detail on the methods and criterion for detection, and how activities will be altered when animals are present. Some specifics that are necessary to evaluate this proposal include the following:

a) Size, number and acoustic source level of explosive charges that will be used in harbor construction.
b) Method to be used to drive the piles (*e.g.* hammer blow, vibratory, drilling).

These data are needed to determine the magnitude of acoustic stimuli that will be produced. Once these data are known, then the following specifics of the mitigation proposal can be addressed:

c) What methods will be used for detection (both hardware and software)?

d) What is the range criterion for activity alteration, (e.g. 1000 meters)? Presumably only nearby animals would warrant an alteration of activity, therefore the "trigger" criterion used needs to be stated.
e) How would the activity be altered to mitigate exposure to the animals?

Additionally, this document fails to consider several other important options for mitigation. These include temporal mitigation and the use of air bubble curtains to attenuate the sound of pile driving. For example, if heavy construction and pile driving work were conducted between April 15 and November 1, that would eliminate any potential impact on humpback whales, since they are not found off Kona during those times. Humpbacks almost certainly have very good low frequency hearing and would be most vulnerable to these activities. Furthermore, there are multiple methods of placing piles, each of which have different potential environmental impacts. The document does not specify how the piles will be placed or if alternative methods were feasible or considered. Suggested references for this issue of pile driving and its effect on animals include the following:

David JA (2006) Likely sensitivity of bottlenose dolphins to pile-driving noise. Water and Environment Journal 20:48-54

Würsig B, Greene CR, Jr., Jefferson TA (2000) Development of an air bubble curtain to reduce underwater noise of percussive piling. Marine Environmental Research 49:79-93

Next, the last two paragraphs in this section on boat-produced noise disregards a large body of published scientific literature on the effects of noise on marine animals. The document refers to an unattributed "Department of Defense report" (p. 57) that attributes much of the noise production in San Diego harbor to large vessels. That may be true, but small vessels are still an important source of anthropogenic noise in all harbors. Furthermore, San Diego harbor is a major shipping and naval port, which has a much higher proportion of large vessels than Kona. Therefore, the application of the San Diego data to the Kona area is not analogous and inappropriate.

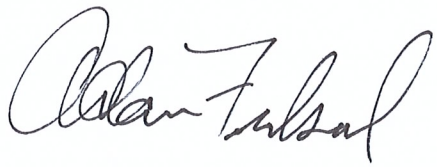
Furthermore, this document states that "while intense sound levels can adversely impact marine mammals and potentially other species, this level of sound pressure has not been shown to be produced by the small boats envisioned to occupy the new marina". It is true that the smaller boats that will and do operate out of Honokohau harbor do not produce the highest sound levels. However, it has been shown that small boat interactions in fact can lead to biologically significant effects on marine mammals. This is discussed in papers by Bejder et al (2006), and are based on studies with the types of small vessels that would and currently do operate out of Honokohau harbor.

The statement in the document that "no definitive information is available to determine the level of impact produced by increase in small boat generated noise on fish, marine

mammals and sea turtles" is misleading. The behavioral responses of animals to anthropogenic activity are complex and not yet fully understood. However, there exists a large and growing body of research that describes animal responses to vessels and other human activity. The document appears to dismiss these findings. A small sampling of references to research papers addressing this topic are provided at the end of my letter.

The document goes on to assert that because dolphins occasionally bowride, they "are apparently not overtly impacted by vessel traffic noises". This conclusion is not justified for the following reasons. First, individual animals respond differently to acoustic stimuli, therefore while some animals might choose to bowride, others may avoid the boat. Furthermore, spinner dolphins have different behavioral states and may be more sensitive to vessel disturbance at some times and less at others. Finally, it is important to consider the recent articles by Bejder et al (2006) that show how easily observed short-term and small-scale behavioral disturbances could result in long-term survival consequences for a local population.

In conclusion, it is my professional opinion that this document fails to sufficiently address the potential impacts of the proposed project. Moreover, it inadequately describes mitigation measures and completely fails to propose alternatives as required under Hawai'i Revised Statutes Chapter 343 Section 2. Therefore, I conclude that this document does not begin to meet the definition, spirit or requirements of an Environmental Impact Statement. In summary, this document needs to be thoroughly reviewed, revised and rewritten if it is to serve as an accurate and meaningful descriptor of the Kona Kai Ola project and its potential impact on the underwater environment.



Adam S. Frankel, Ph.D.

A sample of literature describing the effects of noise on marine animals.

Bejder L, Samuels A, Whitehead H, Gales N (2006) Interpreting short-term behavioural responses to disturbance within a longitudinal perspective. Animal Behavior 72:1149-1158

Bejder L, Samuels AMY, Whitehead HAL, Gales N, Mann J, Connor R, Heithaus M, Watson-Capps J, Flaherty C, Krutzen M (2006) Decline in Relative Abundance of Bottlenose Dolphins Exposed to Long-Term Disturbance. Conservation Biology

Engås A, Løkkeborg S (2002) Effects of seismic shooting and vessel-generated noise on fish behaviour and catch rates. Bioacoustics 12:313-316

Gordon J, Moscrop A (1996) Underwater Noise pollution and its significance for whales and dolphins. In: Simmonds MP, Hutchinson JD (eds) The Conservation of Whales and Dolphins. John Wiley & Sons Ltd., pp 281-319

Gregory PR, Rowden AA (2001) Behaviour patterns of bottlenose dolphins (*Tursiops truncatus*) relative to tidal state, time-of-day, and boat traffic in Cardigan Bay, West Wales. Aquatic Mammals 27:105-113

Luna-Valiente NV, Bazúa-Durán C (2006) Behavioral response of spinner dolphins (*Stenella longirostris*) to human activities in the archipelago of Hawai`i. In: ECS 2006, Gydnia, Poland

Lusseau D (2003) Male and female bottlenose dolphins Tursiops spp. have different strategies to avoid interactions with tour boats in Doubtful Sound, New Zealand. Marine Ecology-Progress Series 257:267-274

Lusseau D (2004) The hidden cost of tourism: Detecting long-term effects of tourism using behavioral information. Ecology and Society 9:2-

Lusseau D (2006) The short-term behavioral reactions of bottlenose dolphins to interactions with boats in Doubtful Sound, New Zealand. Marine Mammal Science 22:802-818

Nowacek SM, Wells RS, Solow AR (2001) Short-term effects of boat traffic on bottlenose dolphins, *Tursiops truncatus*, in Sarasota Bay, Florida. Marine Mammal Science 17:673-688

Richardson WJ, Fraker MA, Würsig B, Wells RS (1985) Behaviour of Bowhead Whales *(Balaena mysticetus*) summering in the Beaufort Sea: Reactions to Industrial Activities. Biological Conservation 32:195-230

Ritter F (2002) Behavioural observations of rough-toothed dolphins (*Steno bredanensis*) off La Gomera, Canary Islands (1995-2000), with special reference to their interactions with humans. Aquatic Mammals 28:46-59

Scarpaci C, Bigger SW, Corkeron PJ, Nugegoda D (2000) Bottlenose dolphins (*Tursiops truncatus*) increase whistling in the presence of 'swim-with-dolphin' tour operations. Journal of Cetacean Research and Management 2:183-185

Scholik AR, Yan HY (2001) Effects of underwater noise on auditory sensitivity of a cyprinid fish. Hearing Research 152:17-24

Scholik AR, Yan HY (2002) Effects of boat engine noise on the auditory sensitivity of the fathead minnow, *Pimephales promelas*. Environmental Biology of Fishes 63:203-209

Scholik AR, Yan HY (2002) Effects of noise on auditory sensitivity of fishes. Bioacoustics 12:186-188

Scholik AR, Yan HY (2002) The effects of noise on the auditory sensitivity of the bluegill sunfish, *Lepomis macrochirus*. Comparative Biochemistry and Physiology Part A Molecular and Integrative Physiology 133A:43-52

Smith ME, Kane AS, Popper AN (2004) Acoustical stress and hearing sensitivity in fishes: does the linear threshold shift hypothesis hold water? Journal of Experimental Biology 207:3591-3602

Smith ME, Kane AS, Popper AN (2004) Noise-induced stress response and hearing loss in goldfish (*Carassius auratus*). Journal of Experimental Biology 207:427-435

Smith ME, Wysocki LE, Popper AN (2006) Effects of background sound on fish. The Journal of the Acoustical Society of America 119:3283-3284

Van Parijs SM, Corkeron PJ (2001) Boat traffic affects the acoustic behaviour of Pacific humpback dolphins, *Sousa chinensis*. Journal of the Marine Biological Association of the United Kingdom 81:533-538.

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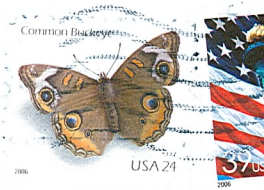

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July 23 2007

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Dear Mr. Frankel:

Subject: Kona Kai Ola Draft Environmental Impact Statement
Response to Your Comments Dated February 6, 2007

Thank you for your comments on the Kona Kai Ola Draft Environmental Impact Statement. We respond to your comments in the order of page and paragraph. Paragraph numbers on a page start at the first full paragraph.

Page 1, Paragraph 2, through Page 2, Paragraph 4

In response to DEIS comments, Marine Acoustics, Inc., (MAI) was retained to conduct three studies, as follows:

- Description of Marine Mammal and Sea Turtles
- Ambient Noise Measurements and Estimation Study
- Acoustic Analysis of Potential Impacts

These studies have significantly increased the EIS discussion on the affected marine environment and noise impacts that may be generated by the proposed project. Information sources are accurately represented, and modeling techniques provide a reliable indication of possible project-related impacts. We are including Section 3.9.4, Marine Mammals and Sea Turtles, as Attachment 1 in this letter.

Page 2, Paragraphs 5 and 6

We acknowledge your comments regarding the purpose of an EIS, and note that the EIS includes a thorough evaluation of potential impacts of the proposed development. Further, every effort was made to fully investigate issues raised in DEIS comments. Several additional studies were conducted to expand our understanding of existing conditions, identify project impacts and proposed appropriate mitigation measures. Additional studies conducted in response to DEIS comments included:

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www.oceanit.com

- An Inventory and Assessment of Anchialine Pools Including Management and Mitigation Recommendations
- Marina Harbor Water Quality Study
- Evidence and Implications of Saline Cold Groundwater
- Groundwater Effects on Anchialine Pools
- Supplemental Groundwater Sampling and Analyses for Priority Pollutants
- Description of Marine Mammal and Sea Turtle Species
- Acoustic Analysis of Potential Impacts (related to construction-generated underwater acoustics)
- Ambient Noise Measurements and Estimation Study
- Workforce Housing Impacts Assessment

In addition, the EIS has expanded the analysis of alternatives. As explained in the DEIS, the agreement between JDI and the State of Hawai'i established a required scope and scale of the project for which the impact analysis was provided. Several comments have addressed the fact that alternatives other than the No Project Alternative were not addressed in the DEIS Section 2, Alternatives Analysis.

Kona Kai Ola is of the position that alternative actions other than a No Project alternative are not currently feasible without an amendment to the agreement with the State. Agency and public comments in response to the DEIS, as well as additional information generated as a result of inquiry into issues raised by the comments, have been helpful in identifying alternative actions that will serve the State's goal of providing additional marina slips for the Kona area. These alternative actions also serve to reduce or mitigate anticipated effects of the proposed development.

Thus, agencies such as the Land Division of the Department of Land and Natural Resources, the U.S. Department of the Interior Fish and Wildlife Service, the Planning Department of the County of Hawai'i, and the Office of Environmental Quality Control (OEQC), as well as community organizations have commented that a reduced scale marina and related facilities should be considered. The OEQC has also asked that the alternative of a reduced scale project be evaluated under the assumption that DHHL may determine that a downsized project would be preferred.

In response to these comments on the DEIS and in consideration of measures to mitigate anticipated impacts, the EIS Section 2, Alternatives Analysis, has been revised to describe the following alternatives, which are discussed in more detail in the EIS:

- Alternative 1 is a project involving a 400-slip marina, 400 hotel units, 1,100 time-share units, and commercial and support facilities. This alternative would enhance water quality and avoid the need to widen the existing harbor entrance channel, as well as reduce traffic and socioeconomic impacts.

- Alternative 2 is an alternative that had been previously discussed, but not included in the proposed project that includes an 800-slip harbor and a golf course.

- Alternative 3 is the no-action alternative.

A comparison between impacts related to the proposed project concept and impacts related to Alternative 1 indicates that a reduction in the acreage and number of slips in the marina, as well as the reduction in hotel and time-share units, would generate less environmental, traffic, social and economic impacts. Although positive economic impacts would be reduced, Alternative 1 can be considered as a preferable alternative because of reduced environmental impacts. However, while it can be concluded that the 25-acre marina in Alternative 1 would be the preferred size, the DLNR agreement establishes the size of the marina at 45 acres and 800 slips. An amendment to the DLNR agreement is required in order to allow Alternative 1 to proceed. Hence, selection of Alternative 1 is an unresolved issue at this time. The additional EIS text that includes the added EIS Section 2, Alternative Analysis, is contained in Attachment 2 of this letter.

Page 3, Paragraph 3 and 4

Section 3.9.3, Marine Fishing Impacts, has been expanded to specify mitigation in the local environment, as follows:

> An increase in the harbor size offers the opportunity to consolidate, focus, and fund management and enforcement activities at one centralized location. The pressure on fish and invertebrate stocks, as well as upon populations of marine mammals and turtles can be expected to increase as the Kona population increases, regardless of whether the harbor is improved. The following changes could be made by DLNR, paid for at least in part by the additional revenues to DLNR from the Kona Kai Ola project. These changes are in the management authority of the DLNR Division of Aquatic Resources and the DLNR Division of Boating and Ocean Recreation.
>
> - Increase in the number of fisheries enforcement and management personnel in Kona at one centralized harbor location
> - Allocation of slip and office space for fisheries personnel and equipment
> - Increased numbers of submerged mooring buoys (presently approaching 100) at all dive sites,
> - Increased education materials for recreational divers and fishermen
> - Initiate restrictions on the quantity and size of boats in each commercial sector

- For inshore species, initiate catch restrictions in line with Division of Aquatic Resources guidelines that prioritize recreational fishing above commercial fishing, and subsistence fishing above recreational fishing.

Page 3, Paragraph 5

Information regarding monk seals has been revised in Section 3.9.4, as follows:

> **Hawaiian Monk Seals:** Endangered Hawaiian Monk Seals (*Monachus schauinslandi*, Hawaiian Name: 'Ilio holo I ka uaua) are rare, but not unknown along the Kona Coast. Most monk seals are found in the Northwest Hawaiian Islands, but recent aerial surveys estimated that there are 52 seals in the main Hawaiian Islands (Baker and Johanos 2004). There have been 13 sightings between 2003 and 2006 in the vicinity of Kaloko-Honokohau National Historical Park (NOAA protected species division data) indicating regular, albeit low-level use of these areas by monk seals. Two birth on the Island of Hawai'i have been reported (Baker and Johanos 2004).
>
> The best population estimates for Hawaiian monk seals (as of 2003) was 1,244 (Carretta et al. 2004). However the population is currently showing a decline that has been continuing since the 1950s (Antonelis et al. 2006).
>
> Underwater hearing in the Hawaiian monk seal has been measured between 300 Hz to 40 kHz. Their most sensitive hearing is at 12 to 28 kHz, which is a narrower range compared to other phocids. Above 30 kHz, their hearing sensitivity drops markedly (Thomas et al. 1990).
>
> Monk seals are very intolerant of human activity and are easily disturbed. When the U.S. military inhabited Sand Island and the Midway Islands and Kure Atoll, the monk seals disappeared until after the military left. Monk seals prefer to be solitary animals (Reeves et al., 2002).

Page 3, Paragraphs 6 to 10, and Page 4, Paragraph 1

Your comments have been addressed in the additional studies that are summarized in Attachment 1. These studies identify acoustic noise impacts generated by construction activities. Preliminary mitigation measures have been identified, and will be refined during consultation with the National Marine Fisheries Service (NMFS).

Page 4, Paragraph 2

Construction activities for marina excavation will not include pile driving. Appropriate hole will be drilled and the pilings mortared in place. This is a much quieter process and addressed in Section 3.9.4.2 and Appendix T-3 of the EIS. Regarding timing of construction between April 15 and November 1, determination of mitigation will occur as the project progresses.

Page 4, Paragraphs 3 and 4

The Ambient Noise Measurements and Estimation Study addressed these concerns for marine mammals and sea turtle using the definite impact thresholds and analysis procedures currently used and approved by the regulator, NMFS. This study analyzed noise generated by small boats, and included the source you cite. Findings are summarized in Attachment 1.

Page 5, Paragraph 1

The information presented in the study on the affected environment and the noise studies has revised the DEIS information. The final mitigation strategy and methods are being developed during consultations with NMFS.

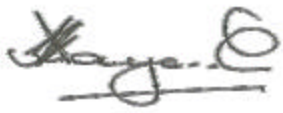
Page 5, Paragraph 2

The additional studies have significantly expanded the DEIS analysis the potential impacts to the underwater environment adjacent to Kona Kai Ola from construction noise and post-construction noise from boat utilization of the enlarged harbor.

As discussed previously, the EIS includes a thorough study of project impacts and describes appropriate mitigation measures. Further, additional studies and the expansion of the alternatives analysis have served to further comply with Hawai'i Revised Statutes Chapter 343.

Your comment letter and this response are included in the Final Environmental Impact Statement. We appreciate your participation in the environmental review process. Please submit a request to our office if you would like to receive a printed or electronic copy of the Final Environmental Impact Statement, or portions thereof.

Sincerely,



Dayan Vithanage, P.E., PhD.
Director of Engineering

cc: Office of Environmental Quality Control
State Department of Hawaiian Home Lands
Jacoby Development, Inc.

Attachment 1

The increased level of fisheries knowledge has spawned an atmosphere of stewardship in the general charter-boat fishing community. With catch and release programs returning upwards of 40 percent of the Kona catch back to the ocean there is an obvious awareness that the value of catching the fish is often far greater than the value of selling it. It is ~~recommended~~ proposed that facilities and programs to foster continued stewardship, fisheries science, tracking of all fish catch, and educational programs be implemented in the design of the new marina facilities.

The proposed marina, marina support facilities, public marina promenade, fishing club, and marine science center will provide a venue for implementing the following efforts:

- Efforts to promote tag and release will be fostered through public education and the implementation of more "Catch and Release – Only" tournaments.
- Promote management through catch limits to possibly include slot weight catch limits, ~~ie.~~i.e. must tag & release animals between 250–950 pounds
- Promote various other stewardship measures relating to fisheries conservation.

~~3.9.5~~3.9.4 Marine Mammals and Sea Turtles

In addition to water quality, which is discussed in Section 3.9.1.3, other environmental impacts that may affect marine mammals and sea turtles include noise and vessel collisions. The following sections describe existing conditions, potential impacts and suggested mitigations to prevent negative impacts to marine mammals and sea turtles from noise and vessel collisions.

~~3.9.5.1~~3.9.4.1 ~~Existing Conditions~~Affected Environment

A number of marine mammal and turtle species are found in Hawaiian waters near the Kona Kai Ola project site. Detailed information on the abundance, behavior, threats to the species, hearing ability and vocalization data is provided for all species in Appendix S. Data on the most prevalent endangered species and species of particular interest are summarized here.

Humpback Whales: The population of h~~H~~umpback whales (*Megaptera novaeangliae*) around Hawai'i was estimated to be between ~~are mammals and belong to the baleen whale suborder, *mysticeti*. An estimated~~ 4,500-6,500 in 2000 ~~whales migrate between subpolar Alaska and Hawai'i each year~~ (Mobley et al 2001). The population growth rate between 1993 and 2000 is estimated to be seven percent indicating that the population is recovering from its dramatic reduction due to commercial whaling. It is worth noting that this is considered a high rate of increase for a mammalian species.

The highest densities of animals are found within the 100 fathom isobath. ~~and seek refuge in shallow waters close to shore.~~ Most humpbacks off Hawai'i are found north of Honokōhau in the waters of the Hawaiian Islands Humpback Whale National Marine Sanctuary. Nevertheless, they are commonly seen off Honokōhau in winter months. Humpbacks are not deep diving animals. Whales in Hawai'i typically dive to less than 100 feet, although occasional deeper dives are possible (Hamilton et al. 1997)The whales breed and give birth while in Hawai'i during the winter months, and migrate north to feed each spring.

~~Humpback whales found in Hawai'i's waters are part of a global population of Humpback whales that was reduced by over 250,000 individuals, or 90 percent, due to hunting (Johnson et al 1984). In 1966, the International Whaling Commission instituted a moratorium on all hunting of whales globally, and populations have begun to rebound. The North Pacific population of humpback whales, with a population of approximately 15,000 prior to hunting, is recovering from an estimated low of 1,000 individuals (Rice 1978, Johnson et al 1984). Humpback whales are also protected under the Federal Endangered Species Act. It is estimated that Hawai'i's population of Humpback whales is growing by 7% annually (Mobley et al 2001).~~

Congress designated the Hawaiian Islands Humpback Whale National Marine Sanctuary (HINMS) on November 4, 1992, and was followed by the Governor of Hawai'i's formal approval in 1997. The Sanctuary's purpose includes protecting humpback whales and their habitat within the Sanctuary, educating the public about the relationship of humpback whales to the Hawaiian Islands marine environment, managing the human uses of the Sanctuary, and providing for the identification of marine resources and ecosystems of national significance for possible inclusion in the Sanctuary. The sanctuary is approximately four nautical miles north of Honokōhau Harbor.

~~While waters surrounding the main Hawaiian islands constitute one of the world's most important North Pacific humpback whale habitats (Calambokidis et al. 1997), the Sanctuary actually encompasses five noncontiguous marine protected areas across the Main Hawaiian Islands, totaling 1370 square miles. Almost half of this area surrounds the islands of Maui, Lāna'i and Moloka'i. Smaller areas are designated on the North shore of Kaua'i, North and Southeast shores of O'ahu, and Hawai'i's Kona Coast. On Hawai'i's Kona Coast, the Sanctuary encompasses the entire northwest-facing coast, consisting of submerged lands and waters seaward of the shoreline to the 100-fathom (183 meter) isobath from 'Upolu Point southward to Keāhole Point, which is approximately four nautical miles north of Honokōhau Harbor.~~

Whales have very sensitive hearing, so any loud underwater sound has ~~may have~~ the potential to disturb these animals. ~~Vessel collisions are also a concern with whales.~~ Playback experiments have estimated that humpback whales will respond to biologically meaningful sound at levels as low as 102 dB re 1 µPa, a level that is similar to background ambient noise (Frankel et al. 1995). Increases in vessel numbers will lead to an increase in noise from operating boats. However, even at its greatest predicted increase, the median sound level from active boats is not expected to raise sound levels to an intensity that would be considered an impact (Level B take) to marine mammal population (See Appendices T-2 and T-3). Humpback whale song ranges from 20 Hz to over 10,000 Hz, with most acoustic energy typically concentrated in the 100-1000 Hz range. This vocal production and the anatomy of their inner ear indicate that these animals are most sensitive to low-frequency sound (Ketten 1992).

Numerous studies have shown that human activity can affect humpback whale behavior, including vessel activity (Bauer 1986; Norris 1994; Corkeron 1995; McCauley et al. 1996; Scheidat et al. 2004), oceanographic research (Frankel and Clark 2000; Frankel and Clark 2002), and sonar (Miller et al. 2000; Fristrup et al. 2003). If the humpback whale population continues to expand at its present rate (8%/year) it can be expected that greater numbers of whales will extend into waters off the Kona Coast. This is likely to increase the demand for whale watching vessels from the new harbor and this increase will have a negative impact on the whale population expansion. The increase in both the number of vessels and number of whales increases the chance for collisions.

Vessel collisions are also a major concern. The majority of whale strikes occur~~red~~ where whales and boats are most common, such as in ~~and boats watching are common as in~~ shallow waters between Lāna‘i and Maui. In a recent study, three of ~~conducted by NMFS on~~ 22 ~~27~~ recorded whale-vessel collisions ~~strikes~~ in the main Hawaiian Islands ~~, only two were recorded~~ occurred off the Kona coast. (Lammers et al. 2003). That study also found that 14 of the 22 collisions were reported between 1995 and 2003. This observed increase may result from more awareness of the issue, or from the greater number of both whales and vessels in Hawaiian waters. In Hawai‘i, data from 1972 to 1996 reveal at least six entanglements of humpback whales in commercial fishing equipment (Mazzuca et al. 1998). These data also indicate an increasing trend of entanglement since 1992 and a three-fold increase in death and entanglement occurrences related to human activity in 1996.

It is highly unlikely that humpback whales will approach to within the Level A or Level B impact “take” zones created by the explosive blasts of harbor construction. However, the sounds generated by these explosions will be within the frequency hearing range of humpback whales and could potentially be heard by whales between Kona and Maui. Modeling predicts that the maximum sound level two miles offshore the site is less than 150 dB re1 µPa, which is less than the threshold for Level B impacts. As the explosions are planned to occur daily for up to 9 months, the cumulative impact of this noise must be considered if construction is anticipated when whales are expected in the area (December 15 – March 30).~~In one instance, a fishing boat was pulling in a catch and was lifted by a whale. In the other instance, a whale was struck by a dive boat heading towards its diving spot.~~

Dolphins: A number of dolphin species are found in the waters near Honokōhau Harbor. Detailed information on all of these can be found in Appendix S. Spinner dolphins (*Stenella longirostris*) are regularly seen in shallow water and in close proximity to the project site. ~~Spinner dolphins (*Stenella longirostris*), often inhabit waters within Honokōhau Bay and at times intentionally congregate near the harbor channel to take advantage by bow-riding outgoing vessels. "Spinners" common name stems from their habit of leaping clear of the water and twirling in the air.~~ They are the smallest dolphins typically seen in Hawai‘i, with a mature size of 6 feet in length and 160 pounds.

Spinners school in pods of a few animals to ~~100~~ 180 or more, with pod sizes of 1-20 being most common (Östman-Lind et al. 2004). They ~~and show community behavior when~~ feed~~ing in~~ on mesopelagic fish, squid and shrimp in deep water at night, and rest in nearshore shallow waters during the day (Norris and Dohl 1980; Benoit-Bird et al. 2001). ~~when they come near shore to play and rest. On the Island of Hawai'i, Kealakekua Bay is one location of almost daily spinner visits, but they frequent many other bays along the coast and regularly rest in Honokōhau Bay.~~ There are seven primary resting areas along the Kona coast of Hawai'i, including Honokōhau Bay, where spinners are regularly seen near the harbor entrance (Östman-Lind et al. 2004). There is some evidence that the spinner dolphins may be resident to the area (Östman-Lind et al. 2004), making them more susceptible to repeated disturbance.

The hearing ability of spinner dolphins has not been measured. However, hearing of the related striped dolphin (*Stenella coeruleoalba*) was measured between 500 Hz and 160 kHz, with maximum sensitivity at 64 kHz (Kastelein et al. 2003). The hearing response of this single dolphin was less sensitive below 32 kHz than other dolphins. ~~As all marine mammals have very sensitive hearing, any loud underwater sounds have the potential to disturb dolphins as well. Given the sporting habit of spinners and other dolphins of bow-riding ships and small boat wakes, they are apparently not overtly impacted by vessel traffic noises.~~

Despite their limited sensitivity to low frequency sound, spinner dolphins have been shown to be impacted by human activity. Examples include interruption of resting activity and increases in the number of higher energy behaviors (Luna-Valiente and Bazúa-Durán 2006). Numerous studies describe changes in distribution (Haviland-Howell et al. in press) and short-term behavioral changes of dolphins in response to vessel traffic (Bejder et al. 1999; Scarpaci et al. 2000; Gregory and Rowden 2001; Nowacek et al. 2001; Van Parijs and Corkeron 2001; Ritter 2002; Lusseau 2003; Ng and Leung 2003). However, it has been established that for at least one population of bottlenose dolphins, these repeated short-term effects translate into long-term detrimental effects on the affected population (Bejder et al. 2006a; Bejder et al. 2006b).

In Hawai'i, some entanglements of spinner dolphins have been observed (Nitta and Henderson 1993; Rickards et al. 2001) but no estimate of annual human-caused mortality and serious injury is available. A habitat issue of increasing concern is the potential effect of swim-with-dolphin programs and other tourism activities focused on spinner dolphins around the main Hawaiian Islands (Östman-Lind et al. 2004).

Hawaiian Monk Seals: Endangered Hawaiian Monk Seals (*Monachus schauinslandi*, Hawaiian Name: 'Ilio holo I ka uaua) ~~are on the endangered species list . They~~ are rare, but not unknown along the Kona Coast. ~~Fortunately, monk seals are air breathing and spend the majority of their time above water where they are easily observed. If a monk seal is reported observed in the area, Kona Kai Ola would work with relevant agencies to protect the seal.~~ Most monk seals are found in the Northwest Hawaiian Islands, but recent aerial surveys estimated that there are 52 seals in the main Hawaiian Islands (Baker and Johanos 2004). There have been 13 sightings between 2003 and 2006 in the vicinity of Kaloko-Honokōhau National Historical Park (NOAA protected species division data) indicating regular, albeit low-level use of these areas by monk seals. ~~One~~Two birth on the Island of Hawai'i have~~s~~ been reported (Baker and Johanos 2004).

The best population estimates for Hawaiian monk seals (as of 2003) was 1,244 (Carretta et al. 2004). However the population is currently showing a decline that has been continuing since the 1950s (Antonelis et al. 2006).

Underwater hearing in the Hawaiian monk seal has been measured between 300 Hz to 40 kHz. Their most sensitive hearing is at 12 to 28 kHz, which is a narrower range compared to other phocids. Above 30 kHz, their hearing sensitivity drops markedly (Thomas et al. 1990).

Monk seals are very intolerant of human activity and are easily disturbed. When the U.S. military inhabited Sand Island and the Midway Islands and Kure Atoll, the monk seals disappeared until after the military left. Monk seals prefer to be solitary animals (Reeves et al., 2002).

Sea Turtles: Five species of sea turtles are known to frequent Hawaiian waters, with Hawaiian green sea turtles (*Chelonia mydas*) by far the most abundant at 97% of the total numbers, hawksbill turtles (*Eretmochelys imbricata*, 1.7% of total), olive ridley turtles (*Lepidochelys olivacea*, 0.8%), and occasional sightings of leatherback (*Dermochelys coriacea*) and loggerhead sea turtles (*Caretta caretta*, Chaloupka, et al, 2006, from stranding reports). Green sea turtles are the most plentiful large marine herbivore in the world and have experienced a very successful population recovery in Hawaiian waters since 1974 when harvest was outlawed in Hawai'~~i~~i, and 1978 when they became protected under the Endangered Species Act (Balazs, et al. 2004). Both green sea turtles and hawksbills are known to breed and nest on beaches within the main Hawaiian Islands, and have a 25-30 year generation time with a life span of 60-70 years (Balazs et al 2004). Total population numbers of green sea turtles in the Hawaiian archipelago have not been estimated, but the population has at least tripled since the 1970s and may now be approaching the carrying capacity of the islands (Chaloupka, et al. 2006).

Bartol et al. (1999) measured the hearing of juvenile loggerhead sea turtles using auditory evoked potentials to low-frequency tone bursts found the range of hearing to be from at least 250 to 750 Hz. The frequency range that was presented to the turtles was from 250 Hz to 1000 Hz (Bartol et al. 1999).

Most recently, Bartol and Ketten (2006) used auditory evoked potentials to determine the hearing capabilities of subadult green sea turtles and juvenile Kemp's ridleys. Subadult Hawaiian green sea turtles detected frequencies between 100 and 500 Hz, with their most sensitive hearing between 200 and 400 Hz. However, two juvenile green turtles tested in Maryland had a slightly expanded range of hearing when compared to the subadult greens tested in Hawai'i. These juveniles responded to sounds ranging from 100 to 800 Hz, with their most sensitive hearing range from 600 to 700 Hz. The two juvenile Kemp's ridleys had a more restricted range (100 to 500 Hz) with their most sensitive hearing falling between 100 and 200 Hz (Bartol and Ketten 2006).

Adult ~~G~~green turtles are primarily herbivorous often seen on reefs as deep as 100+ feet but much more common in shallower waters. Foraging behavior of green turtles is well documented and in Hawai‘i is typically characterized by numerous short dives (4 to 8 min) in shallow water (typically less than 3 m) with short surface intervals (less than 5 sec) (Rice et al. 1999).Resting periods are characterized by longer dives (over 20 min) in deeper water (4 to 40 m) with surface intervals averaging 2.8 min (Rice et al. 1999). The amount of time that turtles spend foraging versus resting is still largely unknown. Green turtles in Hawai‘i frequently use small caves and crevices in the sides of reefs as resting areas, and spend significant amounts of time on the tops of reefs (Balazs et al. 1987). Green turtles are known to be resident in Kiholo Bay, Hawai‘i (Balazs et al. 2000), and presumably other areas as well, potentially increasing their susceptibility to vessel collision and/or repeated disturbance. Two turtle “cleaning stations” have been reported near the mouth of Honokōhau Harbor. ~~During periods of calm water green sea turtles are often seen over very shallow reef flats where the choicest of algae are to be found. While some turtles may "rest" upon the surface, it is much more common to find them in small caves or wedged between coral heads where they are less subject to shark attacks. Green sea turtles may occasionally be seen far at sea (they nest in French Frigate Shoals in the NW Hawaiian Islands), but they are much more prevalent over the shallow shoreline areas where they forage for food.~~

Vessel collisions and potential noise impacts are a concern with regard to turtles. In a study of 3,861 turtle strandings in the main Hawaiian Islands from 1982 – 2003 (Chaloupka, et al. 2006), boat strikes accounted for only about 2.7 percent of the cases and were almost always fatal (95 percent). Entanglement in gill nets accounted for about six percent of strandings and also had a high rate of mortality (75 perce~~d~~nt). Hook and line entanglement (seven percent of strandings) was much less likely to result in the death of the turtle (52 percent mortality). At least 20 green sea turtles have stranded in Honokōhau Harbor or along the boundaries of Kaloko- Honokōhau National Historical Park. ~~Of all 3,861 strandings recorded in the Main Hawaiian Islands since 1982 only three occurred within 10 miles north or south of Honokōhau Harbor (Balazs, personal communication from NMFS database).~~

Recent increases in longline fisheries may be a serious source of mortality. Greens comprised 14% of the annual observed take of all species of turtles by the Hawai‘i-based longline fishery between 1990 to 1994 (NMFS 1998a). Over the period of 1994 to 1999, it was estimated that an annual average of 40 green sea turtles were caught by the Hawai‘i-based longline fishery (McCracken 2000).

Recent proliferation of a tumorous disease known as fibropapillomatosis (Herbst 1994) may reverse improvements in the status of the Hawaiian stock (NMFS 1998a), although recent modeling suggests that population levels continue to increase despite the disease (Chaloupka and Balazs 2005). The disease is characterized by grayish tumors of various sizes, particularly in the axial regions of the flippers and around the eyes. This debilitating condition can be fatal and neither a cause nor a cure has been identified.

Hawksbill turtles (Eretmochelys imbricate) are observed less often than green sea turtles near Honokōhau. About 20-30 female hawksbills nest annually in the Main Hawaiian Islands (NMFS 1998b). In 20 years of netting and hand-capturing turtles at numerous nearshore sites in Hawai‘i, only eight hawksbills (all immatures) have been encountered at capture sites including Kiholo Bay and Ka‘u (Hawai‘i), Palo‘ou (Moloka‘i) and Makaha (O‘ahu) (NMFS 1998b). It was only recently discovered that hawksbills appear to be specialist sponge carnivores (Meylan 1988). Previously they had been classified as opportunistic feeders on a wide variety of marine invertebrates and algae.

Increasing human populations and the concurrent destruction of habitat are also a major concern for the Pacific hawksbill populations (NMFS 1998b). Hawksbill turtles appear to be rarely caught in pelagic fisheries (McCracken, 2000). However, incidental catches of hawksbill turtles in Hawai‘i do occur, primarily in nearshore gillnets (NMFS 1998b). The primary threats to hawksbills in Hawai‘i are increased human presence, beach erosion and nest predation (*e.g.,* by mongooses) (NMFS 1998b).

~~3.9.5.2~~3.9.4.2 Anticipated Impacts and ~~Recommended~~ Proposed Mitigation

A complete analysis of the in-air and in-water potential acoustic impacts from the construction of the Kona Kai Ola small boat harbor was completed by Marine Acoustics, Inc.(MAI) and is included in this document as Appendix T-3. In conducting this analysis, the best available scientific, environmental, geologic, and meteorological data were obtained and used to calculate the acoustic transmission loss (TL) and subsequently to predict the received levels (RLs) at the five receiver sites. State of the art acoustic propagation models were employed in this analysis to determine in-air and in-water TL. MAI used the Acoustic Integration Model© (AIM©) to assess the impact of the predicted acoustic sound field on the species of marine mammals that could conceivably occur near the Kona Kai Ola project site.

The conclusion of that report determined that the criteria for Level A impacts to marine mammals for either in-air or in-water conditions at the receiver sites were never exceeded for the model source and receiver locations for non-blasting activities. However, these thresholds could be exceeded by the explosive blasting used to create the new harbor. For both in-air or in-water acoustic propagation, this only occurred when an animal was within about 200 meters (656 ft) of the explosion, This condition could only occur when the explosive source was at locations farthest north in the new harbor and closest to the existing harbor. This condition mandates that a safety range out to at least 200 meters (656 ft) of the source be shown to be clear of all marine mammals and sea turtle prior to each blast to preclude potential Level A takes.

The MAI report indicated that the in-air RLs for the explosive sources would exceed the assumed 100 dBA threshold for Level B harassment of pinnipeds (seals) for ranges out to about 0.4 nm (i.e., 800 yds [731 m]). This threshold is nominally for pinnipeds, but it should be extended to surface resting marine mammals and basking or beached sea turtles. Therefore, an in-air safety buffer of at least 731m from any explosive source is proposed, that should be maintained and found clear of marine mammals and basking or beached sea turtles prior to any blasts. It should be noted that although a receiver site was not modeled specifically in the existing harbor, that area is often within the range of this safety buffer and that extra care should be taken to ensure that no marine mammals or sea turtle are in the existing harbor prior to any blast. Analysis of the most restrictive Level B in-water explosive threshold shows that it is only exceeded when an animal is closer than 300 m (984 ft) from the explosive source.

Although the possibility exists for Level B impacts to marine mammals, based purely on the sound fields produced by the explosive blasts, analysis is the marine mammal distribution and movement as predicted by the AIM model, indicates that this is very unlikely situation. Therefore, it is expected that there will be much less than 0.5 Level B takes, with or without mitigation. But the mitigation safety buffer must still be enforced to preclude the unlikely possibility of marine mammals or sea turtle being near the explosive sources when they are used.

It should be recognized that several mitigation measures are already built into the proposed project. For example, the proposed practice to maintain a rock "dam" separating the construction site from the existing harbor reduces acoustic energy propagating to area potentially containing marine mammals or sea turtles. Also, this dam precludes animals from entering the construction area. This dam or land-bridge will be in place for all drilling and dredging activities, except for the removal of the land bridge itself.

Several other possible methods of mitigation are available to the Kona Kai Ola project, and feasibility, practicality, and benefit will be discussed with the National Marine Fisheries Service (NMFS) during consultation, and may be implemented subsequent to that consultation. The first possible mitigation technique is to acoustically monitor the potentially impacted areas during construction to: a) assess the accuracy of the modeling and b) to interact proactively with construction personnel to ensure that the identified threshold levels are not exceeded. Although the best available science and data was used to model the acoustics of the area, numerous conservative assumptions needed to be built into the modeling. By monitoring the actual levels received, in-situ corrections/updates to modeled parameters could potentially reduce the built--in conservativeness and reduce the potentially impacted areas. For example, the modeling assumes that all of the small voids in the bedrock are water-filled and therefore impart minimum attenuation on the acoustic signal as it propagates through. If even a small percentage of the voids are gas-filled, this attenuation would increase greatly and the impacted area would be reduced.

Another possible mitigation technique would be to augment the land-based visual observer, who it is assumed would verify that the area was clear the animals, with boat-based observers. This would increase the effectiveness of recognizing the presence of marine mammals and sea turtles in the potentially affected areas.

Additionally, interactions with the construction teams to alter the blasting methods modeled could potentially mitigate and reduce acoustic impacts to marine animals. A blasting expert will be consulted to develop a discontinuous non-linear blasting plan that will optimize cancellation of the explosion pressure wave into the marine environment. Examples of possible changes include: reducing charge size, reducing the depth drilled and blasted during any blast, reducing the number of blast holes or the volume of each blast, etc. The combination of these techniques with acoustic monitoring could potentially allow a large portion of the northern third of the harbor to be excavated with little or no potential impact to marine animals.

Interactions with NMFS during the consultation period will be used to examine these or any other techniques which may be identified. Also, the project is requesting help in identifying any possible method known to NMFS to establish and maintain turtle exclusion areas, especially in the existing harbor, without harassing the turtles. It may become apparent during those consultations that even with the identified buffer zones and mitigation techniques that an Incidental Harassment Authorization (IHA) is required, especially for the northern third of the proposed harbor.

Marine Acoustics, Inc. also completed a study of the expected ambient noise levels in Honokōhau Bay as a result of the increased vessel traffic from the expanded harbor. This report is included in this document as Appendix T-2. That report concluded that the average maximum daytime ambient noise levels would be expected to increase about 9.7 dB across the frequency spectrum from 100 Hz – 2 kHz, with the quadrupling of the vessels using the expanded harbor (i.e., the proposed action). Although significant, this increase would occur primarily during daylight hours, and the predicted median ambient noise would still be below 100 dB for all frequencies. The other significant factor is that there will be a quadrupling of the number of localized (i.e., small) individual sound fields in the area. These sound fields surround the individual boat that are contributing to the overall ambient noise. Noise levels in excess of 120 dB extend out to about 550 m (1804 ft) from these boats, with even high levels at closer ranges. Short of actual collisions with animals, Level A impacts are unlikely for noise levels typically generated by small boats. The Level B threshold nominally extends to approximately ten meters around each boat (depending on equipment such as size of motor, conditions of propeller and other equipment). Therefore potential Level B impacts to marine mammals and sea turtles would only occur within this range. Therefore, the chance for potential Level B impacts is small.

Completion of the harbor expansion project will increase the vessel traffic crossing the Hawaiian Islands Humpback Whale National Marine Sanctuary, the southern boundary of which is approximately four nautical miles north of Honokōhau Harbor. At a time when the whale population is growing, an increase of vessel traffic may increase the likelihood of vessel-whale collisions. Related to vessel traffic, an increase in whale watching activities is also likely. Vessels participating in these activities directly seek out higher whale population densities, increasing the likelihood of collisions, but also having the potential for disrupting whale behaviors such as resting, courting, mating or birthing.

As noted earlier, however, of the ~~27~~ 22 recorded whale strikes in the main Hawaiian Islands, only ~~two~~ three were recorded off the Kona coast. Sanctuary managers may need to implement additional regulations for private and/or commercial activities directly involving whale encounters. Mariner education programs, already in place as part of Sanctuary operations, will help to mitigate possible impacts due to increased boaters, and the proposed marine science center will complement Sanctuary educational programs.

~~Impacts to turtles may occur during construction of the marina. Since most of the marina will be excavated in a land-locked condition, turtles will not be subject to any potential harm from excavation. Experience during construction of the Ko Olina lagoons, and the expansion of the Barber's Point Harbor on O'ahu indicate that turtles abandoned their offshore (30-100 ft depth) resting habitats and concentrated in very near shore waters adjacent to the harbor and, at times, even within the active construction areas as soon as blasting and excavation began. Although no turtle injuries or mortalities were reported during either of those harbor construction activities, this should serve as a cautionary example for future coastal construction activities.~~

An increased level of impacts to turtles from increased boating and fishing activities may occur. ~~The level of impact documented by National Marine Fisheries Service is limited to only three turtle mortalities confirmed, since 1982, from a total of 3,861 strandings throughout the Main Hawaiian Islands~~. Of the 3,861 turtle strandings recorded from the Main Hawaiian Islands since 1982, 75% were mortalities, and of these about 4% (~est. 116, from Figure 3 of Chaloupka, et.al.) were from boat strikes and 3 of these occurred within 10 miles of Honokōhau Harbor. Data from NPS staff at the adjacent Kaloko-Honokōhau National Historical Park show a total of 20 strandings within the parking (19) and harbor (1) between 2000 and 2006 with one attributed to boat strike and 6 to fishing gear entanglement. Eleven additional gear entanglements and one additional boat strike were also recorded but not listed as strandings. Human caused impacts from fishing and boat strikes are anticipated to increase as turtle populations continue to increase and boating /fishing activities increase with the expanding harbor.

~~It would appear that anthropomorphic impact to turtles from boat strikes and fishing activities is very low along the Kona Coast adjacent to the existing harbor. It is likely that this is due in part to the relatively steep ocean bottom that limits the habitat of the turtles to the very nearshore areas away from the areas of heavy boat traffic~~. Recognition by the general public that sea turtles are protected ~~also~~ puts a heavy social pressure on fishermen who may inadvertently catch a sea turtle, and is likely a factor in the recovery of this species. Although no adverse impacts to turtles have been documented within the existing harbor, the close proximity of boats and turtles in this environment is cause for concern.

~~During land-based construction of the marina, no mitigation is necessary as previous experience has shown that turtles are not adversely impacted by these activities.~~ Once the land bridge is open, ~~however,~~ it is highly likely that turtles will be attracted into the new harbor and be subject to potential harm from in-water construction of piers or other facilities. During this period of time and until the harbor is operational, ~~it is recommended that a~~ mesh barrier will be ~~is~~ erected across the new harbor channel to exclude turtles from the inner basin. The mesh size needs to be selected in consultation with ~~regulatory~~ NMFS ~~agencies~~ to make sure it does not entangle turtles.

As the new harbor area will ~~likely~~possibly attract turtles to the basin (similar to the existing harbor) and an increase in boat traffic is expected in the harbor channel there will be an increased possibility of turtle strikes within the channel and new harbor area. To minimize this possibility it is ~~recommended~~ proposed that educational signs be erected around the harbor describing the turtles and warning boaters to be cautious while traversing harbor channels. The slow no-wake lane in the entrance channel should also be strictly enforced and the State should consider extending the slow no-wake zone further out to the first green buoy.

~~As all marine mammals have very sensitive hearing, any loud underwater sounds have the potential to disturb these creatures. Potential underwater acoustics may impact marine mammals and sea turtles during construction activities, such as blasting and pile driving. Appendix Q contains a study of underwater noise impacts during the construction and operation of the proposed project.~~

~~To mitigate impacts related to noise generated by construction activities, such as blasting and pile driving, a program to monitor sound levels and the presence of marine mammals and sea turtles will be implemented. Construction activities will be adjusted if whales, monk seals, dolphins or sea turtles are in the vicinity. Further, keeping the land bridge closed to the ocean until all major pile driving and blasting are completed will further avoid adverse impacts.~~

~~Increased boat traffic will result in increased low intensity sounds in the harbor area and along transit routes. The ecological role played by anthropomorphic sound in the marine environment has recently received heightened awareness. Evidence from declassified Department of Defense ocean recordings off of San Diego show that background sound levels off-shore of the harbor have increased approximately ten-fold in 30 years. Much of this increase in sound level has been ascribed to large ship traffic. While intense sound levels can adversely impact marine mammals and potentially other species, this level of sound pressure has not been shown to be produced by the small boats envisioned to occupy the new marina.~~

~~Adverse impacts of lower intensity noise, such as from small boat engines, have been very difficult to quantify. No definitive information is available to determine the level of impact produced by increase in small boat generated noise on fish, marine mammals and sea turtles. Given the sporting habit of spinners and other dolphins of bow-riding ships and small boat wakes, they are apparently not overtly impacted by vessel traffic noises.~~

~~However, boat-generated noises can be reduced by slowing boats to "slow-no-wake" in the main traffic lane of the entrance channel. The State could also consider extending the "slow-no-wake" lane out to the first green buoy. Appropriate signage to enforce these requirements is recommended.~~

~~3.9.6~~3.9.5 Ciguatera

Attachment 2

2 Alternatives Analysis

~~In typical land development projects, the initial planning process includes the exploration of alternatives to development objectives. In the EIS process, these alternatives are presented with a disclosure of reasons for the dismissal of non-preferred alternatives.~~

~~Kona Kai Ola does not follow this same pattern of alternatives evaluation.~~ As discussed in Section 1.4, the proposed Kona Kai Ola project is the result of agreements between JDI and the State DLNR and DHHL. The agreements and leases between the State and JDI stipulate the parameters of development for this site in terms of uses, quantities and size of many features, resulting in a limited range of land uses. Unlike a private property project, JDI is required to meet the criteria outlined in the agreements, thereby affording less flexibility in options and uses. From the developer's perspective, the agreements must also provide sufficient flexibility to allow for a development product that responds to market needs and provides a reasonable rate of return on the private investment.

The agreements between JDI and DLNR specify that the proposed harbor basin is to be 45 acres and accommodate 800 slips. This development proposal is the subject of this EIS. In response to DEIS comments, additional water quality studies and modeling were conducted. These studies determined that the water circulation in a 45-acre 800-slip marina would be insufficient to maintain the required standard of water quality. The models of water circulation suggest that a new 25-acre harbor basin could successfully maintain required water quality in the new harbor. Comments on the DEIS from DLNR, from other government agencies, the neighbors and the general community also called for the consideration of alternatives in the EIS, including a project with a smaller harbor basin and less density of hotel and time-share units.

In response to these comments on the DEIS, three alternatives are evaluated in this Final EIS and include Alternative 1, which is a plan with a 25-acre 400-slip harbor basin including a decrease in hotel and time-share units; Alternative 2, which is an alternative that had been previously discussed but not included in the proposed project, that includes an 800-slip harbor and a golf course; and Alternative 3, the no-project alternative. Each alternative is included in the EIS with an evaluation of their potential impacts. These project alternatives are presented to compare the levels of impacts and mitigation measures of the proposed project and alternative development schemes pursuant to requirements set forth in Chapter 343, HRS.

~~JDI is required to provide a new marina basin not less than 45 acres and a minimum of 800 new boat slips. Further, the agreements provide the following options for land uses at the project site:~~

- ~~Golf Course~~
- ~~Retail Commercial Facilities~~
- ~~Hotel Development Parcels~~
- ~~Marina Development Parcels~~
- ~~Community Benefit Development Parcels~~

~~JDI is not pursuing the golf course option and is proposing instead to create various water features throughout the project site. All other optional uses have been incorporated in Kona Kai Ola.~~

2.1 Project Alternatives

2.1.1 Alternative 1: 400-Slip Marina

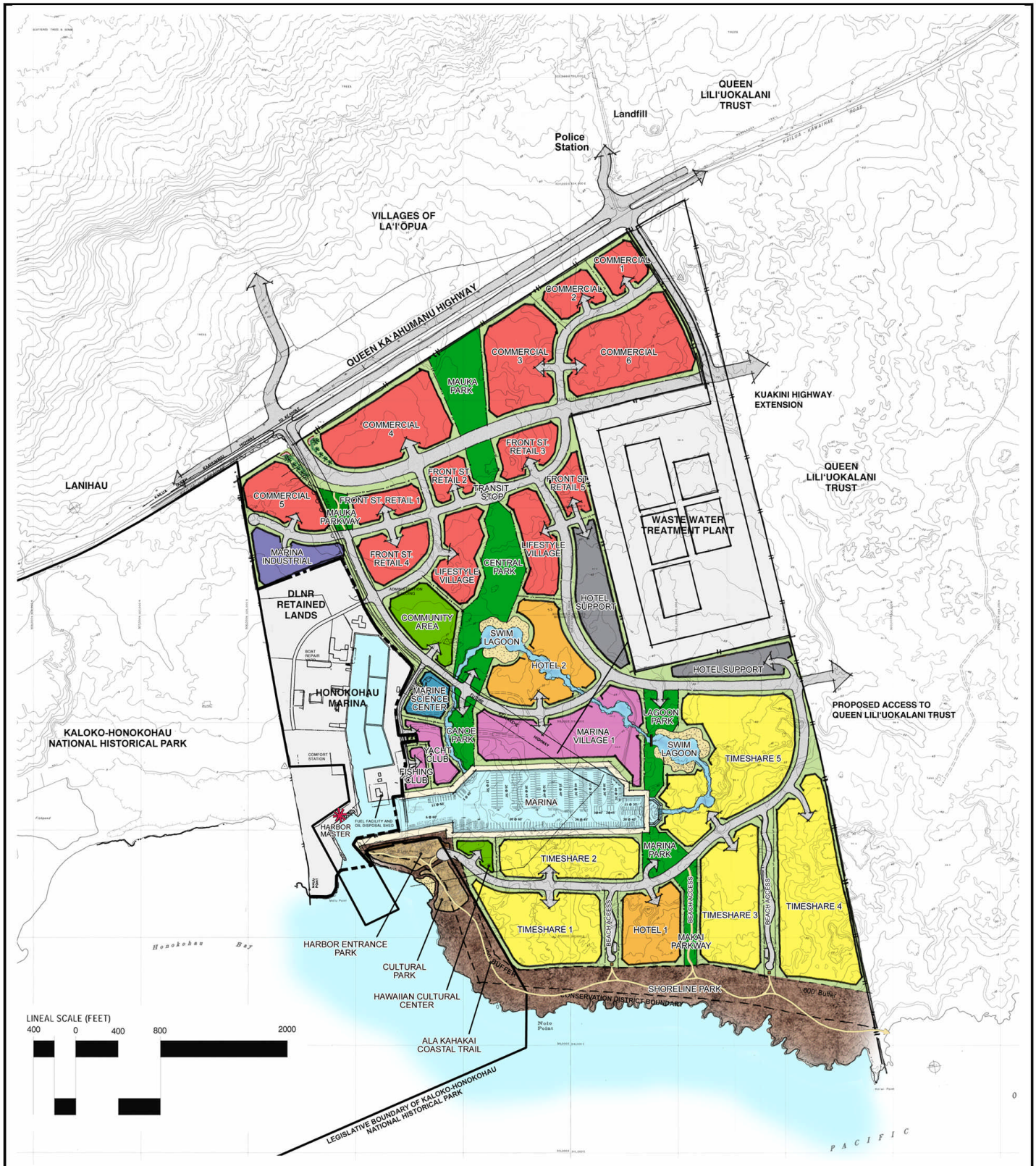
Studies conducted in response to DEIS comments found the construction and operation of an 800-slip marina may significantly impact the water quality within the marina and along the shoreline. Specifically, the Harbor Water Quality Modeling Study, as contained in Appendix U, found that the water circulation in a 45-acre 800-slip harbor was insufficient to maintain an acceptable level of water quality. Further, the existing harbor channel, which would serve both the existing and new harbors, could not adequately serve the increased boat traffic generated by an 800-slip marina during peak traffic. Mitigation measures to accommodate peak boat traffic included the widening of the existing channel, an action that would entail a complex process of Federal and State approvals and encounter significant environmental concern.

Concerns related to the proposed density of hotel and time-share units were also expressed in comments to the DEIS from members of the public, neighbors to the project site, especially the Kaniohale Community Association, and government agencies. Common themes in DEIS comments were related to impacts regarding traffic, project requirements of potable water and infrastructure systems, including sewer, drainage, utility and solid waste systems, and socioeconomic impacts.

In response to the water quality study results, and to the DEIS comments, an alternative plan was developed with a smaller marina with less boat slips, and a related decrease in hotel and time share units. Illustrated in Figure G, Alternative 1 reflects this lesser density project, and features a 400-slip marina encompassing 25 acres. For the purposes of the Alternative 1 analysis, JDI assumed 1,100 time-share units and 400 hotel rooms. Project components include:

- 400 hotel units on 34 acres
- 1,100 time-share units on 106 acres
- 143 acres of commercial uses
- 11 acres of marina support facilities
- 214 acres of parks, roads, open spaces, swim lagoons and community use areas

In addition, Alternative 1 would include the construction of a new intersection of Kealakehe Parkway with Queen Ka'ahumanu Highway, and the extension of Kealakehe Parkway to join Kuakini Highway to cross the lands of Queen Lili'uokalani Trust, and connecting with Kuakini Highway in Kailua-Kona. This is a significant off-site infrastructure improvement and is included in the agreements between the State and JDI.



Source: PBR HAWAII

Plan is conceptual only and subject to change

Figure G: Alternative 1: 400-Slip Marina

LEGEND

- TIME SHARE
- HOTEL
- RETAIL / COMMERCIAL
- MARINA RETAIL
- MARINA SUPPORT / COMMERCIAL
- MARINE SCIENCE CENTER
- COMMUNITY AREA / CULTURAL CENTER
- SWIM LAGOON
- MARINA
- UTILITIES
- PARKS & GREEN SPACE
- SHORELINE
- HARBOR ENTRANCE PARK / CULTURAL PARK

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Like the proposed project, Alternative 1 would have a strong ocean orientation, and project components that support this theme would include various water features including seawater lagoons and a marine science center. The new Alternative 1 harbor would include a yacht club, fishing club, a canoe park, and a cultural park with a focus on Hawaiian maritime cultural heritage of the voyaging canoe. The coastal area would be protected with a shoreline park with trails and public access parking for walking and shoreline fishing, and a cultural park surrounding the heiau, the cultural sites and 'Alula for community use. Additional Alternative 1 community areas would include facilities and space for community use, including programs of the Kona Kai Ola Community Foundation, which supports community programs in health care, culture, education, and employment training for the local community, especially to native Hawaiians. Like the original proposed plan, Alternative 1 includes 40 percent of the land in parks, roads, open spaces, swim lagoons and community use areas.

2.1.2 Alternative 2: Golf Course Feature

Alternative 2 was among the alternatives discussed at a community charrette in September 2003. It includes a golf course, which is a permitted use in the DLNR agreement and DHHL lease. As Figure H illustrates, an 18-hole championship golf course would occupy 222 acres on the southern portion of the project site. As with the proposed project, Alternative 2 includes an 800-slip marina on a minimum of 45 acres.

To support the economic viability of the project, other Alternative 2 uses include:

- Golf course clubhouse on three acres
- 1,570 visitor units on 88 acres fronting the marina
- 118 acres of commercial uses
- 23 acres of community uses

Community uses in Alternative 2 include an amphitheater, a canoe facilities park, a community health center, a Hawaiian cultural center and fishing village, a marine science center and employment training center. The sea water lagoon features contained in the proposed project and Alternative 1 are not included in this alternative.

2.1.3 Alternative 3: No Action

In Alternative 3, the project site would be left vacant, and the proposed marina, hotel and time-share facilities, commercial and marina industrial complexes, and community-oriented uses would not be realized.

~~The economic viability and sustainability of the project is determined by the density and uses proposed. Because JDI is obligated to develop an 800-slip marina for the State, complete road improvements, and provide various public enhancement features at its own expense, the density proposed for the income generating features of the development must be sufficient to provide an acceptable level of economic return for JDI. The market study, which is discussed in Section 4.6, reviewed various development schemes and determined that the currently proposed density and mix is the optimum to meet the anticipated financing and development cost obligations for the public features associated with the development.~~

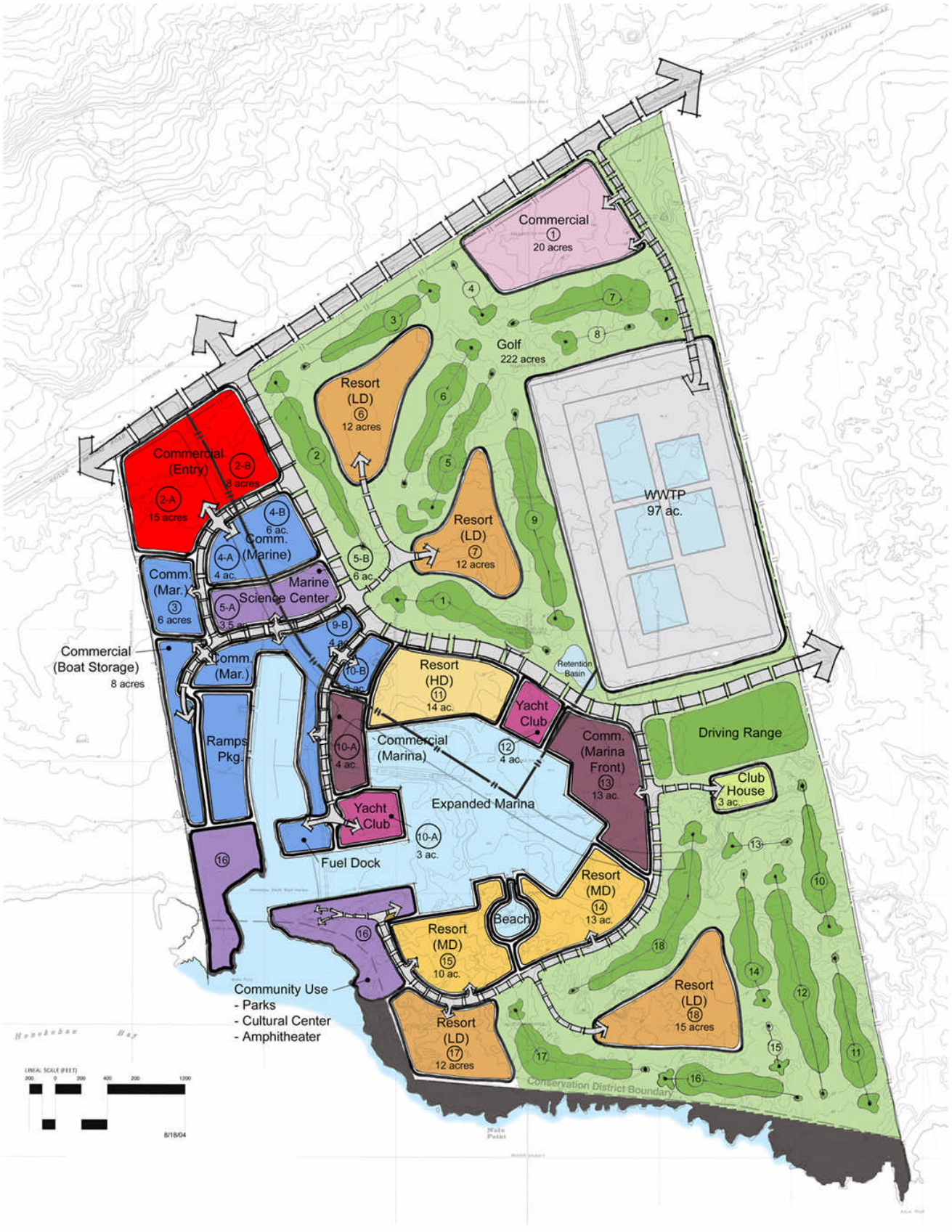

Figure H. Alternative 2: Golf Course Alternative

Legend

N E S W

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2.2 Alternatives Analysis

As discussed in Section 2.1, the proposed Kona Kai Ola project (also referred to as "proposed project") is defined by development requirements related for a marina and the related uses that would be needed to generate a reasonable rate of return that covers development costs.

Beginning with Section 2.2.1, the alternative development concepts are comparatively assessed for potential impacts that may reasonably be expected to result from each alternative. Following is an overview of the primary observations of such assessment.

Alternative 1 includes half of the State-required boat slips and 60 percent of the proposed hotel and time-share units and, due to the decreased density, this alternative would generate significantly less environmental and socio-economic impacts. A harbor water quality model found the reduction of the volume of the new marina basin by about half (approximately 25 acres) significantly improved the water circulation and quality. Further, the reduced number of boat slips would generate less boat traffic, thereby reducing congestion and the need to mitigate impacts further by the widening of the existing harbor channel.

A project with fewer hotel and time-share units and increased commercial space with a longer (14 years) absorption period would change the mix of employment offered by the project, and slightly increase the overall employment count. The public costs/benefits associated with Alternative 1 would change, compared to the proposed project, with a general increase in tax collections, and a general decrease in per capita costs. Detailed discussion of Alternative 1 potential economic impacts are provided in Section 4.6.6. Comparisons of levels of impact are presented throughout this FEIS.

While this analysis might indicate that the 25-acre marina in Alternative 1 would be the more prudent choice, the DLNR agreement establishes the minimum size and slip capacity of the marina at 45 acres and 800 slips, respectively. Amendments to the DLNR agreement would be required in order to allow Alternative 1 to proceed as the preferred alternative. Hence, selection of the preferred alternative is an unresolved issue at the writing of this FEIS.

Alternative 2, the golf course alternative, was not previously considered to be the preferred alternative primarily because market conditions at the time of project development might not likely support another golf course. Further, DHHL has a strategy goal to have more revenue-generating activities on the commercial lease lands within the project area. In addition, concerns have been expressed as to environmental impacts of coastal golf courses, including the potential adverse impact on Kona's water supply if potable water is used for golf course irrigation.

While Alternative 3, the no-project alternative, would not generate adverse impacts related to development of these lands associated with the construction and long-term operations, it would also not allow for an expanded public marina that would meet public need and generate income for the public sector. Further, the no-project alternative would foreclose the opportunity to create a master-planned State-initiated development that would result in increased tax revenue, recreation options and community facilities. Crucial privately-funded improvements, such as the marina, regional roadway and circulation improvements, and improvements to the existing wastewater treatment plant, would not be implemented. Private funds toward the development of community-oriented facilities such as parks, other recreational facilities, and public access would not be contributed.

~~Hence, the only valid alternative to the proposed project is the no-action alternative. In this alternative, the project site would be left vacant, and the proposed marina, hotel and time-share facilities, commercial and marina industrial complexes, and community-oriented uses would not be realized.~~

~~The no-project alternative would therefore not generate adverse impacts associated with the construction and long-term operations would not occur.~~

~~Likewise, the creation of a master-planned state-initiated development, resulting in increased employment, tax revenue, recreation options and community facilities, would not be created. Privately-funded improvements, such as the marina, regional roadway and circulation improvements, and improvements to the existing wastewater treatment plant, would not be implemented. Private funds toward the development of community-oriented facilities such as parks, other recreational facilities and public access would not be contributed.~~

Further, the creation of revenue-producing businesses on the DHHL property to fund homestead programs would not occur, resulting in fewer potential benefits for Hawaiians.

Hence, the agreements and leases between the State and JDI indicate that the no-action alternative is not in the public interest~~has been rejected at this time~~.

2.2.1 Impact Comparison

Grading and Excavation

The proposed project requires grading and excavation. Both actions may impact groundwater due to rainfall runoff during construction. Alternative 1 would require a significantly smaller excavation for the marina basin and would therefore carry a lesser risk of potential adverse effects on water quality. Alternative 2 would require the same basin excavation as the proposed project, and would also include extensive grading and filling to build the golf course, the latter of which would generate additional impacts. Alternative 3 would result in no change to the geography, topography and geology.

Further discussion on grading and excavation is contained in Section 3.3.

Natural Drainage

Most precipitation infiltrates into the porous ground at the site, and no significant sheet flow is likely. Alternative 1 would generate similar levels of impacts on natural drainage as those of the proposed project and thus require similar mitigation measures. The golf course in Alternative 2 would not be as porous since the site would be graded, soil would be placed, and grass and other landscaping would be grown. Sheet flow and runoff can occur on a golf course, and drainage patterns might change. Alternative 3 would result in no change to the existing natural drainage pattern. Further discussion on natural drainage is contained in Section 3.4.

Air Quality

Air quality will be affected by construction activities, as well as pollutants from vehicular, industrial, natural, and agricultural sources. Alternative 1 would generate less construction air quality impacts than the proposed project due to the reduced amount of intensive groundwork associated with the smaller marina basin and fewer long-term impacts by reducing traffic 35 and 40 percent during, respectively, AM and PM peak traffic times. Construction of Alternative 2 would result in fugitive dust and exhaust from equipment and is expected to generate the same level of air quality impact as the proposed project. Alternative 3 would result in no change to existing air quality. Further discussion on air quality is contained in Section 3.5.

Terrestrial Environment

To provide additional habitat for shorebirds and some visiting seabirds, the project proposes to construct a brackishwater pond area suitable for avian fauna, including stilts, coots and ducks. While habitat expansion is beneficial, there is also a possibility that these species may be exposed to activity that may harm them. Alternative 1 would not include a brackish water pond, but will include 5 acres of seawater features, which is 74 percent less than the 19 acres of seawater features in the proposed project. While this would reduce beneficial impacts, it would also decrease exposure to potentially harmful activity. Alternative 2 does not include the brackish water pond features, but would include drainage retention basins that would attract avian fauna and expose them to chemicals used to maintain golf course landscaping. While Alternative 3 would result in no increase in potentially harmful activity, it would also not provide additional habitat for avian fauna. Further discussion on the terrestrial environment is contained in Section 3.7.

Groundwater

Groundwater at the project site occurs as a thin basal brackish water lens. It is influenced by tides and varies in flow direction and salt content. The existing Honokōhau Harbor acts as a drainage point for local groundwater. Any impact to groundwater flow from the proposed harbor is likely to be localized. The proposed marina basin will not result in any significant increase in groundwater flow to the coastline, but rather a concentration and redirection of the existing flows to the harbor entrance.

There will be differences in the flow to the marina entrance between the proposed project and Alternative 1. Alternative 1, being smaller in size, will have less impact on groundwater flow than the proposed marina. Alternative 2 will have a similar impact to groundwater quality as the proposed project. Alternative 2 may also impact water quality by contributing nutrients and biocides to the groundwater from the golf course. Alternative 3 would result in no change in existing groundwater conditions. Further discussion on groundwater is contained in Section 3.8.1.

Surface Water

There are no significant natural freshwater streams or ponds at the site, but there are brackish anchialine pools. Surface water at the project site will be influenced by rainfall. Runoff typically percolates rapidly through the permeable ground. The proposed project will include some impermeable surfaces, which together with building roofs, will change runoff and seepage patterns.

Alternative 1 is a lower density project that is expected to have proportionally less impact on surface water and runoff patterns and less potential impact on water quality than the proposed project. Alternative 2 would have more impact on surface water quality than the proposed project due to fertilizers and biocides carried by runoff from the golf course. Alternative 3 would result in no change to surface water conditions. Further discussion on surface water is contained in Section 3.8.2.

Nearshore Environment and Coastal Waters

The potential adverse impacts to the marine environment from the proposed project are due to the construction of an 800-slip marina and the resulting inflow of higher salinity seawater and inadequate water circulation, both of which are anticipated to impair water quality to the extent of falling below applicable standards. One possible mitigation measure is to significantly reduce the size of the marina expansion.

The reduced marina size (from 45 to 25 acres) and reduced lagoon acreage in Alternative 1 are expected to result in a proportionate reduction in seawater discharging into the new harbor and increased water circulation. Alternative 2 includes the same marina basin size and is therefore subject to the same factors that are expected to adversely affect water quality.

In the existing Honokōhau Harbor, water quality issues focus on the potential for pollutants, sediments, mixing and discharge into the nearshore marine waters. Before the harbor was constructed, any pollutants entrained within the groundwater were believed to have been diffused over a broad coastline.

The water quality in the proposed harbor depends on several components. These include salinity, nutrients, and sediments that come from the ocean, rainfall runoff, water features with marine animals, and dust. The smaller project offered as Alternative 1 is expected to produce a reduced amount of pollutants and reduce the risk of adverse impact upon water quality.

It is notable that the 45-acre marina basin planned in the proposed project and Alternative 2 only becomes viable from a water quality impact standpoint if the additional brackish groundwater inflow into the new marina exceeds 60 mgd. The resulting flushing from such inflow would be expected to better maintain water quality. However, it is unclear whether 60 mgd of brackish groundwater would be available. As proposed in Alternative 1, reduction of the volume of the new marina basin by 45 percent will significantly improve the flushing and water quality because the lower volume can be flushed by the available groundwater flow.

In addition, there could be higher rainfall runoff from the Alternative 2 golf course into the harbor, because the grassed golf course will be less porous than the natural surface. The golf course will also require relatively high levels of fertilizer, biocides, and irrigation, all of which could contribute to adverse water quality impacts.

Further discussion on nearshore environment and coastal waters is contained in Section 3.9.1.

Anchialine Pools

Anchialine pools are located north of Honokōhau Harbor, and south of the harbor on the project site. The marine life in these pools is sensitive to groundwater quality, and changes due to construction and operation of the project could degrade the viability of the pool ecosystem. In the southern complex, 3 anchialine pools with a combined surface area of $20m^2$ would be eliminated due to the harbor construction in the proposed project and Alternatives 1 and 2.

Predicting the extent of change in groundwater flow is difficult if not impossible even with numerous boreholes and intense sampling. The actual flow of groundwater towards the sea is minimal today, and tidal measurements show that tide fluctuations represent more than 90 percent in actual harbor tides. The fluctuations occur simultaneous with the ocean/harbor tide, which indicate a vertical and horizontal pressure regime between bore hole 6 and the ocean and harbor. Hence, the tides alone create a mixing system that increases salinity, as the flow approaches the point of discharge which will be either the channel or the shore. Another factor that could influence groundwater quality is the increased local recharge from irrigation between the channel and shore. This will add fresh water to the lens locally but is not quantified at this time.

Quantification of these impacts, including the flow of groundwater through each pond, is therefore extremely difficult. The shallow lavas are of the pahoehoe type and have a relatively high horizontal permeability. In surface depressions or undulations, the pahoehoe lavas have a tendency to lose vertical permeability from sedimentation thus restricting water exchange within the individual pools. This is normally reflected in both the salinity and temperature and this information has been adequately studied in the pools.

Changes in groundwater quality may or may not impact biological communities in the anchialine and estuarine environment. In either case, it is important to understand these relationships to effectively manage the resource. If there is significant deviation from the baseline especially in regard to nutrients, pathogens, and toxins, a mitigation plan to determine the cause and take decisive appropriate action will be implemented.

Due to the uncertainty of changes in groundwater flow and quality due to marina construction, the variability in impacts between the proposed project and Alternatives 1 and 2 is unknown at this time. Alternative 3 would result in no change in groundwater flow. While this would eliminate the potential for adverse impacts, Alternative 3 would also continue the pattern of existing degradation related to human activity and the introduction of alien species. Further discussion on anchialine pools is contained in Section 3.9.2.

Marine Fishing Impacts

The proposed marina will increase the number of boats in the area and it is reasonable to assume that a portion of these new boats will engage in fishing activities. The increase in boats in the area would be primarily related to the marlin and tuna / pelagic fishery, coral reefs due to extractive fisheries, and SCUBA activities. The pressure on fish and invertebrate stocks is expected to increase with or without the marina. Harbor expansion provides the opportunity to address existing conditions to consolidate, focus, and fund management and enforcement activities at one location.

Compared to the proposed project, Alternative 1 would result in a 21 percent decrease in boat traffic, thereby lessening the potential for marine fishing impacts. The level of impacts in Alternative 2 would be similar to that of the proposed project. Alternative 3 would result in no change in existing marine fishing conditions, and no opportunity to address already existing pressure on fish and invertebrate stocks. Further discussion on marine fishing impacts is contained in Section 3.9.3.

Cultural and Archaeological Resources

The proposed project will integrate cultural and archaeological resources in the overall development. Archaeological sites recommended for preservation will be preserved, and cultural practices will be encouraged. Kona Kai Ola includes a canoe park, and a cultural park with a focus on Hawaiian maritime cultural heritage of the voyaging canoe. Proposed is a 400-foot shoreline setback that would serve as a buffer between the ocean and developed areas. This coastal area would be protected with a shoreline park with trails and public access parking for walking and shoreline fishing, and a cultural park surrounding the heiau, the cultural sites and ʻAlula for community use.

Alternative 1 would contain all of the cultural archaeological features and the shoreline setback area would be 400 feet in the northern portion of the site and increase to 600 feet in the southern portion. Alternative 2 would preserve cultural and archaeological resources, but does not include a 400-foot shoreline setback. Alternative 3 would result in no change to existing cultural and archaeological resources and no addition of cultural and community facilities and activities. Further discussion on cultural and archaeological resources is contained in, respectively, Sections 4.1 and 4.2.

Noise

Project-generated noise is due to construction equipment and blasting, boats, marina activities, vehicle traffic, and the Kealakehe Wastewater Treatment Plant operations. Alternative 1 would generate less noise impacts due to reduced construction activities, fewer boats, less traffic and less on-site activity. Alternative 2 would also generate less noise due to reduced traffic and less on-site activity, but noise related to the excavation of the marina basin and an increase in the number of boats would be similar to that of the proposed project. Further discussion on noise impacts is presented in Section 4.4.

Socioeconomic Impacts

The proposed project will generate an increase in de facto population of an estimated 5,321 persons due to the increase in hotel and time-share units. The estimated de facto population increase in Alternative 1 is 37 percent less, at 3,363 persons, than the proposed project. The de facto population increase in Alternative 2 is similar to Alternative 1.

Employment in the commercial components will nearly double in Alternative 1, from a stabilized level of 1,429 full-time equivalent (FTE) positions in the proposed project to 2,740 in the Alternative 1.

Under Alternative 1, the total operating economic activity at Kona Kai Ola will increase due to the added commercial space more than off-setting the fewer visitor units, moving upward from $557.6 million per year to circa $814.3 million annually. The total base economic impact resulting from development and operation of Alternative 1 will similarly be higher by between 35 and 45 percent than that of the proposed project.

Alternative 1, which has a reduced marina size of 25 acres, and fewer hotel and time-share units, would have a meaningful market standing, create significant economic opportunities, and provide a net benefit to State and County revenues. From a market perspective, a smaller Kona Kai Ola would still be the only mixed use community in the Keahole to Kailua-Kona Corridor offering competitive hotel and time-share product.

The estimated absorption periods for marketable components of Alternative 1 are generally shorter than those for the same components in the proposed project. Marina slips under Alternative 1 are estimated to be absorbed within 2 years after groundbreaking, as compared with 9 years for absorption of slips in the proposed project. Hotel rooms under Alternative 1 are estimated to be absorbed within 4 years after groundbreaking, as compared with 7 years under the proposed project. Time-share units would be absorbed within 10 years under Alternative 1, while 15 years are projected under the proposed project. Due to the planned increase in commercial facilities under Alternative 1, the absorption period of commercial space is estimated at 14 years, as compared with 8 years for absorption of such facilities under the proposed project.

The State and County will still both receive a net benefit (tax receipts relative to public expenditures) annually on a stabilized basis under the Alternative 1. The County net benefits will be some $12.2 million per year under the Alternative 1 versus $14.9 million under the proposed project. The State net benefits will increase under the Alternative 1 to about $37.5 million annually, up substantially from the $11.4 million in the proposed project.

Due to the lower de facto population at build-out, the effective stabilized public costs for both the State and County will decline meaningfully under the Alternative 1, dropping from $7.7 million annually for the County and $36.5 million for the State, to $4.9 million and $23 million per year, respectively.

Alternative 3 would result in no increase in de facto population and improvement to economic conditions. Further discussion on social and economic impacts are contained in, respectively, Sections 4.5 and 4.6.

Vehicular Traffic

The proposed project will impact the nearby road network that currently is congested during peak traffic times. The proposed project includes roadway improvements that would reduce the impact and improve roadway conditions for the regional community.

Alternative 1 includes the same roadway system improvements as the proposed project, yet would reduce vehicular traffic by 35 percent when compared to the proposed project. Alternative 2 would have similar traffic conditions and roadway improvements as Alternative 1. Alternative 3 would result in no increase in traffic and no roadway improvements.

Marina Traffic Study

The increase in boat traffic due to the proposed 800-slip marina would cause entrance channel congestion during varying combinations of existing and new marina peak traffic flow. Worst case conditions of active sport fishing weekend and summer holiday recreational traffic result in traffic volumes exceeding capacity over a short afternoon period. Mitigation to address boat traffic in the proposed project include widening the entrance channel, traffic control, implementation of a permanent traffic control tower, or limiting vessel size.

Alternative 1 would result in a 21 percent reduction in boat traffic congestion under average existing conditions and ten percent reduction during peak existing conditions. The reduction to 400 slips also reduces the impacts of congestion at the entrance channel, thereby reducing the need for any modifications to the entrance channel.

Alternative 2 would have the same level of boat traffic as the proposed project. Alternative 3 would not meet the demand for additional boat slips and would not generate additional boat traffic. Further discussion on marina traffic is contained in Section 4.8.

Police, Fire and Medical Services

The proposed project will impact police, fire and medical services due to an increase in de facto population and increased on-site activity. Alternatives 1 and 2 would have similar levels of impact as the proposed project due to increased on-site activity. Further discussion on police, fire and medical services are contained, respectively, in Sections 4.10.1, 4.10.2 and 4.10.3.

Drainage and Storm Water Facilities

The proposed project will increase drainage flows, quantities, velocities, erosion, and sediment runoff.

Alternative 1 involves a reduction of the project density that would reduce storm runoff from the various land uses due to a reduction in impervious surfaces associated with hotel and time-share development and to the creation of more open space. However, roadway areas will increase by about 30 percent in Alternative 1. Storm runoff from proposed streets would therefore increase; thus requiring additional drainage facilities and possibly resulting in no net savings. The golf course in Alternative 2 may also change drainage characteristics from those of the proposed project and may not reduce impacts. Alternative 3 would result in no change in existing conditions and no improvements to drainage infrastructure. Further discussion on drainage and storm water facilities is contained in Section 4.10.5

Wastewater Facilities

The proposed development is located within the service area of the Kealakehe WWTP and a sewer system will be installed that connects to the WWTP. The sewer system will be comprised of a network of gravity sewers, force mains, and pumping stations which collect and convey wastewater to the existing Kealakehe WWTP. Project improvements will incorporate the usage of recycled / R1 water. Improvements implemented by the proposed project will also accommodate the needs of the regional service population.

Alternative 1 would generate approximately 10 percent less wastewater flow than the proposed project. Wastewater flow in Alternative 2 is undetermined. Alternative 3 would result in no additional flow, as well as no improvements that will benefit the regional community. Further discussion on wastewater facilities is contained in Section 4.10.6.

Potable Water Facilities

The proposed project average daily water demand is estimated at 1.76 million gallons per day. Existing County sources are not adequate to meet this demand and source development is required. The developer is working with DLNR and two wells have been identified that will produce a sustainable yield that will serve the project. These wells will also serve water needs beyond the project.

Alternative 1 would result in net decrease of about five percent of potable water demand. Alternative 2 may have a lower water demand than the proposed project as long as potable water is not used for irrigation. Alternative 3 would result in no additional flow, as well as no source development that will benefit the regional community. Further discussion on potable water facilities is contained in Section 4.10.8.

Energy and Communications

Regarding Alternative 1, preliminary estimates for electrical, telecommunications, and cable resulted in a net demand load that remains similar to the proposed project. Further discussion on energy and communications is contained in Section 4.10.9.1.

The proposed project will increase the demand for electrical energy and telecommunications. The demand would be reduced in Alternative 1 because the number of boat slips and units would decrease. Similarly, Alternative 2 would have fewer units than the proposed project and therefore reduce energy demands. Further reduction in energy demand for either alternative could be achieved by using seawater air conditioning (SWAC) and other energy reduction measures, as planned by the developer. Further discussion on energy and telecommunications is contained in Section 4.10.9.2.

Water Features and Lagoons

The proposed project includes a brackishwater pond, lagoons, and marine life exhibits supplied by clean seawater. The water features in Alternative 1 would significantly decrease by 74 percent from 19 acres in the proposed project to five acres in Alternative 1. This decrease in water features would result in a corresponding decrease in water source requirements and seawater discharge. Alternative 2 does not include the seawater features. Alternative 3 would result in no additional demand for water source requirements and seawater discharge.

2.2.2 Conformance with Public Plans and Policies

State of Hawai'i

Chapter 343, Hawai'i Revised Statutes

Compliance with this chapter is effected, as described in Section 5.1.1 in regard to the proposed project and the alternatives discussed.

- State Land Use Law, Chapter 205, Hawai'i Revised Statutes

  The discussion in Section 5.1.2 is directly applicable to Alternative 1, the proposed project. Alternative 1 will involve a setback of 400 feet that increases to 600 feet along the southern portion of the project site's shoreline area. Alternative 2 does not provide for such a setback, but may still require approvals from DLNR for cultural, recreational, and community uses and structures within the Conservation district.

- Coastal Zone Management Program, Chapter 205A, Hawai'i Revised Statutes

  Recreational Resources:

  In addition to the discussion of consistency with the associated objective and policies, as described in Section 5.1.3, the reduction from the proposed project's 800-slip marina to a 400-slip marina under Alternative 1 will still expand the region's boating opportunities and support facilities. The existing harbor entrance will still be utilized under this alternative; however, potential risks relating to boat traffic and congestion in the marina entrance area will be reduced significantly. The 400-600 foot shoreline setback, public parks, trails, cultural areas, community facilities, and marine science center remain important recreational components under Alternative 1.

Alternative 2 includes a golf course component, which would add a more passive recreation to the active and social components, such as boating, fishing, swimming, trails, walkways, parks, marine life, educational and interactive areas that are also part of the project. The golf course would enhance the range of leisure and recreational opportunities offered at Kona Kai Ola.

Alternative 2, like the proposed project, will expand the region's boating opportunities and support facilities through its 800-slip marina. However, the potential adverse impacts of increased boat traffic from the size of the marina are significant enough to offset the benefits of increased boating opportunities.

Coastal Ecosystems:

The discussion in Section 5.1.3 is directly applicable to Alternative 1.

Alternative 1 not only reduces the number of slips proposed by 50 percent, but it also reduces the size of the marina from 45 acres to 25 acres. The 25-acre marina will increase the body of water within the existing harbor, but to a significantly lesser extent than the proposed project's estimated increase, which is also applicable to the 45-acre size that is proposed for the marina under Alternative 2.

The findings of the Harbor Water Quality Modeling Study conclude that a reduction in the size of the harbor expansion is an alternative that will mitigate the risk of significant impacts upon water quality within the marina and existing harbor. Accordingly, the reduction in both the number of slips and the size of the marina basin under Alternative 1, in combination with proper facilities design, public education, and enforcement of harbor rules and regulations, would result in fewer long-term impacts to water quality and coastal ecosystems. Short-term (construction-related) impacts would likely remain the same although the reduction in the total acreage of excavation is expected to result in a shorter duration of such impacts.

In addition to its 800-slip marina and potential adverse impacts upon water quality and the marine environment, Alternative 2 includes a golf course component, which has the potential to impact coastal ecosystems by increasing the nutrient loading in surface runoff and groundwater and also by introducing pesticides, herbicides, and other chemicals common in golf course use and management into the nearshore waters surrounding the project site.

Economic Uses

Although reduced in the number of slips, the smaller marina under Alternative 1 will nevertheless serve public demand for more boating facilities in West Hawai'i and is consistent with the objective and policies and discussion set forth in Section 5.1.3. The economic impacts of Alternative 2, while comparable to those of the proposed project's marina development, are notably marginal as to the golf course component, based on the marketability analysis that indicates a condition of saturation within the region.

Coastal Hazards

The discussion and considerations set forth in Section 5.1.3 are also applicable to Alternatives 1 and 2 and indicate compliance with the objective and policies addressed. Tsunami risks mainly affect the large shoreline setback area that is proposed for the project and Alternative 1. Alternative 2 projects a transient accommodation site that is partially within the tsunami hazard zone and thus carries a higher hazard risk. However, the essential requirement for these alternatives, as well as the proposed project, is a well-prepared and properly implemented evacuation plan.

Beach Protection

Discussion and considerations set forth in Section 5.1.3 are also applicable to Alternatives 1 and 2 and indicate compliance with the objective and policies addressed. Alternative 1 and, to a lesser extent, Alternative 2, will retain the shoreline area in its natural condition.

Similar to the proposed project, Alternative 1 provides for a shoreline setback of considerable width within which no structure, except for possible culturally-related structures, would be allowed. Alternatives 1 and 2 will thus be designed to avoid erosion of structures and minimize interference with natural shoreline processes.

Marine Resources

The discussion in Section 5.1.3 is also applicable to Alternative 1 which is described to be an alternative that is specifically projected to mitigate anticipated adverse impacts on water quality and the marine environment that might otherwise result from the original harbor design and scale, which is also incorporated in Alternative 2 . The reduced marina size under Alternative 1 is projected to meet water quality standards and enable greater compliance with the objective and policies addressed in this section.

Alternative 2 includes a golf course component and thus the potential to adversely impact marine resources by increasing the nutrient loading in surface runoff and groundwater and also by introducing pesticides, herbicides, and other chemicals common in golf course use and management into the nearshore waters surrounding the project site.

Hawai'i State Plans, Chapter 226, Hawai'i Revised Statutes

Section 226-4 (State goals), 5 (Objectives and policies for population, and 6 (Objective and policies for economy in general):

The discussion in Section 5.1.4 is applicable to Alternatives 1 and 2, in addition to the proposed project. These development concepts generally conform to the goals, objectives, and policies set forth in these sections because they will provide some degree of economic viability, stability, and sustainability for future generations. Kona Kai Ola will convert essentially vacant land into a mixed-use development with a distinctive marina and boating element, providing a wide range of recreational, business, and employment opportunities to the community.

Section 226-8 Objective and policies for the economy – the visitor industry:

Alternatives 1 and 2 will be consistent with the State's economic objective and policies relating to the tourism industry for the same reasons that are discussed in regard to the proposed project in Section 5.1.4. They will incorporate JDI's commitment to sustainability principles in the planning and design of the development concepts in Alternatives 1 and 2. Although the total hotel and time-share unit count is reduced to approximately 1,500 in Alternatives 1 and 2, the transient accommodations component of these alternatives will still further the State's objective and policies for increased visitor industry employment opportunities and training, foster better visitor understanding of Hawai'i's cultural values, and contribute to the synergism of this mixed-use project concept that addresses the needs of the neighboring community, as well as the visitor industry.

Section 226-11 Objectives and policies for the physical environment: land-based, shoreline and marine resources:

Alternative 1 is expected to involve less potential adverse impacts upon these environmental resources than the proposed project. Likewise, and Alternative 2 would have less adverse impact because of its reduction in the size of the marina and in the total hotel and time-share unit count. Alternative 1 carries less potential risk to water quality and related impacts upon the marine environment and anchialine pool ecosystems. Although approximately three anchialine pools are expected to be destroyed, the great majority of pools will be preserved within and outside of the proposed 400-foot shoreline setback.

The golf course component in Alternative 2 has the potential to impact marine resources by increasing the nutrient loading in surface runoff and groundwater and also by introducing pesticides, herbicides, and other chemicals common in golf course use and management into the marina basin and nearshore waters surrounding the project site. It also has the potential to adversely affect the anchialine pools by introducing the chemicals into the pond systems.

Section 226-12 Objective and policies for the physical environment: scenic, natural beauty, and historic resources:

The discussion in Section 5.1.4 is directly applicable to Alternative 1 and describes the compliance with the objective and policies addressed.

The golf course component of Alternative 2 would create a park-like view that would potentially enhance the beauty of the project site and surrounding areas when considered in combination with the existing rugged natural beauty of the area.

Just as with the proposed project, Alternatives 1 and 2 would also be designed to blend with the natural terrain and to honor and protect the cultural history, resources, and practices of these lands.

Section 226-13 Objectives and policies for the physical environment: land, air and water quality:

As stated above, because of the reduction in both the number of slips and the size of the marina basin, with proper facilities design, public education and enforcement of harbor rules and regulations, Alternative 1 is anticipated to cause fewer long-term impacts to water quality than either the proposed project or Alternative 2. Based on the findings of the Harbor Water Quality Modeling Study, water quality resulting from a reduced marina basin size as proposed under Alternative 1 is expected to be similar to existing conditions.

As previously noted, Alternative 2 has the potential to adversely impact water quality by increasing the nutrient loading in surface runoff and groundwater by introducing pesticides, herbicides and other chemicals common in golf course development and maintenance into the marina basin and nearshore waters surrounding the project site.

Section 226-14 Objectives and policies for facility systems - general:

Alternatives 1 and 2 will conform to the objective and policies of this section on the grounds that are discussed in regard to the proposed project in Section 5.1.4. The master-planning and phasing of the project concepts under these alternatives will be coordinated with associated public and private infrastructural planning and related private and public infrastructural financing. The cost of the marina construction and project-related infrastructure is to be borne by the developer, resulting in considerable savings for the public. In addition, the projected lease revenue from these public lands will provide additional public benefits by establishing a revenue stream for capital improvements and maintenance of a range of State facilities.

Section 226-15 Objectives and policies for facility systems - solid and liquid wastes:

In addition to the developer's commitment to sustainable development design, the project will involve upgrades to the County of Hawai'i's Kealakehe Wastewater Treatment Plant to meet current needs, as well as the project's future needs. This commitment is applicable to Alternatives 1 and 2, as well as the proposed project that is discussed in Section 5.1.4.

Section 226-16 Objectives and policies for facility systems – water:

The discussion of water conservation methods and the need to secure additional potable water sources in Section 5.1.4 is also applicable to Alternative 1 and demonstrates conformity to the objective and policies for water facilities. Alternative 2 involves greater irrigation demands in regard to its golf course component and greater potable water demands for human consumption than those for Alternative 1. Alternative 2 is expected to face more serious challenges in securing adequate and reliable sources of water.

Section 229-17 Objectives and policies for facility systems – transportation:

Alternatives 1 and 2 will conform to this objective and policies because they will present water transportation opportunities, including the possible use of transit water shuttles to Kailua-Kona, as described in regard to the proposed project in Section 5.1.4.

Section 226-18 Objectives and policies for facility systems – energy:

Alternatives 1 and 2 conform to these objective and policies through the use of energy efficient design and technology and commitment to the use and production of renewable energy to serve the project's needs. Solar energy production, solar hot water heating, and the use of deep cold seawater for cooling systems are currently identified as means of saving substantial electrical energy costs for the community and the developer.

Section 226-23 Objectives and policies for socio-cultural advancement – leisure:

Alternative 1 conforms to this objective and related policies for the reasons offered in Section 5.1.4 in regard to the proposed project. Alternative 1 will be of greater conformity with the policy regarding access to significant natural and cultural resources in light of the 400-600 foot shoreline setback that has been designed for this alternative.

Although it does not propose the considerable shoreline setback that is planned for Alternative 1, Alternative 2 is consistent with this objective and related policies in incorporating opportunities for shoreline-oriented activities, such as the walking trails. In addition, the golf course component adds a more passive recreation alternative to the active and social components, such as boating, fishing, swimming, trails, walkways, parks, marine life educational and interactive areas that are also part of the project. The golf course would enhance the range of leisure and recreational opportunities offered at Kona Kai Ola.

Section 226-25 Objectives and policies for socio-cultural advancement-culture:

The discussion in Section 5.1.4 is relevant to Alternatives 1 and 2 and demonstrate their conformity the objective and policies of this section.

Both alternatives involve the preservation and protection of cultural features that have been identified by the Cultural Impact Assessment and archaeological studies for the project area. Both provide for public shoreline access, and both will continue the policy of close consultation with the local Hawaiian community and cultural and lineal descendants in the planning of cultural resource preservation and protection.

Section 226-103 Economic priority guidelines:

Alternatives 1 and 2 conform to these guidelines for the same reasons that are set forth in Section 5.1.4. They involve private investment in a public project that will create economic diversification through a mix of marina, industrial, commercial, visitor, and cultural facilities. This presents a wide range of entrepreneurial opportunities, long-term employment opportunities, and job training opportunities.

Section 226-104 Population growth and land resources priority guidelines:

As described in Section 5.1.4, the policy support for the proposed project also extends to the similar development concepts considered in Alternatives 1 and 2. Those alternatives conform to the guidelines of this section because they involve an urban development under parameters and within geographical bounds that are supported by the County's General Plan, a preliminary form of the Kona Community Development Plan, the County's Keahole to Kailua Regional Development Plan, and the reality of being located along the primary commercial/industrial corridor between Keahole Airport and Kailua-Kona. As with the proposed project, the development concepts of Alternatives 1 and 2 are essentially alternatives for the implementation and "in-filling" of the urban expansion area in North Kona.

DHHL Hawai'i Island Plan

This 2002 plan projects DHHL's Honokōhau makai lands for commercial use. As compared to the proposed project and Alternative 2, Alternative 1 presents an expanded commercial component that provides greater compliance with the plan, while addressing certain beneficiaries' concerns about the scale of the marina originally required in the Project. Alternative 2 also conforms to the recommended commercial uses in the makai lands but to a lesser degree than Alternative 1 because of its more limited commercial component. Like the proposed project, its marina size and number of slips raise environmental issues, as more specifically discussed in Part 3, and community concerns.

County of Hawai'i General Plan

HCGP Section 4 – Environmental Quality Goals, Policies and Courses of Action:

Alternative 1 is consistent with this section. It presents a reduction in both the number of slips and the size of the marina basin that, in combination with proper facilities design, public education and enforcement of harbor rules and regulations, would result in very few long term impacts to water quality. Based on the findings of the Harbor Water Quality Modeling Study, water quality would remain similar to existing conditions.

Alternative 2 is the least consistent with this section. In addition to the potential significant impacts of its 800 slip marina basin, its golf course component has the potential to adversely impact marine resources by increasing the nutrient loading in surface runoff and groundwater and also by introducing pesticides, herbicides and other chemicals common in golf course use and management into the nearshore waters surrounding the project site. It also has the potential to adversely affect the anchialine pools beyond their current conditions by introducing such substances into the pool systems.

HCGP Section 7 – Natural Beauty Goals and Policies:

Alternative 2 conforms to some degree with this section. Its golf course component would create a park-like view that would potentially enhance the beauty of the project site and surrounding areas when considered in combination with the existing rugged natural beauty of the area, as demonstrated in other makai golf courses within the region.

HCGP Section 8 – Natural Resources and Shoreline:

Alternative 1 is most consistent with the goals and policies of this section. It would require considerably less marina excavation than the proposed project and Alternative 2 and would reduce the potential risk of long-term adverse impacts to water quality. Based on the findings of the Harbor Water Quality Modeling Study, water quality would remain similar to existing conditions with the degree of reduction in marina basin size that is proposed under Alternative 1. This reduction is also expected to reduce potential impacts upon anchialine pools and their ecosytems, as well as shoreline and marine resources that are affected by water quality. Alternative 1 also retains the shoreline preservation and protection concepts that are proposed in and described for the Project.

HCGP Section 10 – Public Facilities Goals and Policies:

The discussion in Section 5.2.1. in relation to the proposed project is applicable to Alternatives 1 and 2. Improvements to public facilities are are integral to the Kona Kai Ola development. The provision of additional boat slips and numerous road improvements, including a makai extension of Kuakini Highway south to Kailua-Kona are incorporated into plans for the project's development. In light of these elements, Alternatives 1 and 2 are consistent with the goals and policies of this section.

HCGP Section 11 – Public Utility Goals, Policies:

As with the proposed project, Alternatives 1 and 2 are consistent with the goals and policies of this section, based on the relevant grounds set forth in Section 5.2.1. The developer is committed to design, fund, and develop environmentally sensitive and energy efficient utility systems to the extent possible, as described previously in Part 5. Its master planning provides for the coordinated development of such systems with the objective of achieving significant savings for the public. As previously-mentioned example, the project development involves the upgrading of the Kealakehe Wastewater Treatment Plant.

HCGP Section 12 – Recreation:

Alternative 1 is consistent with the goals, policies, and courses of action for North Kona in this section.

Although the number of slips is reduced under Alternative 1, the region's boating opportunities and support facilities will still be expanded. The existing marina entrance would still be utilized under this alternative. However, concerns relating to increased activity leading to increased congestion in the marina entrance area would be mitigated to a certain extent. The 400-600 foot shoreline setback, public parks, trails, cultural areas, community facilities and marine science center remain important components of Alternative 1.

The golf course component of Alternative 2 would add a more passive recreation to the active and social components, such as boating, fishing, swimming, trails, walkways, parks, marine life, educational and interactive areas that are also part of the project. The golf course would enhance the range of leisure and recreational opportunities offered at Kona Kai Ola. Alternative 2 is also considered to be consistent with this section.

HCGP Section 13 and 13.2 – Transportation:

The reduced marina component under Alternative 1 will still provide transportation opportunities and provide for possible use of transit water shuttles to Kailua-Kona, although to a lesser degree than under the proposed project and Alternative 2 . However, in each scenario, internal people-movers are planned, and numerous roadway improvements are planned for coordination with public agencies, including but not limited to the construction of the Kuakini Highway extension between Honokōhau and Kailua-Kona. Accordingly, both Alternatives 1 and 2 are consistent with the goals, policies, and courses of action for North Kona under these sections of the General Plan.

HCGP Section 14.3 – Commercial Development:

For the reasons presented in the discussion under Section 226-104 of the State Plan, the planned commercial component under Alternatives 1 and 2 are consistent with this section.

HCGP Section 14.8 – Open Space:

Alternatives 1 and 2 are consistent with the goals and policies of this section. Alternative 1 provides a considerable (400-600 foot) shoreline setback along the entire ocean frontage of the project site as a means of protecting the area's scenic and open space resources, as well as natural and cultural resources. Although it does not incorporate the shoreline setback planned in Alternative 1, Alternative 2 provides a golf course component would contribute to the amount of open space that is currently proposed and allow additional view corridors to be created.

Community Development Plans

Community development plans are being formulated for different regions in the County in order to supplement the County's General Plan. The Kona Kai Ola project is located in the Kona Community Development Plan (CDP) area. Maps associated with the preliminary work phases

of the Kona CDP include the Kona Kai Ola project site within the "Preferred Urban Growth" boundary of the North Kona district. The Kona CDP process is guided by a Steering Committee composed of a broad cross-section of the community. The Steering Committee will eventually complete its work and recommend the CDP's adoption.

After the DEIS was published, the Kona CDP has progressed to the development of plans for the major urban growth corridor north of Kailua-Kona. The Kona CDP has produced a draft plan showing a transit oriented development that includes a midlevel public transit corridor along the mauka residential elevation, and a makai transit corridor that runs along a proposed new frontage road just makai and parallel to Queen Kaahumanu Highway. The development plan for Alternative 1 includes the Kuakini Highway as part of this proposed frontage road and transit line from Kailua Kona to the Kealakehe area, along with a transit stop at Kona Kai Ola. The Alternative 1 plan also includes a road that could be extended to be part of the proposed frontage road should it be approved and implemented. In addition, the Kona CDP has continued to emphasize the principles of smart growth planning with mixed use urban areas where people can live, work, play and learn in the same region. Kona Kai Ola has been specifically designed to be consistent with this policy in order to provide a stable employment base close to where people live in the mauka residential areas already planned for DHHL and HHFDC lands.

It should be noted that currently and over the years, the 1990 Keāhole to Kailua Development Plan (K-to-K Plan) guides land use actions by the public and private sectors. It is intended to carry out the General Plan goals and policies related to the development of the portion of North Kona area, including the Kona Kai Ola site. The "Preferred Growth Plan" of the Keāhole to Kailua Development Plan identifies the project site as a new regional urban center to include commercial, civic, and financial business related uses, an expanded "Harbor Complex," a shoreline road, and a shoreline park. The proposed project and the development concepts in Alternatives 1 and 2 are therefore consistent with the recommendations in the Keāhole to Kailua Development Plan.

Hawai'i County Zoning

As shown on Figure AA, the project site is zoned "Open". Under Section 25-5-160 of the Hawai'i County Code, "The O (Open) district applies to areas that contribute to the general welfare, the full enjoyment, or the economic well-being of open land type use which has been established, or is proposed. The object of this district is to encourage development around it such as a golf course and park, and to protect investments which have been or shall be made in reliance upon the retention of such open type use, to buffer an otherwise incompatible land use or district, to preserve a valuable scenic vista or an area of special historical significance, or to protect and preserve submerged land, fishing ponds, and lakes (natural or artificial tide lands)".

Some of the proposed uses at Kona Kai Ola are permitted uses in the Open zone such as:

- Heiau, historical areas, structures, and monuments;
- Natural features, phenomena, and vistas as tourist attractions;
- Private recreational uses involving no aboveground structure except dressing rooms and comfort stations;

- Public parks;
- Public uses and structures, as permitted under Section 25-4-11.

In addition to those uses permitted outright, the following uses are permitted after issuance of a use permit:

- Yacht harbors and boating facilities; provided that the use, in its entirety, is compatible with the stated purpose of the O district.
- Uses considered directly accessory to the uses permitted in this section shall also be permitted in the O district.

The proposed time-share and hotel units and commercial uses would not be consistent with the zoning designation of "Open". Project implementation therefore requires rezoning of portions of the project to the appropriate zoning category or use permits for certain uses.

Special Management Area

As shown in Figure AB, the entire project area up to the highway is within the coastal zone management zone known as the Special Management Area ("SMA"). At the County level, implementation of the CZM Program is through the review and administering of the SMA permit regulations. Kona Kai Ola complies with and implements the objectives and policies of the Coastal Zone Management (CZM) Program, and a full discussion is provided in Section 5.1.3. The development concepts in the proposed project and Alternatives 1 and 2 will be subject to applicable SMA rules and regulations.

Barbara E. Scott
75-5782 Lopeka Place
Kailua-Kona, HI 96740

February 4, 2007

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828 Fort Street Mall, 6th Floor
Honolulu, HI 96813

Kona Kai Ola
Draft Environmental Impact Statement (DEIS)
Public Comment

Need for Harbor Improvements

Legislative audits have repeatedly indicated deplorable conditions at State small boat harbors, repeating a scathing comment in audit reports:

> "The boating program's mismanagement and neglect have deteriorated facilities to the point where their continued use threatens public safety."

The reality of statewide facility conditions has not inspired funding support from Legislators for harbor development, improvement, or maintenance, resulting in continuing deterioration.

The current public/private partnership is an approach that provides community benefits and provides revenue as a funding resource. Department of Land and Natural Resources (DLNR) oversight ensures regulatory compliance that might otherwise be elusive under privatization.

The adjacent Department of Hawaiian Home Lands (DHHL) project is part of their long-term master plan to generate economic opportunity for Native Hawaiians and the greater community, and to generate revenue to place Hawaiians on DHHL lands.

The Board of Natural Resources (BLNR) and DHHL selected Jacoby Development, Inc. (JDI) to develop their respective projects. Both agencies have imposed restricting conditions on development at the harbor and adjacent lands. JDI meets the qualification and proposal requirements and is capable of meeting all project demands.

It is debatable whether statewide harbor conditions are the result of funding or management problems and reflective of North Kona district infrastructure deficiencies. Many who oppose the JDI project cite unacceptable strains on existing infrastructure and reject JDI's proposed contributions to improve surrounding infrastructure. The County mechanism to provide local infrastructure depends on developer actions; rejecting JDI proposed improvements perpetuates infrastructure deficiencies in the project area.

Traffic Infrastructure and Connectivity Improvements

Escalating traffic congestion throughout West Hawaii is somewhere between legendary and infamous. While DOT continues the Queen Ka'ahumanu Highway widening project, DOT also projects traffic to increase to 90,000 vehicles per day by 2010 throughout North Kona at development buildout, based on Department of Water Supply (DWS) water

commitment units currently approved for proposed development. DOT buildout figures drive home the point that District connectivity is the key to resolving traffic congestion problems.

The proposed road over Queen Liliuokalani Trust (QLT) lands will connect Kealakehe Parkway with Kuakini Highway, which provides much needed local access between the Old Airport and the Kona Kai Ola project. The Kealakehe Parkway intersection improvement at Queen Ka'ahumanu Highway will also enhance connectivity.

As part of the entire project, JDI will sponsor shuttle buses between Kailua Village and the surrounding area to alleviate some of the additional traffic the project will generate.

Water Resources

Development at the DHHL project has the potential to provide much needed housing in the Kona Kai Ola project area. JDI recognizes the limited developed water resources, i.e., as of December 2004, DWS water commitments represented 6,048,000 gallons per day - it is questionable whether current County well resources can meet committed usage.

Negotiations are ongoing between JDI, DWS, and other agencies to develop project water resources. The DHHL project has been delayed for years due to unavailable water resources, so this collaboration has the potential to resolve that problem.

As another part of the project, JDI will upgrade the wastewater treatment plant to produce R1 grade water, which the DOH supports for irrigation. Currently, potable water is used for irrigation and dust control, squandering potable water resources.

JDI also intends to implement deep seawater for air-conditioning throughout the project. It is possible for that project to be successful and uses technology promoted at the NELHA facility.

Did I mention yet that I am tickled to death by this project? JDI resolves long-standing basic infrastructure deficiencies for the Kona Kai Ola project area and benefits the entire community.

Other Community Benefits

The DHHL project will provide housing for jobs generated by the Kona Kai Ola project, and includes an area shuttle service to enhance mobility.

The prospect of having a marine science center at the facility is exciting - promoting marine education opportunities for local schools and tourists. The seawater lagoons, the shoreline park, and the cultural park all support the environmental component of the project.

JDI incorporates archeological and cultural sites into the project for preservation as valued features. The project plan generates a vision for a showplace in the Kailua-Kona area and demonstrates that development can work with community concerns.

Smart Growth and Synergy

The North Kona long-range plan includes high-density urban development in the surrounding North Kona area. In recent years, the County reduced affordable housing requirements, paving the way for luxury housing without consideration for worker

accommodations. Using the current formula, affordability in North Kona is well beyond the means of most workers.

JDI intends to provide worker housing and will develop DHHL lands, providing economic and housing opportunities for native Hawaiians. JDI will sponsor a shuttle service, benefiting workers and visitors.

All of West Hawaii has experienced a building boom. The Kona Community Development Plan (KCDP) continues to oppose all development, and with good reason – local infrastructure deficiencies are beyond reason. Residential/commercial development does not generate opposition; the lack of infrastructure development generates opposition.

The JDI project includes consideration for every conceivable community concern and is in negotiations to provide the needed road, potable water, and irrigation infrastructure for the project area.

The West Hawaii area has recently seen some remarkable commercial changes. The NELHA facility is now a Foreign Trade Zone (FTZ) and continues to work on alternate energy projects, as well as aquaculture, commercial seawater production, and who knows what technology will come next. NELHA will develop the road between the facility and the airport, which is another community benefit to reduce traffic on the local highway.

Keahole International Airport (KOA) is undergoing expansion and improvement; the site provides a training venue for the Short Austere Air Field (SAAF) – C-17s training for maneuvers in disaster areas. While I may not be a fan of military use for commercial airport facilities, the designated agencies determined the venue as the best possible in proximity to meet future needs.

Just north of KOA, negotiations continue for a new West Hawaii Community College site.

The additional commercial development in the North Kona area illustrates a need for short-term hotel and time-share accommodations. It is reasonable to provide more accommodation choices for the growing area. Revenues will also be a part of the funding process that will make all of this possible.

The project fits with current North Kona projects and proposes to provide needed infrastructure beyond project needs. Jacoby Development, Inc. sets the standard for environmental stewardship.

Regards and aloha,

Barbara E. Scott

Barbara E. Scott

BARBARA SCOTT
75 5782 LOPEKA PL
KAILUA KONA HI 96740

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oceanit
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July 23, 2007

Barbara E. Scott
75-5782 Lopeka Place
Kailua-Kona, Hawai'i 96740

Dear Ms. Scott:

Subject: Kona Kai Ola Draft Environmental Impact Statement
Response to Your Comments Dated February 4, 2007

Thank you for your comments on the Kona Kai Ola Draft Environmental Impact Statement. We are responding to your comments based on the order of topics you address.

Need for Harbor Improvement

We concur with your assessment of the public demand for additional boat slips and harbor facilities. The public/private partnership approach is indeed an effective approach to meeting community need and providing revenue as a funding source. At Kona Kai Ola, the public-private partnership between the State and JDI will allow the realization of crucial privately-funded improvements, such as the marina, regional roadway and circulation improvements, and improvements to the existing wastewater treatment plant. Private funds will also be used in the development of community-oriented facilities such as parks, other recreational facilities and public access. Public interest will be served through the development of the Kona Kai Ola project.

Traffic Infrastructure and Connectivity Improvement

We concur with your assessment of roadway improvements related to the Kona Kai Ola project. The roadway system will be improved beyond specific mitigation for project-related impacts. In Phase 1 of the project, JDI will not only provide access to the commercial parcel, but also address regional traffic issues through the improvements of the roadway system. JDI plans to improve the intersection of the Queen Ka'ahumanu Highway and the Kealakehe WWTP Access Road. The Kealakehe WWTP Access Road is planned to be realigned and widened to an 80-foot road right-of-way (ROW) that will serve the Commercial Parcel No. 1 and eventually intersect with the proposed Kuakini Highway Extension to the west. Such improvements will ensure that the project minimizes its own impacts while improving existing conditions. Further, with the development of Kona Kai Ola, the Kuakini Highway extension road is anticipated to be built on a more accelerated schedule than would occur without the Kona Kai Ola project.

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In addition, Kona Kai Ola will reduce transportation related impacts through provision of mass transit options. The project will provide public transit service linking the airport and the new harbor village and Kailua Village. The development will also establish a transit system to transport people around the project site. Further, Kona Kai Ola will be a walkable development. The development will be easily navigable on-foot or on a bike. The plan will include numerous walking and biking trails linking site features. Additionally, reducing site temperatures will enhance the walkability of the site.

Water Resources

We concur with your assessment of Kona Kai Ola mitigation measures to address not only project-related impacts, but also regional conditions that currently exist.

The developer is continuing to work with public agencies on developing new water sources and the success of these efforts will benefit not only Kona Kai Ola, but also adjacent communities that are also subject to an insufficient water supply.

The anticipated infrastructure improvements to the wastewater treatment plant are anticipated to actually improve the health and safety of the community by improving an older facility to meet higher operational standards. All structures will be built to current building and safety codes, while access to the shore and around the site will be improved.

Seawater Air Conditioning (SWAC) is planned to utilize deep, cold ocean water for cooling or air conditioning, thereby significantly reducing energy consumption requirements. As you pointed out, deep, cold, seawater technology is currently being used at NELHA near the Kona International Airport. It is a logical use in this area considering the hot, dry climate, accessibility of deep, cold water and the increasing cost of energy and fossil fuels. It is a renewable alternative energy source that will result in long-term cost savings and reduced energy requirements, in keeping with goals and policies of the State and County. Solar hot water heating is also being planned for use throughout the development.

Other Community Benefits

We concur with your statements regarding the developer-based provision of workforce housing, the establishment of a shuttle system that connects workers and their employment locations at Kona Kai Ola, and the incorporation and preservation of historic and cultural resources throughout the project.

We also acknowledge your anticipation of the marine science center, which will be an integral part of the project's ocean orientation. Other project components that support this theme include various water features including seawater lagoons with a marine wildlife park, a yacht club, fishing club, a canoe park, and

a cultural park with a focus on the Hawaiian maritime cultural heritage of the voyaging canoe.

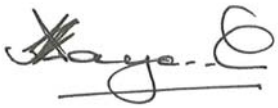
Smart Growth and Synergy

We agree with your various points that indicate that smart growth principles are inherent in plans for Kona Kai Ola. We further concur with your assertion that "residential / commercial development does not generate opposition; the lack of infrastructure development generates opposition."

We further note that the Kona Kai Ola project reflects the input from over 920 Big Island community members who have participated in Kona Kai Ola presentations from November 2005 through June 2007. The vision for Kona Kai Ola is shaped by a synergy of community input gathered from these presentations and JDI's smart growth expertise.

Your comment letter and this response are included in the Final Environmental Impact Statement. We appreciate your participation in the environmental review process. Please submit a request to our office if you would like to receive a printed or electronic copy of the Final Environmental Impact Statement, or portions thereof.

Sincerely,



Dayan Vithanage, P.E., PhD.
Director of Engineering

cc: Office of Environmental Quality Control
State Department of Hawaiian Home Lands
Jacoby Development, Inc.

Envelope PostMarked 27 Feb 2007

February 5, 2007
Betsy Morrigan
87-3187 Honu Moe Road
Captain Cook, Hi 96704
808-328-8911
Hawaii Island registered voter

RE: ANOTHER ISLAND RESIDENT AGAINST KONA KAI OLA

I wish to go on record against the KONA KAI OLA project at the Honokohau Harbor, Island of Hawaii.

This project would only add to Kona all the problems that that the Kona community already has too many of:

More traffic
More pollution
More congestion and noise
More newcomers
More pressure on an already inadequate infrastructure

and will bring us less and less of what we here do desire and want to preserve:

Local decision-making
Natural spaces and uncluttered views
Peace and quiet
Affordable homes
Pristine anchialine ponds

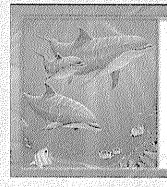
I am greatly concerned with the cavalier attitude that Jacoby takes concerning the destruction of the anchialine brackish water ponds which they admit in the EIS will become saline, losing their special and unique properties. These anchialine ponds, unique to just a few places on earth, with the Kona coastline possessing the majority of them, are a natural feature that I do not want to see destroyed. I value them over more marina slips or timeshare rentals.

This project plan is at odds with both the Hawaii County General Plan or the Kona Community Development Plan. The people of Hawaii and their leaders have spent a great deal of time and effort in developing these plans, which should serve as guidance for the way to proceed with development in Kona. Instead, I see Kona Kai Ola as a "get rich quick" plan that will benefit only the developers and certain business interests at the expense of the Kona community as well as the natural resources. Do not accept this development in Kailua-Kona.

Sincerely,

Betsy Morrigan

Betsy Morrigan



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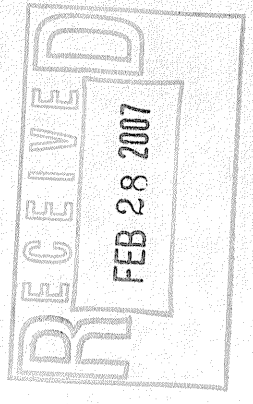

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July 23, 2007

Ms. Betsy Morrigan
87-3187 Honu Moe Road
Captain Cook, Hawai'i 96704

Dear Ms. Morrigan :

Subject: Kona Kai Ola Draft Environmental Impact Statement
Response to Your Comments Dated February 5, 2007

Thank you for your comments of February 5, 2007 on the Kona Kai Ola Draft Environmental Impact Statement. Your enveloped was postmarked February 27, 2007, and we received your letter on February 28, 2007. Although your letter was received after the 45-day comment period, which ended on February 6, 2007, we are including your letter and our response in the Final Environmental Impact Statement.

Your letter lists several concerns regarding problems that you believe will be worsened due to Kona Kai Ola. The following addresses each problem:

More traffic: While the project will generate additional traffic, Kona Kai Ola will improve the roadway system beyond specific mitigation for project-related impacts. In Phase 1 of the project, JDI will not only provide access to the commercial parcel, but also address regional traffic issues through the improvements of the roadway system. JDI plans to improve the intersection of the Queen Ka'ahumanu Highway and the Kealakehe WWTP Access Road. The Kealakehe WWTP Access Road is planned to be realigned and widened to an 80-foot road right-of-way (ROW) that will serve the Commercial Parcel No. 1 and eventually intersect with the proposed Kuakini Highway Extension to the west. Such improvements will ensure that project minimize its own impacts while improving existing conditions. Further, with development of Kona Kai Ola, the Kuakini Highway extension road is anticipated to be built on a more accelerated schedule than would occur without the Kona Kai Ola project.

More pollution: The type pollution you refer to is not specified, so it is not possible for us to provide specific information. The EIS contains a full and thorough discussion of project impacts related to the natural and human environment, as well as mitigation measures to avoid, minimize, rectify or reduce adverse impacts.

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We add that JDI has made a corporate commitment to environmental sustainability in all its work. In Kona Kai Ola, JDI intends to incorporate the latest environmental design and technology to create an energy efficient, low environmental impact, sustainable development at Kona Kai Ola. The vision for the project is to develop a project that has minimal impact on the environment by striving to significantly reduce water consumption, waste disposal, energy use and carbon dioxide emissions.

One key to measuring the sustainability of the project's design and operation is to use the Leadership in Energy and Environmental Design (LEED) Green Building Rating System. The LEED Green Building Rating System is the nationally accepted benchmark for the design, construction, and operation of high performance green buildings. LEED gives building developers and operators the tools they need to have an immediate and measurable impact on their buildings' performance (LEED 2006). JDI has experience with the LEED certification process from its other projects both for individual buildings, and for large campus infrastructure as well. JDI intends to pursue, at a minimum, Silver LEED certification for its development of the Kona Kai Ola project.

More congestion and noise: We assume you are referring to traffic congestion, and we addressed that on the previous page of this letter.

Regarding noise, it is not expected that construction-related project-generated noise will impact adjacent properties as they are mostly vacant or industrial. The only areas that may be affected are the Honokōhau Harbor users and the Fishing Club located south of Kealakehe Parkway. Commercial, hotel and time-share buildings completed in the initial phases may also be affected by construction noise due to subsequent phases as they are in very close proximity to the construction site.

Construction blasting, if required for the new marina, could produce noise impacts. However, blasting at construction sites near populated areas is usually accomplished by using numerous small charges detonated with small time delays. Blast mats can also be used to assist in directing the explosive energy into the rock, controlling flying debris, and muffling the noise. With the appropriate blast design techniques, the noise from blasting can be controlled to minimize noise impacts. In cases where construction noise exceeds, or is expected to exceed, the State's "maximum permissible" property line noise levels, a permit will be obtained from the State DOH to allow the operation of vehicles, cranes, construction equipment, power tools, etc., which emit noise levels in excess of the "maximum permissible" levels.

During the various operations of the project, noise generated by the project will be within permissible levels.

More newcomers: We assume that, by "newcomers," you mean new residents. Kona Kai Ola will not include any residential uses, as that is prohibited in agreements between JDI and the State.

The project will generate population impacts related to the region's de facto population. Kona Kai Ola's proposed hotel and time-share units, which will begin generating on-site de facto population in Year 4 of development, is projected to generate a de facto guest / time-share owner population of 5,321 persons at full

build-out and stabilization in Year 15. This on-site population would account for four percent of the forecast 2020 de facto population for West Hawai‘i.

Secondary population impacts may occur related to the in-migration of workers at Kona Kai Ola. As agreements between the State and JDI prohibit residential development at Kona Kai Ola, workforce housing would need to be located off-site. The most suitable location for workforce housing units is the Villages at La‘i‘Ōpua community, a DHHL project, or within the Hawai‘i Housing Finance and Development Corporation affordable housing development planned for Keahuolū. These are two State-owned undertakings directly across the highway in the same or adjacent ahupua‘a. Locating workforce affordable housing units in these communities would substantially lessen the traffic impacts associated with a community subject workforce. Alternatively, the State lands adjacent to Waikoloa Village would be appropriate for workforce housing. JDI will comply with all affordable housing requirements of applicable Hawai‘i County ordinances.

More pressure on an already inadequate infrastructure: Kona Kai Ola will mitigate all project-related impacts on infrastructure systems, and, in some cases such as the roadway system and the wastewater system, project improvements will benefit the larger community. Further, the project includes crucial privately-funded improvements, such as the marina, as well as privately-funded community-oriented facilities such as parks, other recreational facilities and public access.

Your letter also lists several community attributes that you feel will be negatively impacted by the project. Our responses to these items follow:

Local decision-making: JDI has made every attempt to include the local community in its planning of Kona Kai Ola. From November 2005 through June 2007, over 920 Big Island community members have participated in Kona Kai Ola presentations. Community input gathered from these presentations and facilitated by JDI’s smart growth expertise has shaped the vision for Kona Kai Ola.

Natural spaces and uncluttered views: While Kona Kai Ola will alter the visual environment, every effort will be made to protect views and preserve important natural spaces. To protect view planes to and along the shoreline area, the proposed project includes a 400-foot buffer zone along the shoreline that will be preserved as open space. Improvements within this buffer zone will be limited to lateral shoreline public trails, mauka-makai access trails from the project site, and cultural or environmental-related improvements related to existing features within the buffer zone. No buildings or structures shall be built within the 400-foot shoreline setback area, with the possible exception of structures that are directly related to native Hawaiian cultural resources in the buffer zone and that are requested by JDI’s cultural advisors.

To control building mass near the shoreline, development sites directly adjacent to the shoreline setback area will be limited by design covenants to a lower unit density. Buildings immediately adjacent to the 400-foot shoreline setback are proposed at one and two stories high to minimize building mass against the shoreline setback area. Major roadways, parking areas, and areas surrounding all major structures will be landscaped in accordance with a landscape master plan.

Peace and quiet: As discussed on page two of this letter, construction-generated noise will be mitigated to be within permissible levels, and long-term noise generated at Kona Kai Ola will be within permissible levels.

Affordable homes: It is estimated that Kona Kai Ola will generate a workforce housing need of 625 units, based on the ratio set forth in Hawai'i County Ordinance Chapter 11, Section 4, Affordable Housing Requirements. As stated earlier, JDI will comply with all affordable housing requirements of applicable Hawai'i County ordinances.

Pristine anchialine ponds: Studies conducted for the EIS found that the anchialine ponds at Kona Kai Ola are not "pristine." Two surveys confirmed the presence of direct human use and disturbance, such as trash receptacles and toilet facilities. The second survey found that the greatest degradation to the majority of the anchialine and estuarine resources was due to the presence of alien fish, including topminnows and tilapia, and introduced plants, predominantly pickelweed and mangrove.

Three of the existing pools will be eliminated due to project construction. JDI will make every effort to facilitate the long term health of the remaining anchialine pools and mitigation measures will be based on environmental monitoring, which is vital as an early warning system to detect potential environmental degradation. As a mitigation measure, bioretention, which is a Best Management Practice (BMP), is a highly appropriate application for the proposed development to prevent any nonpoint source pollution of groundwater. Another mitigation measure that may be included in the management plan is salinity adjustment of the anchialine pools to maintain healthy habitat for the anchialine ecosystem by surcharging man-made anchialine pools created adjacent to or in the vicinity of natural pools with low salinity well water.

Hawai'i County General Plan or the Kona Community Plan: We acknowledge your comment that "this project plan is at odds with both the Hawai'i County General Plan or the Kona Community Plan." We disagree with this statement.

First, regarding the General Plan, in December 2005, the County Planning Director proposed that the DLNR portion of the Kona Kai Ola project that was designated "Open" in the 2005 General Plan, be amended to "Urban Expansion Area." On November 29, 2006, the Hawai'i County Council approved this amendment.

Kona Kai Ola is consistent with the Urban Expansion Area designation. The agreement between the developer and the State identifies hotel and time-share uses as possible development at Kona Kai Ola. The project is not a resort. A resort is a concept in which visitors are attracted to spend most, if not all, of their stay within the resort area through the design of amenities that fulfill the needs of a particular visitor market segment. This self-containment is achieved to varying degrees in resort development, depending on the natural, historic/cultural, and recreational resources within a resort site and the intended scale of the resort.

State and County laws recognize this distinction between a "resort" and a "hotel" or "time-share unit." Section 514E-5, Hawai'i Revised Statutes, authorizes time share

units to be located in a resort area or any other area in which a county may by ordinance allow a hotel unit. The Hawai'i County Code correspondingly permits hotels and time-share units in non-resort zoning districts. The proposed project may include up to 700 hotel units and 1,803 time-share units, and depending on the eventual location of these project components, rezoning may be required for implementation.

Second, regarding the Kona Community Development Plan, since the DEIS was published, JDI has considered alternatives to the proposed project. Alternative 1, which is discussed below, is consistent with the current draft of the Kona CDP and the community vision for the proposed development area.

As explained in the DEIS, the agreement between JDI and the State of Hawai'i established a required scope and scale of the project for which the impact analysis was provided. Several comments have addressed the fact that alternatives other than the No Project Alternative were not addressed in the DEIS Section 2, Alternatives Analysis.

While Kona Kai Ola is of the position that alternative actions other than a No Project alternative are not currently feasible absent an amendment to the agreement with the State, the agency and public comments and additional information generated as a result of inquiry into issues raised by the comments have been helpful in identifying alternative actions that will serve the State's goal of providing additional marina slips for the Kona area and that will serve to reduce or mitigate anticipated effects of the proposed development.

Thus, agencies such as the Land Division of the Department of Land and Natural Resources, the U.S. Department of the Interior Fish and Wildlife Service, the Planning Department of the County of Hawai'i, and the Office of Environmental Quality Control (OEQC), as well as community organizations have commented that a reduced scale marina and related facilities should be considered. The OEQC has also asked that the alternative of a reduced scale project be evaluated under the assumption that DHHL may determine that a downsized project would be preferred.

In response to these comments on the DEIS and in consideration of measures to mitigate anticipated impacts, the EIS Section 2, Alternatives Analysis, has been revised to describe the following alternatives, which are discussed in more detail in the EIS:

- Alternative 1 is a project involving a 400-slip marina, 400 hotel units, 1,100 time-share units, and commercial and support facilities. This alternative would enhance water quality and avoid the need to widen the existing harbor entrance channel, as well as reduce traffic and socioeconomic impacts.
- Alternative 2 is an alternative that had been previously discussed, but not included in the proposed project that includes an 800-slip harbor and a golf course, and
- Alternative 3 is the no-action alternative.

A comparison between impacts related to the proposed project concept and impacts related to Alternative 1 indicates that a reduction in the acreage and number of slips in the marina, as well as the reduction in hotel and time-share units, would generate less environmental, social and economic impacts. Although positive economic impacts would be reduced, Alternative 1 can be considered as a preferable alternative because of reduced environmental impacts. However, while it can be concluded that the 25-acre marina in Alternative 1 would be the preferred size, the DLNR agreement establishes the size of the marina at 45 acres and 800 slips. An amendment to the DLNR agreement is required in order to allow Alternative 1 to proceed. Hence, selection of Alternative 1 is an unresolved issue at this time. We are attaching Attachment 1, the revised Section 2, Alternatives Analysis, for your information.

Second, the Kona Community Development Plan (CDP) has progressed to the development of plans for the major urban growth corridor north of Kailua-Kona since the publication of the DEIS. The Kona CDP has produced a draft plan showing a transit oriented development that includes a midlevel public transit corridor along the mauka residential elevation, and a makai transit corridor that runs along a proposed new frontage road just makai and parallel to Queen Ka‘ahumanu Highway.

To make sure that Kona Kai Ola is consistent with this new Kona CDP transit oriented plan, Alternative 1 was prepared and includes the Kuakini Highway as part of this proposed frontage road and transit line from Kailua Kona to the Kealakehe area, along with a transit stop at Kona Kai Ola. The Alternative 1 plan also includes a road that could be extended to be part of the proposed frontage road should it be approved and implemented.

In addition the Kona CDP has continued to emphasize the principles of smart growth planning with mixed use urban areas where people can live, work, play and learn in the same region. Kona Kai Ola has been specifically designed to be consistent with this policy in order to provide a stable employment base close to where people live in the mauka residential areas already planned for DHHL and HHFDC lands.

“Get rich quick plan”: You state that the Kona Kai Ola project “will benefit only the developers and certain business interests at the expense of the Kona community as well as the natural resources.” We disagree with this statement.

The project is funded by private investment and will generate a reasonable rate of return for the private developer and ongoing revenue for DLNR and DHHL. Further, the project includes crucial privately-funded improvements, such as the marina, regional roadway and circulation improvements, and improvements to the existing wastewater treatment plant. Private funds will also be used in the development of community-oriented facilities such as parks, other recreational facilities and public access. In addition, DLNR and DHHL will be receiving revenues from this project to support the many public programs of these departments.

We note that ownership of these lands will remain with the State. Further, several project features will enhance the public experience on these lands. These community-oriented features include various water features such as seawater lagoons with a marine wildlife park and a marine science center, a yacht club, fishing

club, a canoe park, and a cultural park with a focus on Hawaiian maritime cultural heritage of the voyaging canoe. The coastal area would be protected with a shoreline park with trails and public access parking for walking and shoreline fishing, and a cultural park surrounding the heiau, the cultural sites and ʻAlula for community use. Additional project community areas would include facilities and space for community use, including programs of the Kona Kai Ola Community Foundation, which supports community programs in health care, culture, education, and employment training for the local community, especially to native Hawaiians. Hence, public interest will be served through the development of the Kona Kai Ola project.

Your comment letter and this response are included in the Final Environmental Impact Statement. We appreciate your participation in the environmental review process. Please submit a request to our office if you would like to receive a printed or electronic copy of the Final Environmental Impact Statement, or portions thereof.

Sincerely,

Dayan Vithanage, P.E., PhD.
Director of Engineering

cc: Office of Environmental Quality Control
State Department of Hawaiian Home Lands
Jacoby Development, Inc.

Attachment 1

2 Alternatives Analysis

~~In typical land development projects, the initial planning process includes the exploration of alternatives to development objectives. In the EIS process, these alternatives are presented with a disclosure of reasons for the dismissal of non-preferred alternatives.~~

~~Kona Kai Ola does not follow this same pattern of alternatives evaluation.~~ As discussed in Section 1.4, the proposed Kona Kai Ola project is the result of agreements between JDI and the State DLNR and DHHL. The agreements and leases between the State and JDI stipulate the parameters of development for this site in terms of uses, quantities and size of many features, resulting in a limited range of land uses. Unlike a private property project, JDI is required to meet the criteria outlined in the agreements, thereby affording less flexibility in options and uses. From the developer's perspective, the agreements must also provide sufficient flexibility to allow for a development product that responds to market needs and provides a reasonable rate of return on the private investment.

The agreements between JDI and DLNR specify that the proposed harbor basin is to be 45 acres and accommodate 800 slips. This development proposal is the subject of this EIS. In response to DEIS comments, additional water quality studies and modeling were conducted. These studies determined that the water circulation in a 45-acre 800-slip marina would be insufficient to maintain the required standard of water quality. The models of water circulation suggest that a new 25-acre harbor basin could successfully maintain required water quality in the new harbor. Comments on the DEIS from DLNR, from other government agencies, the neighbors and the general community also called for the consideration of alternatives in the EIS, including a project with a smaller harbor basin and less density of hotel and time-share units.

In response to these comments on the DEIS, three alternatives are evaluated in this Final EIS and include Alternative 1, which is a plan with a 25-acre 400-slip harbor basin including a decrease in hotel and time-share units; Alternative 2, which is an alternative that had been previously discussed but not included in the proposed project, that includes an 800-slip harbor and a golf course; and Alternative 3, the no-project alternative. Each alternative is included in the EIS with an evaluation of their potential impacts. These project alternatives are presented to compare the levels of impacts and mitigation measures of the proposed project and alternative development schemes pursuant to requirements set forth in Chapter 343, HRS.

~~JDI is required to provide a new marina basin not less than 45 acres and a minimum of 800 new boat slips. Further, the agreements provide the following options for land uses at the project site:~~

- ~~Golf Course~~
- ~~Retail Commercial Facilities~~
- ~~Hotel Development Parcels~~
- ~~Marina Development Parcels~~
- ~~Community Benefit Development Parcels~~

~~JDI is not pursuing the golf course option and is proposing instead to create various water features throughout the project site. All other optional uses have been incorporated in Kona Kai Ola.~~

2.1 Project Alternatives

2.1.1 Alternative 1: 400-Slip Marina

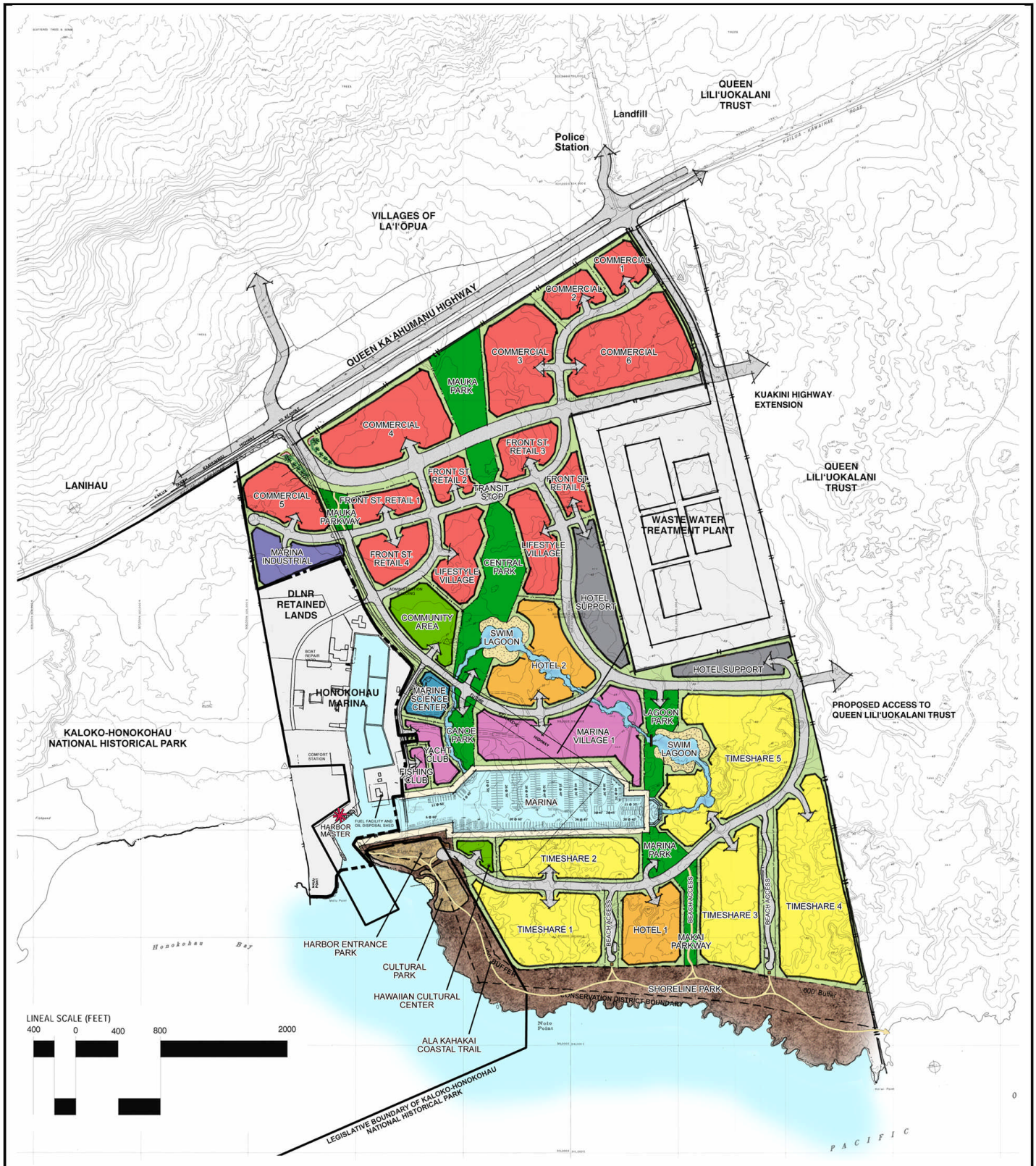
Studies conducted in response to DEIS comments found the construction and operation of an 800-slip marina may significantly impact the water quality within the marina and along the shoreline. Specifically, the Harbor Water Quality Modeling Study, as contained in Appendix U, found that the water circulation in a 45-acre 800-slip harbor was insufficient to maintain an acceptable level of water quality. Further, the existing harbor channel, which would serve both the existing and new harbors, could not adequately serve the increased boat traffic generated by an 800-slip marina during peak traffic. Mitigation measures to accommodate peak boat traffic included the widening of the existing channel, an action that would entail a complex process of Federal and State approvals and encounter significant environmental concern.

Concerns related to the proposed density of hotel and time-share units were also expressed in comments to the DEIS from members of the public, neighbors to the project site, especially the Kaniohale Community Association, and government agencies. Common themes in DEIS comments were related to impacts regarding traffic, project requirements of potable water and infrastructure systems, including sewer, drainage, utility and solid waste systems, and socioeconomic impacts.

In response to the water quality study results, and to the DEIS comments, an alternative plan was developed with a smaller marina with less boat slips, and a related decrease in hotel and time share units. Illustrated in Figure G, Alternative 1 reflects this lesser density project, and features a 400-slip marina encompassing 25 acres. For the purposes of the Alternative 1 analysis, JDI assumed 1,100 time-share units and 400 hotel rooms. Project components include:

- 400 hotel units on 34 acres
- 1,100 time-share units on 106 acres
- 143 acres of commercial uses
- 11 acres of marina support facilities
- 214 acres of parks, roads, open spaces, swim lagoons and community use areas

In addition, Alternative 1 would include the construction of a new intersection of Kealakehe Parkway with Queen Ka'ahumanu Highway, and the extension of Kealakehe Parkway to join Kuakini Highway to cross the lands of Queen Lili'uokalani Trust, and connecting with Kuakini Highway in Kailua-Kona. This is a significant off-site infrastructure improvement and is included in the agreements between the State and JDI.



Source: PBR HAWAII

Plan is conceptual only and subject to change

Figure G: Alternative 1: 400-Slip Marina

LEGEND

- TIME SHARE
- HOTEL
- RETAIL / COMMERCIAL
- MARINA RETAIL
- MARINA SUPPORT / COMMERCIAL
- MARINE SCIENCE CENTER
- COMMUNITY AREA / CULTURAL CENTER
- SWIM LAGOON
- MARINA
- UTILITIES
- PARKS & GREEN SPACE
- SHORELINE
- HARBOR ENTRANCE PARK / CULTURAL PARK

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Like the proposed project, Alternative 1 would have a strong ocean orientation, and project components that support this theme would include various water features including seawater lagoons and a marine science center. The new Alternative 1 harbor would include a yacht club, fishing club, a canoe park, and a cultural park with a focus on Hawaiian maritime cultural heritage of the voyaging canoe. The coastal area would be protected with a shoreline park with trails and public access parking for walking and shoreline fishing, and a cultural park surrounding the heiau, the cultural sites and 'Alula for community use. Additional Alternative 1 community areas would include facilities and space for community use, including programs of the Kona Kai Ola Community Foundation, which supports community programs in health care, culture, education, and employment training for the local community, especially to native Hawaiians. Like the original proposed plan, Alternative 1 includes 40 percent of the land in parks, roads, open spaces, swim lagoons and community use areas.

2.1.2 Alternative 2: Golf Course Feature

Alternative 2 was among the alternatives discussed at a community charrette in September 2003. It includes a golf course, which is a permitted use in the DLNR agreement and DHHL lease. As Figure H illustrates, an 18-hole championship golf course would occupy 222 acres on the southern portion of the project site. As with the proposed project, Alternative 2 includes an 800-slip marina on a minimum of 45 acres.

To support the economic viability of the project, other Alternative 2 uses include:

- Golf course clubhouse on three acres
- 1,570 visitor units on 88 acres fronting the marina
- 118 acres of commercial uses
- 23 acres of community uses

Community uses in Alternative 2 include an amphitheater, a canoe facilities park, a community health center, a Hawaiian cultural center and fishing village, a marine science center and employment training center. The sea water lagoon features contained in the proposed project and Alternative 1 are not included in this alternative.

2.1.3 Alternative 3: No Action

In Alternative 3, the project site would be left vacant, and the proposed marina, hotel and time-share facilities, commercial and marina industrial complexes, and community-oriented uses would not be realized.

~~The economic viability and sustainability of the project is determined by the density and uses proposed. Because JDI is obligated to develop an 800-slip marina for the State, complete road improvements, and provide various public enhancement features at its own expense, the density proposed for the income generating features of the development must be sufficient to provide an acceptable level of economic return for JDI. The market study, which is discussed in Section 4.6, reviewed various development schemes and determined that the currently proposed density and mix is the optimum to meet the anticipated financing and development cost obligations for the public features associated with the development.~~

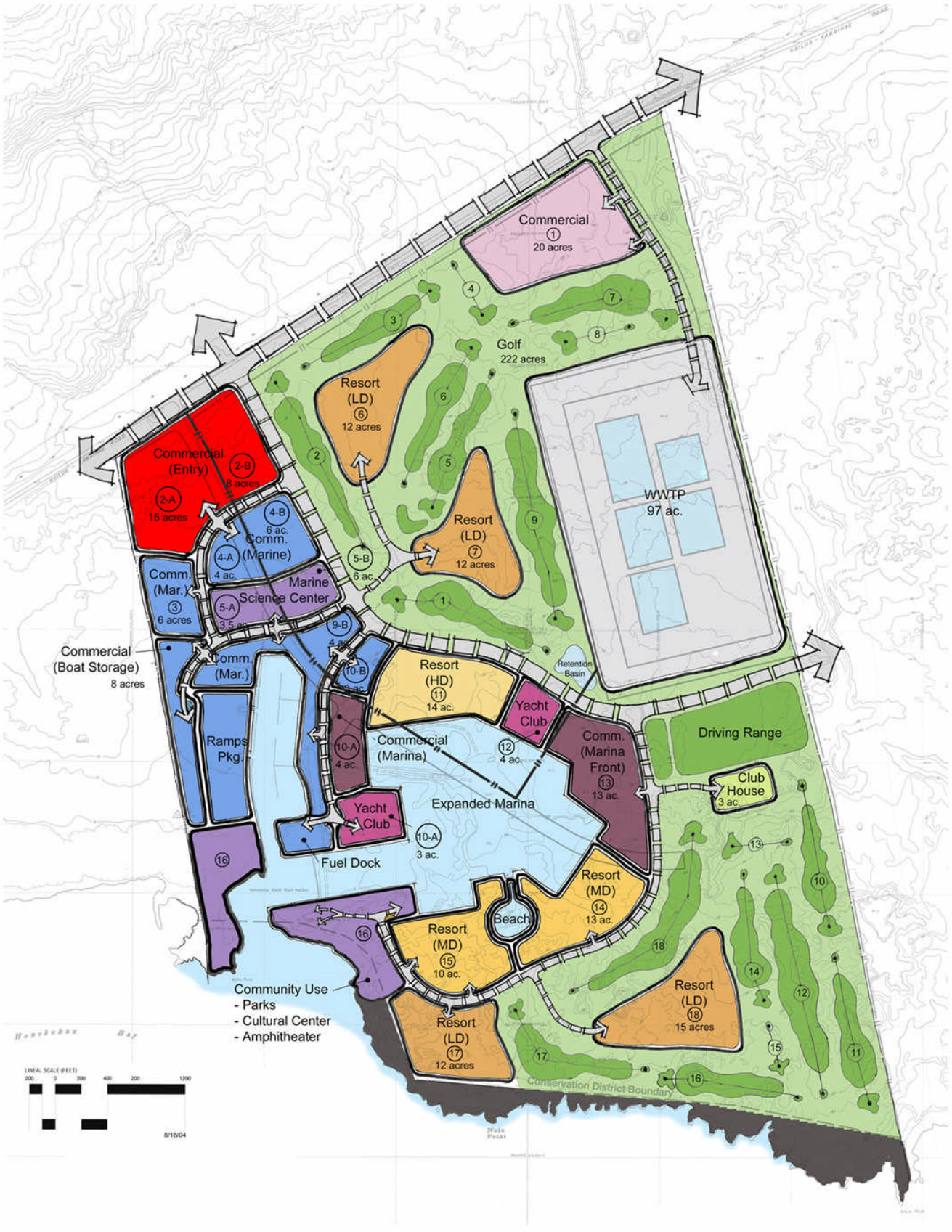

Figure H. Alternative 2: Golf Course Alternative

Legend

N E S W

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2.2 Alternatives Analysis

As discussed in Section 2.1, the proposed Kona Kai Ola project (also referred to as "proposed project") is defined by development requirements related for a marina and the related uses that would be needed to generate a reasonable rate of return that covers development costs.

Beginning with Section 2.2.1, the alternative development concepts are comparatively assessed for potential impacts that may reasonably be expected to result from each alternative. Following is an overview of the primary observations of such assessment.

Alternative 1 includes half of the State-required boat slips and 60 percent of the proposed hotel and time-share units and, due to the decreased density, this alternative would generate significantly less environmental and socio-economic impacts. A harbor water quality model found the reduction of the volume of the new marina basin by about half (approximately 25 acres) significantly improved the water circulation and quality. Further, the reduced number of boat slips would generate less boat traffic, thereby reducing congestion and the need to mitigate impacts further by the widening of the existing harbor channel.

A project with fewer hotel and time-share units and increased commercial space with a longer (14 years) absorption period would change the mix of employment offered by the project, and slightly increase the overall employment count. The public costs/benefits associated with Alternative 1 would change, compared to the proposed project, with a general increase in tax collections, and a general decrease in per capita costs. Detailed discussion of Alternative 1 potential economic impacts are provided in Section 4.6.6. Comparisons of levels of impact are presented throughout this FEIS.

While this analysis might indicate that the 25-acre marina in Alternative 1 would be the more prudent choice, the DLNR agreement establishes the minimum size and slip capacity of the marina at 45 acres and 800 slips, respectively. Amendments to the DLNR agreement would be required in order to allow Alternative 1 to proceed as the preferred alternative. Hence, selection of the preferred alternative is an unresolved issue at the writing of this FEIS.

Alternative 2, the golf course alternative, was not previously considered to be the preferred alternative primarily because market conditions at the time of project development might not likely support another golf course. Further, DHHL has a strategy goal to have more revenue-generating activities on the commercial lease lands within the project area. In addition, concerns have been expressed as to environmental impacts of coastal golf courses, including the potential adverse impact on Kona's water supply if potable water is used for golf course irrigation.

While Alternative 3, the no-project alternative, would not generate adverse impacts related to development of these lands associated with the construction and long-term operations, it would also not allow for an expanded public marina that would meet public need and generate income for the public sector. Further, the no-project alternative would foreclose the opportunity to create a master-planned State-initiated development that would result in increased tax revenue, recreation options and community facilities. Crucial privately-funded improvements, such as the marina, regional roadway and circulation improvements, and improvements to the existing wastewater treatment plant, would not be implemented. Private funds toward the development of community-oriented facilities such as parks, other recreational facilities, and public access would not be contributed.

~~Hence, the only valid alternative to the proposed project is the no-action alternative. In this alternative, the project site would be left vacant, and the proposed marina, hotel and time-share facilities, commercial and marina industrial complexes, and community-oriented uses would not be realized.~~

~~The no-project alternative would therefore not generate adverse impacts associated with the construction and long-term operations would not occur.~~

~~Likewise, the creation of a master-planned state-initiated development, resulting in increased employment, tax revenue, recreation options and community facilities, would not be created. Privately-funded improvements, such as the marina, regional roadway and circulation improvements, and improvements to the existing wastewater treatment plant, would not be implemented. Private funds toward the development of community-oriented facilities such as parks, other recreational facilities and public access would not be contributed.~~

Further, the creation of revenue-producing businesses on the DHHL property to fund homestead programs would not occur, resulting in fewer potential benefits for Hawaiians.

Hence, the agreements and leases between the State and JDI indicate that the no-action alternative is not in the public interest~~has been rejected at this time~~.

2.2.1 Impact Comparison

Grading and Excavation

The proposed project requires grading and excavation. Both actions may impact groundwater due to rainfall runoff during construction. Alternative 1 would require a significantly smaller excavation for the marina basin and would therefore carry a lesser risk of potential adverse effects on water quality. Alternative 2 would require the same basin excavation as the proposed project, and would also include extensive grading and filling to build the golf course, the latter of which would generate additional impacts. Alternative 3 would result in no change to the geography, topography and geology.

Further discussion on grading and excavation is contained in Section 3.3.

Natural Drainage

Most precipitation infiltrates into the porous ground at the site, and no significant sheet flow is likely. Alternative 1 would generate similar levels of impacts on natural drainage as those of the proposed project and thus require similar mitigation measures. The golf course in Alternative 2 would not be as porous since the site would be graded, soil would be placed, and grass and other landscaping would be grown. Sheet flow and runoff can occur on a golf course, and drainage patterns might change. Alternative 3 would result in no change to the existing natural drainage pattern. Further discussion on natural drainage is contained in Section 3.4.

Air Quality

Air quality will be affected by construction activities, as well as pollutants from vehicular, industrial, natural, and agricultural sources. Alternative 1 would generate less construction air quality impacts than the proposed project due to the reduced amount of intensive groundwork associated with the smaller marina basin and fewer long-term impacts by reducing traffic 35 and 40 percent during, respectively, AM and PM peak traffic times. Construction of Alternative 2 would result in fugitive dust and exhaust from equipment and is expected to generate the same level of air quality impact as the proposed project. Alternative 3 would result in no change to existing air quality. Further discussion on air quality is contained in Section 3.5.

Terrestrial Environment

To provide additional habitat for shorebirds and some visiting seabirds, the project proposes to construct a brackishwater pond area suitable for avian fauna, including stilts, coots and ducks. While habitat expansion is beneficial, there is also a possibility that these species may be exposed to activity that may harm them. Alternative 1 would not include a brackish water pond, but will include 5 acres of seawater features, which is 74 percent less than the 19 acres of seawater features in the proposed project. While this would reduce beneficial impacts, it would also decrease exposure to potentially harmful activity. Alternative 2 does not include the brackish water pond features, but would include drainage retention basins that would attract avian fauna and expose them to chemicals used to maintain golf course landscaping. While Alternative 3 would result in no increase in potentially harmful activity, it would also not provide additional habitat for avian fauna. Further discussion on the terrestrial environment is contained in Section 3.7.

Groundwater

Groundwater at the project site occurs as a thin basal brackish water lens. It is influenced by tides and varies in flow direction and salt content. The existing Honokōhau Harbor acts as a drainage point for local groundwater. Any impact to groundwater flow from the proposed harbor is likely to be localized. The proposed marina basin will not result in any significant increase in groundwater flow to the coastline, but rather a concentration and redirection of the existing flows to the harbor entrance.

There will be differences in the flow to the marina entrance between the proposed project and Alternative 1. Alternative 1, being smaller in size, will have less impact on groundwater flow than the proposed marina. Alternative 2 will have a similar impact to groundwater quality as the proposed project. Alternative 2 may also impact water quality by contributing nutrients and biocides to the groundwater from the golf course. Alternative 3 would result in no change in existing groundwater conditions. Further discussion on groundwater is contained in Section 3.8.1.

Surface Water

There are no significant natural freshwater streams or ponds at the site, but there are brackish anchialine pools. Surface water at the project site will be influenced by rainfall. Runoff typically percolates rapidly through the permeable ground. The proposed project will include some impermeable surfaces, which together with building roofs, will change runoff and seepage patterns.

Alternative 1 is a lower density project that is expected to have proportionally less impact on surface water and runoff patterns and less potential impact on water quality than the proposed project. Alternative 2 would have more impact on surface water quality than the proposed project due to fertilizers and biocides carried by runoff from the golf course. Alternative 3 would result in no change to surface water conditions. Further discussion on surface water is contained in Section 3.8.2.

Nearshore Environment and Coastal Waters

The potential adverse impacts to the marine environment from the proposed project are due to the construction of an 800-slip marina and the resulting inflow of higher salinity seawater and inadequate water circulation, both of which are anticipated to impair water quality to the extent of falling below applicable standards. One possible mitigation measure is to significantly reduce the size of the marina expansion.

The reduced marina size (from 45 to 25 acres) and reduced lagoon acreage in Alternative 1 are expected to result in a proportionate reduction in seawater discharging into the new harbor and increased water circulation. Alternative 2 includes the same marina basin size and is therefore subject to the same factors that are expected to adversely affect water quality.

In the existing Honokōhau Harbor, water quality issues focus on the potential for pollutants, sediments, mixing and discharge into the nearshore marine waters. Before the harbor was constructed, any pollutants entrained within the groundwater were believed to have been diffused over a broad coastline.

The water quality in the proposed harbor depends on several components. These include salinity, nutrients, and sediments that come from the ocean, rainfall runoff, water features with marine animals, and dust. The smaller project offered as Alternative 1 is expected to produce a reduced amount of pollutants and reduce the risk of adverse impact upon water quality.

It is notable that the 45-acre marina basin planned in the proposed project and Alternative 2 only becomes viable from a water quality impact standpoint if the additional brackish groundwater inflow into the new marina exceeds 60 mgd. The resulting flushing from such inflow would be expected to better maintain water quality. However, it is unclear whether 60 mgd of brackish groundwater would be available. As proposed in Alternative 1, reduction of the volume of the new marina basin by 45 percent will significantly improve the flushing and water quality because the lower volume can be flushed by the available groundwater flow.

In addition, there could be higher rainfall runoff from the Alternative 2 golf course into the harbor, because the grassed golf course will be less porous than the natural surface. The golf course will also require relatively high levels of fertilizer, biocides, and irrigation, all of which could contribute to adverse water quality impacts.

Further discussion on nearshore environment and coastal waters is contained in Section 3.9.1.

Anchialine Pools

Anchialine pools are located north of Honokōhau Harbor, and south of the harbor on the project site. The marine life in these pools is sensitive to groundwater quality, and changes due to construction and operation of the project could degrade the viability of the pool ecosystem. In the southern complex, 3 anchialine pools with a combined surface area of $20m^2$ would be eliminated due to the harbor construction in the proposed project and Alternatives 1 and 2.

Predicting the extent of change in groundwater flow is difficult if not impossible even with numerous boreholes and intense sampling. The actual flow of groundwater towards the sea is minimal today, and tidal measurements show that tide fluctuations represent more than 90 percent in actual harbor tides. The fluctuations occur simultaneous with the ocean/harbor tide, which indicate a vertical and horizontal pressure regime between bore hole 6 and the ocean and harbor. Hence, the tides alone create a mixing system that increases salinity, as the flow approaches the point of discharge which will be either the channel or the shore. Another factor that could influence groundwater quality is the increased local recharge from irrigation between the channel and shore. This will add fresh water to the lens locally but is not quantified at this time.

Quantification of these impacts, including the flow of groundwater through each pond, is therefore extremely difficult. The shallow lavas are of the pahoehoe type and have a relatively high horizontal permeability. In surface depressions or undulations, the pahoehoe lavas have a tendency to lose vertical permeability from sedimentation thus restricting water exchange within the individual pools. This is normally reflected in both the salinity and temperature and this information has been adequately studied in the pools.

Changes in groundwater quality may or may not impact biological communities in the anchialine and estuarine environment. In either case, it is important to understand these relationships to effectively manage the resource. If there is significant deviation from the baseline especially in regard to nutrients, pathogens, and toxins, a mitigation plan to determine the cause and take decisive appropriate action will be implemented.

Due to the uncertainty of changes in groundwater flow and quality due to marina construction, the variability in impacts between the proposed project and Alternatives 1 and 2 is unknown at this time. Alternative 3 would result in no change in groundwater flow. While this would eliminate the potential for adverse impacts, Alternative 3 would also continue the pattern of existing degradation related to human activity and the introduction of alien species. Further discussion on anchialine pools is contained in Section 3.9.2.

Marine Fishing Impacts

The proposed marina will increase the number of boats in the area and it is reasonable to assume that a portion of these new boats will engage in fishing activities. The increase in boats in the area would be primarily related to the marlin and tuna / pelagic fishery, coral reefs due to extractive fisheries, and SCUBA activities. The pressure on fish and invertebrate stocks is expected to increase with or without the marina. Harbor expansion provides the opportunity to address existing conditions to consolidate, focus, and fund management and enforcement activities at one location.

Compared to the proposed project, Alternative 1 would result in a 21 percent decrease in boat traffic, thereby lessening the potential for marine fishing impacts. The level of impacts in Alternative 2 would be similar to that of the proposed project. Alternative 3 would result in no change in existing marine fishing conditions, and no opportunity to address already existing pressure on fish and invertebrate stocks. Further discussion on marine fishing impacts is contained in Section 3.9.3.

Cultural and Archaeological Resources

The proposed project will integrate cultural and archaeological resources in the overall development. Archaeological sites recommended for preservation will be preserved, and cultural practices will be encouraged. Kona Kai Ola includes a canoe park, and a cultural park with a focus on Hawaiian maritime cultural heritage of the voyaging canoe. Proposed is a 400-foot shoreline setback that would serve as a buffer between the ocean and developed areas. This coastal area would be protected with a shoreline park with trails and public access parking for walking and shoreline fishing, and a cultural park surrounding the heiau, the cultural sites and ʻAlula for community use.

Alternative 1 would contain all of the cultural archaeological features and the shoreline setback area would be 400 feet in the northern portion of the site and increase to 600 feet in the southern portion. Alternative 2 would preserve cultural and archaeological resources, but does not include a 400-foot shoreline setback. Alternative 3 would result in no change to existing cultural and archaeological resources and no addition of cultural and community facilities and activities. Further discussion on cultural and archaeological resources is contained in, respectively, Sections 4.1 and 4.2.

Noise

Project-generated noise is due to construction equipment and blasting, boats, marina activities, vehicle traffic, and the Kealakehe Wastewater Treatment Plant operations. Alternative 1 would generate less noise impacts due to reduced construction activities, fewer boats, less traffic and less on-site activity. Alternative 2 would also generate less noise due to reduced traffic and less on-site activity, but noise related to the excavation of the marina basin and an increase in the number of boats would be similar to that of the proposed project. Further discussion on noise impacts is presented in Section 4.4.

Socioeconomic Impacts

The proposed project will generate an increase in de facto population of an estimated 5,321 persons due to the increase in hotel and time-share units. The estimated de facto population increase in Alternative 1 is 37 percent less, at 3,363 persons, than the proposed project. The de facto population increase in Alternative 2 is similar to Alternative 1.

Employment in the commercial components will nearly double in Alternative 1, from a stabilized level of 1,429 full-time equivalent (FTE) positions in the proposed project to 2,740 in the Alternative 1.

Under Alternative 1, the total operating economic activity at Kona Kai Ola will increase due to the added commercial space more than off-setting the fewer visitor units, moving upward from $557.6 million per year to circa $814.3 million annually. The total base economic impact resulting from development and operation of Alternative 1 will similarly be higher by between 35 and 45 percent than that of the proposed project.

Alternative 1, which has a reduced marina size of 25 acres, and fewer hotel and time-share units, would have a meaningful market standing, create significant economic opportunities, and provide a net benefit to State and County revenues. From a market perspective, a smaller Kona Kai Ola would still be the only mixed use community in the Keahole to Kailua-Kona Corridor offering competitive hotel and time-share product.

The estimated absorption periods for marketable components of Alternative 1 are generally shorter than those for the same components in the proposed project. Marina slips under Alternative 1 are estimated to be absorbed within 2 years after groundbreaking, as compared with 9 years for absorption of slips in the proposed project. Hotel rooms under Alternative 1 are estimated to be absorbed within 4 years after groundbreaking, as compared with 7 years under the proposed project. Time-share units would be absorbed within 10 years under Alternative 1, while 15 years are projected under the proposed project. Due to the planned increase in commercial facilities under Alternative 1, the absorption period of commercial space is estimated at 14 years, as compared with 8 years for absorption of such facilities under the proposed project.

The State and County will still both receive a net benefit (tax receipts relative to public expenditures) annually on a stabilized basis under the Alternative 1. The County net benefits will be some $12.2 million per year under the Alternative 1 versus $14.9 million under the proposed project. The State net benefits will increase under the Alternative 1 to about $37.5 million annually, up substantially from the $11.4 million in the proposed project.

Due to the lower de facto population at build-out, the effective stabilized public costs for both the State and County will decline meaningfully under the Alternative 1, dropping from $7.7 million annually for the County and $36.5 million for the State, to $4.9 million and $23 million per year, respectively.

Alternative 3 would result in no increase in de facto population and improvement to economic conditions. Further discussion on social and economic impacts are contained in, respectively, Sections 4.5 and 4.6.

Vehicular Traffic

The proposed project will impact the nearby road network that currently is congested during peak traffic times. The proposed project includes roadway improvements that would reduce the impact and improve roadway conditions for the regional community.

Alternative 1 includes the same roadway system improvements as the proposed project, yet would reduce vehicular traffic by 35 percent when compared to the proposed project. Alternative 2 would have similar traffic conditions and roadway improvements as Alternative 1. Alternative 3 would result in no increase in traffic and no roadway improvements.

Marina Traffic Study

The increase in boat traffic due to the proposed 800-slip marina would cause entrance channel congestion during varying combinations of existing and new marina peak traffic flow. Worst case conditions of active sport fishing weekend and summer holiday recreational traffic result in traffic volumes exceeding capacity over a short afternoon period. Mitigation to address boat traffic in the proposed project include widening the entrance channel, traffic control, implementation of a permanent traffic control tower, or limiting vessel size.

Alternative 1 would result in a 21 percent reduction in boat traffic congestion under average existing conditions and ten percent reduction during peak existing conditions. The reduction to 400 slips also reduces the impacts of congestion at the entrance channel, thereby reducing the need for any modifications to the entrance channel.

Alternative 2 would have the same level of boat traffic as the proposed project. Alternative 3 would not meet the demand for additional boat slips and would not generate additional boat traffic. Further discussion on marina traffic is contained in Section 4.8.

Police, Fire and Medical Services

The proposed project will impact police, fire and medical services due to an increase in de facto population and increased on-site activity. Alternatives 1 and 2 would have similar levels of impact as the proposed project due to increased on-site activity. Further discussion on police, fire and medical services are contained, respectively, in Sections 4.10.1, 4.10.2 and 4.10.3.

Drainage and Storm Water Facilities

The proposed project will increase drainage flows, quantities, velocities, erosion, and sediment runoff.

Alternative 1 involves a reduction of the project density that would reduce storm runoff from the various land uses due to a reduction in impervious surfaces associated with hotel and time-share development and to the creation of more open space. However, roadway areas will increase by about 30 percent in Alternative 1. Storm runoff from proposed streets would therefore increase; thus requiring additional drainage facilities and possibly resulting in no net savings. The golf course in Alternative 2 may also change drainage characteristics from those of the proposed project and may not reduce impacts. Alternative 3 would result in no change in existing conditions and no improvements to drainage infrastructure. Further discussion on drainage and storm water facilities is contained in Section 4.10.5

Wastewater Facilities

The proposed development is located within the service area of the Kealakehe WWTP and a sewer system will be installed that connects to the WWTP. The sewer system will be comprised of a network of gravity sewers, force mains, and pumping stations which collect and convey wastewater to the existing Kealakehe WWTP. Project improvements will incorporate the usage of recycled / R1 water. Improvements implemented by the proposed project will also accommodate the needs of the regional service population.

Alternative 1 would generate approximately 10 percent less wastewater flow than the proposed project. Wastewater flow in Alternative 2 is undetermined. Alternative 3 would result in no additional flow, as well as no improvements that will benefit the regional community. Further discussion on wastewater facilities is contained in Section 4.10.6.

Potable Water Facilities

The proposed project average daily water demand is estimated at 1.76 million gallons per day. Existing County sources are not adequate to meet this demand and source development is required. The developer is working with DLNR and two wells have been identified that will produce a sustainable yield that will serve the project. These wells will also serve water needs beyond the project.

Alternative 1 would result in net decrease of about five percent of potable water demand. Alternative 2 may have a lower water demand than the proposed project as long as potable water is not used for irrigation. Alternative 3 would result in no additional flow, as well as no source development that will benefit the regional community. Further discussion on potable water facilities is contained in Section 4.10.8.

Energy and Communications

Regarding Alternative 1, preliminary estimates for electrical, telecommunications, and cable resulted in a net demand load that remains similar to the proposed project. Further discussion on energy and communications is contained in Section 4.10.9.1.

The proposed project will increase the demand for electrical energy and telecommunications. The demand would be reduced in Alternative 1 because the number of boat slips and units would decrease. Similarly, Alternative 2 would have fewer units than the proposed project and therefore reduce energy demands. Further reduction in energy demand for either alternative could be achieved by using seawater air conditioning (SWAC) and other energy reduction measures, as planned by the developer. Further discussion on energy and telecommunications is contained in Section 4.10.9.2.

Water Features and Lagoons

The proposed project includes a brackishwater pond, lagoons, and marine life exhibits supplied by clean seawater. The water features in Alternative 1 would significantly decrease by 74 percent from 19 acres in the proposed project to five acres in Alternative 1. This decrease in water features would result in a corresponding decrease in water source requirements and seawater discharge. Alternative 2 does not include the seawater features. Alternative 3 would result in no additional demand for water source requirements and seawater discharge.

2.2.2 Conformance with Public Plans and Policies

State of Hawai'i

Chapter 343, Hawai'i Revised Statutes

Compliance with this chapter is effected, as described in Section 5.1.1 in regard to the proposed project and the alternatives discussed.

- State Land Use Law, Chapter 205, Hawai'i Revised Statutes

  The discussion in Section 5.1.2 is directly applicable to Alternative 1, the proposed project. Alternative 1 will involve a setback of 400 feet that increases to 600 feet along the southern portion of the project site's shoreline area. Alternative 2 does not provide for such a setback, but may still require approvals from DLNR for cultural, recreational, and community uses and structures within the Conservation district.

- Coastal Zone Management Program, Chapter 205A, Hawai'i Revised Statutes

  Recreational Resources:

  In addition to the discussion of consistency with the associated objective and policies, as described in Section 5.1.3, the reduction from the proposed project's 800-slip marina to a 400-slip marina under Alternative 1 will still expand the region's boating opportunities and support facilities. The existing harbor entrance will still be utilized under this alternative; however, potential risks relating to boat traffic and congestion in the marina entrance area will be reduced significantly. The 400-600 foot shoreline setback, public parks, trails, cultural areas, community facilities, and marine science center remain important recreational components under Alternative 1.

Alternative 2 includes a golf course component, which would add a more passive recreation to the active and social components, such as boating, fishing, swimming, trails, walkways, parks, marine life, educational and interactive areas that are also part of the project. The golf course would enhance the range of leisure and recreational opportunities offered at Kona Kai Ola.

Alternative 2, like the proposed project, will expand the region's boating opportunities and support facilities through its 800-slip marina. However, the potential adverse impacts of increased boat traffic from the size of the marina are significant enough to offset the benefits of increased boating opportunities.

Coastal Ecosystems:

The discussion in Section 5.1.3 is directly applicable to Alternative 1.

Alternative 1 not only reduces the number of slips proposed by 50 percent, but it also reduces the size of the marina from 45 acres to 25 acres. The 25-acre marina will increase the body of water within the existing harbor, but to a significantly lesser extent than the proposed project's estimated increase, which is also applicable to the 45-acre size that is proposed for the marina under Alternative 2.

The findings of the Harbor Water Quality Modeling Study conclude that a reduction in the size of the harbor expansion is an alternative that will mitigate the risk of significant impacts upon water quality within the marina and existing harbor. Accordingly, the reduction in both the number of slips and the size of the marina basin under Alternative 1, in combination with proper facilities design, public education, and enforcement of harbor rules and regulations, would result in fewer long-term impacts to water quality and coastal ecosystems. Short-term (construction-related) impacts would likely remain the same although the reduction in the total acreage of excavation is expected to result in a shorter duration of such impacts.

In addition to its 800-slip marina and potential adverse impacts upon water quality and the marine environment, Alternative 2 includes a golf course component, which has the potential to impact coastal ecosystems by increasing the nutrient loading in surface runoff and groundwater and also by introducing pesticides, herbicides, and other chemicals common in golf course use and management into the nearshore waters surrounding the project site.

Economic Uses

Although reduced in the number of slips, the smaller marina under Alternative 1 will nevertheless serve public demand for more boating facilities in West Hawai'i and is consistent with the objective and policies and discussion set forth in Section 5.1.3. The economic impacts of Alternative 2, while comparable to those of the proposed project's marina development, are notably marginal as to the golf course component, based on the marketability analysis that indicates a condition of saturation within the region.

Coastal Hazards

The discussion and considerations set forth in Section 5.1.3 are also applicable to Alternatives 1 and 2 and indicate compliance with the objective and policies addressed. Tsunami risks mainly affect the large shoreline setback area that is proposed for the project and Alternative 1. Alternative 2 projects a transient accommodation site that is partially within the tsunami hazard zone and thus carries a higher hazard risk. However, the essential requirement for these alternatives, as well as the proposed project, is a well-prepared and properly implemented evacuation plan.

Beach Protection

Discussion and considerations set forth in Section 5.1.3 are also applicable to Alternatives 1 and 2 and indicate compliance with the objective and policies addressed. Alternative 1 and, to a lesser extent, Alternative 2, will retain the shoreline area in its natural condition.

Similar to the proposed project, Alternative 1 provides for a shoreline setback of considerable width within which no structure, except for possible culturally-related structures, would be allowed. Alternatives 1 and 2 will thus be designed to avoid erosion of structures and minimize interference with natural shoreline processes.

Marine Resources

The discussion in Section 5.1.3 is also applicable to Alternative 1 which is described to be an alternative that is specifically projected to mitigate anticipated adverse impacts on water quality and the marine environment that might otherwise result from the original harbor design and scale, which is also incorporated in Alternative 2 . The reduced marina size under Alternative 1 is projected to meet water quality standards and enable greater compliance with the objective and policies addressed in this section.

Alternative 2 includes a golf course component and thus the potential to adversely impact marine resources by increasing the nutrient loading in surface runoff and groundwater and also by introducing pesticides, herbicides, and other chemicals common in golf course use and management into the nearshore waters surrounding the project site.

Hawai'i State Plans, Chapter 226, Hawai'i Revised Statutes

Section 226-4 (State goals), 5 (Objectives and policies for population, and 6 (Objective and policies for economy in general):

The discussion in Section 5.1.4 is applicable to Alternatives 1 and 2, in addition to the proposed project. These development concepts generally conform to the goals, objectives, and policies set forth in these sections because they will provide some degree of economic viability, stability, and sustainability for future generations. Kona Kai Ola will convert essentially vacant land into a mixed-use development with a distinctive marina and boating element, providing a wide range of recreational, business, and employment opportunities to the community.

Section 226-8 Objective and policies for the economy – the visitor industry:

Alternatives 1 and 2 will be consistent with the State's economic objective and policies relating to the tourism industry for the same reasons that are discussed in regard to the proposed project in Section 5.1.4. They will incorporate JDI's commitment to sustainability principles in the planning and design of the development concepts in Alternatives 1 and 2. Although the total hotel and time-share unit count is reduced to approximately 1,500 in Alternatives 1 and 2, the transient accommodations component of these alternatives will still further the State's objective and policies for increased visitor industry employment opportunities and training, foster better visitor understanding of Hawai'i's cultural values, and contribute to the synergism of this mixed-use project concept that addresses the needs of the neighboring community, as well as the visitor industry.

Section 226-11 Objectives and policies for the physical environment: land-based, shoreline and marine resources:

Alternative 1 is expected to involve less potential adverse impacts upon these environmental resources than the proposed project. Likewise, and Alternative 2 would have less adverse impact because of its reduction in the size of the marina and in the total hotel and time-share unit count. Alternative 1 carries less potential risk to water quality and related impacts upon the marine environment and anchialine pool ecosystems. Although approximately three anchialine pools are expected to be destroyed, the great majority of pools will be preserved within and outside of the proposed 400-foot shoreline setback.

The golf course component in Alternative 2 has the potential to impact marine resources by increasing the nutrient loading in surface runoff and groundwater and also by introducing pesticides, herbicides, and other chemicals common in golf course use and management into the marina basin and nearshore waters surrounding the project site. It also has the potential to adversely affect the anchialine pools by introducing the chemicals into the pond systems.

Section 226-12 Objective and policies for the physical environment: scenic, natural beauty, and historic resources:

The discussion in Section 5.1.4 is directly applicable to Alternative 1 and describes the compliance with the objective and policies addressed.

The golf course component of Alternative 2 would create a park-like view that would potentially enhance the beauty of the project site and surrounding areas when considered in combination with the existing rugged natural beauty of the area.

Just as with the proposed project, Alternatives 1 and 2 would also be designed to blend with the natural terrain and to honor and protect the cultural history, resources, and practices of these lands.

Section 226-13 Objectives and policies for the physical environment: land, air and water quality:

As stated above, because of the reduction in both the number of slips and the size of the marina basin, with proper facilities design, public education and enforcement of harbor rules and regulations, Alternative 1 is anticipated to cause fewer long-term impacts to water quality than either the proposed project or Alternative 2. Based on the findings of the Harbor Water Quality Modeling Study, water quality resulting from a reduced marina basin size as proposed under Alternative 1 is expected to be similar to existing conditions.

As previously noted, Alternative 2 has the potential to adversely impact water quality by increasing the nutrient loading in surface runoff and groundwater by introducing pesticides, herbicides and other chemicals common in golf course development and maintenance into the marina basin and nearshore waters surrounding the project site.

Section 226-14 Objectives and policies for facility systems - general:

Alternatives 1 and 2 will conform to the objective and policies of this section on the grounds that are discussed in regard to the proposed project in Section 5.1.4. The master-planning and phasing of the project concepts under these alternatives will be coordinated with associated public and private infrastructural planning and related private and public infrastructural financing. The cost of the marina construction and project-related infrastructure is to be borne by the developer, resulting in considerable savings for the public. In addition, the projected lease revenue from these public lands will provide additional public benefits by establishing a revenue stream for capital improvements and maintenance of a range of State facilities.

Section 226-15 Objectives and policies for facility systems - solid and liquid wastes:

In addition to the developer's commitment to sustainable development design, the project will involve upgrades to the County of Hawai'i's Kealakehe Wastewater Treatment Plant to meet current needs, as well as the project's future needs. This commitment is applicable to Alternatives 1 and 2, as well as the proposed project that is discussed in Section 5.1.4.

Section 226-16 Objectives and policies for facility systems – water:

The discussion of water conservation methods and the need to secure additional potable water sources in Section 5.1.4 is also applicable to Alternative 1 and demonstrates conformity to the objective and policies for water facilities. Alternative 2 involves greater irrigation demands in regard to its golf course component and greater potable water demands for human consumption than those for Alternative 1. Alternative 2 is expected to face more serious challenges in securing adequate and reliable sources of water.

Section 229-17 Objectives and policies for facility systems – transportation:

Alternatives 1 and 2 will conform to this objective and policies because they will present water transportation opportunities, including the possible use of transit water shuttles to Kailua-Kona, as described in regard to the proposed project in Section 5.1.4.

Section 226-18 Objectives and policies for facility systems – energy:

Alternatives 1 and 2 conform to these objective and policies through the use of energy efficient design and technology and commitment to the use and production of renewable energy to serve the project's needs. Solar energy production, solar hot water heating, and the use of deep cold seawater for cooling systems are currently identified as means of saving substantial electrical energy costs for the community and the developer.

Section 226-23 Objectives and policies for socio-cultural advancement – leisure:

Alternative 1 conforms to this objective and related policies for the reasons offered in Section 5.1.4 in regard to the proposed project. Alternative 1 will be of greater conformity with the policy regarding access to significant natural and cultural resources in light of the 400-600 foot shoreline setback that has been designed for this alternative.

Although it does not propose the considerable shoreline setback that is planned for Alternative 1, Alternative 2 is consistent with this objective and related policies in incorporating opportunities for shoreline-oriented activities, such as the walking trails. In addition, the golf course component adds a more passive recreation alternative to the active and social components, such as boating, fishing, swimming, trails, walkways, parks, marine life educational and interactive areas that are also part of the project. The golf course would enhance the range of leisure and recreational opportunities offered at Kona Kai Ola.

Section 226-25 Objectives and policies for socio-cultural advancement-culture:

The discussion in Section 5.1.4 is relevant to Alternatives 1 and 2 and demonstrate their conformity the objective and policies of this section.

Both alternatives involve the preservation and protection of cultural features that have been identified by the Cultural Impact Assessment and archaeological studies for the project area. Both provide for public shoreline access, and both will continue the policy of close consultation with the local Hawaiian community and cultural and lineal descendants in the planning of cultural resource preservation and protection.

Section 226-103 Economic priority guidelines:

Alternatives 1 and 2 conform to these guidelines for the same reasons that are set forth in Section 5.1.4. They involve private investment in a public project that will create economic diversification through a mix of marina, industrial, commercial, visitor, and cultural facilities. This presents a wide range of entrepreneurial opportunities, long-term employment opportunities, and job training opportunities.

Section 226-104 Population growth and land resources priority guidelines:

As described in Section 5.1.4, the policy support for the proposed project also extends to the similar development concepts considered in Alternatives 1 and 2. Those alternatives conform to the guidelines of this section because they involve an urban development under parameters and within geographical bounds that are supported by the County's General Plan, a preliminary form of the Kona Community Development Plan, the County's Keahole to Kailua Regional Development Plan, and the reality of being located along the primary commercial/industrial corridor between Keahole Airport and Kailua-Kona. As with the proposed project, the development concepts of Alternatives 1 and 2 are essentially alternatives for the implementation and "in-filling" of the urban expansion area in North Kona.

DHHL Hawai'i Island Plan

This 2002 plan projects DHHL's Honokōhau makai lands for commercial use. As compared to the proposed project and Alternative 2, Alternative 1 presents an expanded commercial component that provides greater compliance with the plan, while addressing certain beneficiaries' concerns about the scale of the marina originally required in the Project. Alternative 2 also conforms to the recommended commercial uses in the makai lands but to a lesser degree than Alternative 1 because of its more limited commercial component. Like the proposed project, its marina size and number of slips raise environmental issues, as more specifically discussed in Part 3, and community concerns.

County of Hawai'i General Plan

HCGP Section 4 – Environmental Quality Goals, Policies and Courses of Action:

Alternative 1 is consistent with this section. It presents a reduction in both the number of slips and the size of the marina basin that, in combination with proper facilities design, public education and enforcement of harbor rules and regulations, would result in very few long term impacts to water quality. Based on the findings of the Harbor Water Quality Modeling Study, water quality would remain similar to existing conditions.

Alternative 2 is the least consistent with this section. In addition to the potential significant impacts of its 800 slip marina basin, its golf course component has the potential to adversely impact marine resources by increasing the nutrient loading in surface runoff and groundwater and also by introducing pesticides, herbicides and other chemicals common in golf course use and management into the nearshore waters surrounding the project site. It also has the potential to adversely affect the anchialine pools beyond their current conditions by introducing such substances into the pool systems.

HCGP Section 7 – Natural Beauty Goals and Policies:

Alternative 2 conforms to some degree with this section. Its golf course component would create a park-like view that would potentially enhance the beauty of the project site and surrounding areas when considered in combination with the existing rugged natural beauty of the area, as demonstrated in other makai golf courses within the region.

HCGP Section 8 – Natural Resources and Shoreline:

Alternative 1 is most consistent with the goals and policies of this section. It would require considerably less marina excavation than the proposed project and Alternative 2 and would reduce the potential risk of long-term adverse impacts to water quality. Based on the findings of the Harbor Water Quality Modeling Study, water quality would remain similar to existing conditions with the degree of reduction in marina basin size that is proposed under Alternative 1. This reduction is also expected to reduce potential impacts upon anchialine pools and their ecosytems, as well as shoreline and marine resources that are affected by water quality. Alternative 1 also retains the shoreline preservation and protection concepts that are proposed in and described for the Project.

HCGP Section 10 – Public Facilities Goals and Policies:

The discussion in Section 5.2.1. in relation to the proposed project is applicable to Alternatives 1 and 2. Improvements to public facilities are are integral to the Kona Kai Ola development. The provision of additional boat slips and numerous road improvements, including a makai extension of Kuakini Highway south to Kailua-Kona are incorporated into plans for the project's development. In light of these elements, Alternatives 1 and 2 are consistent with the goals and policies of this section.

HCGP Section 11 – Public Utility Goals, Policies:

As with the proposed project, Alternatives 1 and 2 are consistent with the goals and policies of this section, based on the relevant grounds set forth in Section 5.2.1. The developer is committed to design, fund, and develop environmentally sensitive and energy efficient utility systems to the extent possible, as described previously in Part 5. Its master planning provides for the coordinated development of such systems with the objective of achieving significant savings for the public. As previously-mentioned example, the project development involves the upgrading of the Kealakehe Wastewater Treatment Plant.

HCGP Section 12 – Recreation:

Alternative 1 is consistent with the goals, policies, and courses of action for North Kona in this section.

Although the number of slips is reduced under Alternative 1, the region's boating opportunities and support facilities will still be expanded. The existing marina entrance would still be utilized under this alternative. However, concerns relating to increased activity leading to increased congestion in the marina entrance area would be mitigated to a certain extent. The 400-600 foot shoreline setback, public parks, trails, cultural areas, community facilities and marine science center remain important components of Alternative 1.

The golf course component of Alternative 2 would add a more passive recreation to the active and social components, such as boating, fishing, swimming, trails, walkways, parks, marine life, educational and interactive areas that are also part of the project. The golf course would enhance the range of leisure and recreational opportunities offered at Kona Kai Ola. Alternative 2 is also considered to be consistent with this section.

HCGP Section 13 and 13.2 – Transportation:

The reduced marina component under Alternative 1 will still provide transportation opportunities and provide for possible use of transit water shuttles to Kailua-Kona, although to a lesser degree than under the proposed project and Alternative 2 . However, in each scenario, internal people-movers are planned, and numerous roadway improvements are planned for coordination with public agencies, including but not limited to the construction of the Kuakini Highway extension between Honokōhau and Kailua-Kona. Accordingly, both Alternatives 1 and 2 are consistent with the goals, policies, and courses of action for North Kona under these sections of the General Plan.

HCGP Section 14.3 – Commercial Development:

For the reasons presented in the discussion under Section 226-104 of the State Plan, the planned commercial component under Alternatives 1 and 2 are consistent with this section.

HCGP Section 14.8 – Open Space:

Alternatives 1 and 2 are consistent with the goals and policies of this section. Alternative 1 provides a considerable (400-600 foot) shoreline setback along the entire ocean frontage of the project site as a means of protecting the area's scenic and open space resources, as well as natural and cultural resources. Although it does not incorporate the shoreline setback planned in Alternative 1, Alternative 2 provides a golf course component would contribute to the amount of open space that is currently proposed and allow additional view corridors to be created.

Community Development Plans

Community development plans are being formulated for different regions in the County in order to supplement the County's General Plan. The Kona Kai Ola project is located in the Kona Community Development Plan (CDP) area. Maps associated with the preliminary work phases

of the Kona CDP include the Kona Kai Ola project site within the "Preferred Urban Growth" boundary of the North Kona district. The Kona CDP process is guided by a Steering Committee composed of a broad cross-section of the community. The Steering Committee will eventually complete its work and recommend the CDP's adoption.

After the DEIS was published, the Kona CDP has progressed to the development of plans for the major urban growth corridor north of Kailua-Kona. The Kona CDP has produced a draft plan showing a transit oriented development that includes a midlevel public transit corridor along the mauka residential elevation, and a makai transit corridor that runs along a proposed new frontage road just makai and parallel to Queen Kaahumanu Highway. The development plan for Alternative 1 includes the Kuakini Highway as part of this proposed frontage road and transit line from Kailua Kona to the Kealakehe area, along with a transit stop at Kona Kai Ola. The Alternative 1 plan also includes a road that could be extended to be part of the proposed frontage road should it be approved and implemented. In addition, the Kona CDP has continued to emphasize the principles of smart growth planning with mixed use urban areas where people can live, work, play and learn in the same region. Kona Kai Ola has been specifically designed to be consistent with this policy in order to provide a stable employment base close to where people live in the mauka residential areas already planned for DHHL and HHFDC lands.

It should be noted that currently and over the years, the 1990 Keāhole to Kailua Development Plan (K-to-K Plan) guides land use actions by the public and private sectors. It is intended to carry out the General Plan goals and policies related to the development of the portion of North Kona area, including the Kona Kai Ola site. The "Preferred Growth Plan" of the Keāhole to Kailua Development Plan identifies the project site as a new regional urban center to include commercial, civic, and financial business related uses, an expanded "Harbor Complex," a shoreline road, and a shoreline park. The proposed project and the development concepts in Alternatives 1 and 2 are therefore consistent with the recommendations in the Keāhole to Kailua Development Plan.

Hawai'i County Zoning

As shown on Figure AA, the project site is zoned "Open". Under Section 25-5-160 of the Hawai'i County Code, "The O (Open) district applies to areas that contribute to the general welfare, the full enjoyment, or the economic well-being of open land type use which has been established, or is proposed. The object of this district is to encourage development around it such as a golf course and park, and to protect investments which have been or shall be made in reliance upon the retention of such open type use, to buffer an otherwise incompatible land use or district, to preserve a valuable scenic vista or an area of special historical significance, or to protect and preserve submerged land, fishing ponds, and lakes (natural or artificial tide lands)".

Some of the proposed uses at Kona Kai Ola are permitted uses in the Open zone such as:

- Heiau, historical areas, structures, and monuments;
- Natural features, phenomena, and vistas as tourist attractions;
- Private recreational uses involving no aboveground structure except dressing rooms and comfort stations;

- Public parks;
- Public uses and structures, as permitted under Section 25-4-11.

In addition to those uses permitted outright, the following uses are permitted after issuance of a use permit:

- Yacht harbors and boating facilities; provided that the use, in its entirety, is compatible with the stated purpose of the O district.
- Uses considered directly accessory to the uses permitted in this section shall also be permitted in the O district.

The proposed time-share and hotel units and commercial uses would not be consistent with the zoning designation of "Open". Project implementation therefore requires rezoning of portions of the project to the appropriate zoning category or use permits for certain uses.

Special Management Area

As shown in Figure AB, the entire project area up to the highway is within the coastal zone management zone known as the Special Management Area ("SMA"). At the County level, implementation of the CZM Program is through the review and administering of the SMA permit regulations. Kona Kai Ola complies with and implements the objectives and policies of the Coastal Zone Management (CZM) Program, and a full discussion is provided in Section 5.1.3. The development concepts in the proposed project and Alternatives 1 and 2 will be subject to applicable SMA rules and regulations.

February 6, 2007

Linda Chinn
c/o Dept. of Hawaiian Homelands
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Scott Condra, Senior Vice President
c/o Jacoby Development Inc.
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Re: Kona Kai Ola Draft Environmental Impact Statement

Welina mai,

My name is listed in Table 2, "Community Contacts" on page 164. However, neither my comments on the project nor preference for the no-build alternative is listed.

Please correct the Final Environmental Impact Statement to reflect the statement I made during the private meeting I had with David Tarnas and Ross Wilson.

Sincerely,

Charles Flaherty

Flaherty
P O Box 922
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Re: Kona Kai Ola Draft Environmental Impact Statement

Welina mai,

The following are comments on the Kona Kai Ola Draft Environmental Impact Statement ("KKO DEIS") that I wish to be addressed within the Final Environmental Impact Statement.

The Lingle Administration could chose to provide sufficient funds to expand and improve the facilities at Honokohau Harbor. Instead, the Administration chose to promote millions of dollars in tax cuts.

The KKO DEIS references the on-going Kona Community Development Plan ("KCDP") process, but does not include the Final Themes that resulted from over 100 community meetings. The Final Themes included:

1) Slow Growth/Moratorium,
2) Increase amount and access of Open Space,
3) No coastline development,
4) Protecting Viewplanes

Further, in a series of KCDP public charrettes, the Kona community indicated that they did not want any further development between Queen Ka'ahumanu Highway and the shoreline.

The KKO DEIS main report does not include information Appendix N regarding a survey which found that a majority of residents wished to halt development.

The KKO DEIS clearly states that the proposed development would cause irreparable harm to constitutionally-protected environmental and cultural resources south of the Honokohau Harbor channel, all terrestrial and aquatic life south of the Harbor entrance will die off. Such irreparable harm would provide sufficient legal cause for a permanent injunction against construction. Under the law, socio-economic benefits cannot mitigate irreparable harm to the public trust.

A review of coastal water monitoring data for development in west Hawai'i, April 2006, a study done for the County of Hawai'i Planning Department has proven that nearshore development in west Hawai'i is causing an increasing number and degree of state marine water quality violations. This fact has been document by water sampling at Mauna Kea, Mauni Lani, Waikoloa, NELHA, Keauhou Bay, and Hokuli'a. The proposed project will result in an unconstitutional degradation of nearshore marine resources.

In January 2005, the current County Council passed General Plan Draft 1 ("GPD1") with the DLNR land designated as Open.

In September 2005, at a BLNR meeting regarding the proposed JDI development, Kona elected representatives Councilman Angel Pilago, Councilwoman Virginia Isbell, and State Rep. Cindi Evans all requested that the development agreement decision be delayed until public hearings can be held in Kona.

In November 2005, the BLNR and JDI entered into the Agreement, a contract. However, HRS 171-60(C), "Prior to leasing any public land to, or entering into a development contract with, a developer or developers, the board shall determine the use or uses to which the lands shall be put, which shall be in conformity with the applicable state, city and county, or county zoning and subdivision laws, ordinances, or regulations…".

GPD1, containing the Open designation for DLNR lands adjoining Honokohau, had been public for two years before the DLNR issued its RFQ/RFP.

It is obvious from the timeline and events above that BLNR, JDI, and certain County officials had constructive knowledge that:

1) existing Open County zoning and GPD1 designation were in conflict with the Honokohau RFQ/RFP when issued.

2) the Agreement was in conflict with existing Open County zoning and the adopted General Plan Open designation.

3) the Agreement was in conflict with HRS171-60(C).

Therefore, the Agreement is voidable under existing state law.

The State Attorney General's position that the Agreement is valid under another section of HRS 171 does not mitigate the fact that the Agreement is voidable under HRS 171-60(C).

Appendix O, Traffic Impact Analysis Study, proves that planned infrastructure improvements described in the Kona Kai Ola DEIS will not mitigate increased traffic caused by the proposed project. If all planned roads and improvements are built, traffic levels of service in 2020 will be "C", average traffic delays, without the proposed project and "D", long traffic delays with the proposed project.

The KKO DEIS does not state whether additional egress/ingress and/or signal light(s) at Queen Ka'ahumanu will be required by the proposed DHHL Phase 1 commercial development. Either would cause additional traffic delays.

The proposed project is not necessary for the public to have access to those environmental and cultural resources that it wishes to enjoy on the proposed project site. History has already proven that additional public access to the proposed project site will result in environmental and cultural resource degradation.

Public education has not mitigated environmental and cultural resource damage caused by increased access and/or use anywhere in the State of Hawai'i. Public education cannot mitigate the irreparable harm caused by increased public access and development of the proposed project site.

The proposed pumping of seawater into the proposed brackish water lagoon has not precedent. All statements made in the KKO DEIS relative to this experimental system are theoretical and unproven. Such experiments are inappropriate in an environmentally- and culturally-sensitive area.

The proposed use of seawater for air-conditioning has no precedent. All statements made in the KKO DEIS relative to this experimental system are theoretical and unproven. Such experiments are inappropriate in an environmentally- and culturally-sensitive area.

Given the above, LEED, "Leadership in Energy and Environmental Designed Green Buildings" is irrelevant given the inherent irreparable harm caused by the proposed project as well as the potential irreparable harm caused by the experimental, artificial systems described above.

The KKO DEIS states that the proposed project will provide additional homes for the Department of Hawaiian Homelands, but does not state how many homes will be provided and by what time certain.

The original intent of the Department of Hawaiian Homelands was to ensure that the Native Hawaiian people were able to return to the land, the 'aina and that which sustains their lives and culture. Being packed into subdivisions does not meet that intent. The State should not have given DHHL 200 acres of land next to a wastewater treatment plant

in the middle of a lava rock desert in exchange for lease payments due to DHHL by the State. The State should exchange the 200 acre DHHL Kealakehe land parcel for a larger area of state land with good soil and water. This exchange would also ensure that the Kealakehe Wastewater Treatment Plant had sufficient room to expand in the future.

The source of the elevated nitrate levels in the southern complex of anchialine ponds, described in Appendix G, "Water Quality, Marine Biological Baseline Studies, and Impact Analysis", must be investigated and determined before the true environmental impact of the proposed project can be known.

The cause(s) of non-point source pollution in nearshore marine waters offshore of Kaloko fishpond must be investigated and determined before the true environmental impact of the proposed project can be known.

The charts and tables contained within Appendix G do not list state water quality standards relative to sample measures.

The KKO DEIS describes the southern complex of anchialine ponds as being degraded relative to the complex of ponds north of the Harbor channel. However, algal mats, indicative of an oxygen-deprived, nutrient-rich environment, cover a much larger percentage of northern ponds.

Appendix G does not state the prevailing currents which existed on the three sampling dates, currents which would explain the higher levels of nutrients at Transects A and B offshore the Kaloko-Honokohau National Historic Park.

Appendix G does not refer to anecdotal statements contained within the Cultural Impact Assessment describing nearshore odors and pollution as being caused by the Kealakehe Wastewater Treatment Plant.

Appendix G describes landscaping as <u>potentially</u> adding fertilizer nutrients, herbicides, and pesticides into the freshwater outflow to the ocean when studies in other nearshore areas have proven this <u>will</u> occur.

Appendix K does not acknowledge current constitutionally-protected Native Hawaiian cultural practices at 'Alula, nor does it assess the impact the proposed development would have on these practices.

Appendix K states "There is no doubt as to unmark[ed] burials inland of the shore, this would be expected of the general function of an 'ahupua'a, but is this shoreline a leina?" The Cultural Impact Assessment does not answer this extremely critical question.

Appendix L does not acknowledge the fact that prehistorical Native Hawaiian habitation sites general contain burials sites.

Appendix N acknowledges the Kona communities desire to "Keep Kona Kona", but this sentiment is not described within the body of the KKO DEIS main report.

Appendix N acknowledges that the uses of the proposed project are incompatible with the uses within the National Historic Park. This fact is not described within the main body of the KKO DEIS.

The proposed project would cause the island of Hawai'i to have nearly twice as many timeshare units as any other island including Oahu. This socio-economic result is not in keeping with the Final Themes of the Kona Community Development Plan.

The main body of the KKO does not acknowledge the Appendix P conclusion that the proposed project will cause a level of service "E" for existing Harbor boat traffic. LOS E occurs when "any disruption of traffic, no matter how minor, will cause queues to form and service to deteriorate to LOS "F", breakdown flow.

Mahalo for the opportunity to comment.

Sincerely,

Charles Flaherty

P.S. - Please extend the public comment period!

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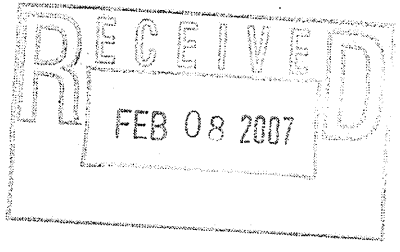

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July 23, 2007

Charles Flaherty
P.O. Box 922
Captain Cook, HI 96704

Dear Mr. Flaherty:

Subject: Kona Kai Ola Draft Environmental Impact Statement
Response to Your Comments in two letters Dated February 6, 2007

Thank you for your comments on the Kona Kai Ola Draft Environmental Impact Statement. You sent us two letters both of which were dated February 6. This letter responds to both.

In one letter, you note that "neither my comments on the project nor preference for the no-build alternative is listed." You also request a correction to the EIS to reflect the various input received in meetings on Kona Kai Ola. From November 2005 through June 2007, over 920 Big Island community members have participated in Kona Kai Ola presentations. It is not possible to list all comments received in these meetings. Collectively, community input gathered from these presentations and facilitated by JDI's smart growth expertise, has shaped the vision for Kona Kai Ola. The remaining parts of this letter respond to your other letter, and our response is provided as listed by page and paragraph in your letter.

Page 1, Paragraphs 3 and 4

The desire to slow growth or put a moratorium on growth was expressed by some participants in Kona CDP workshops. The County Council did pass a resolution requesting a "pause" in rezoning requests before the County. However, at the time the Council was deliberating the resolution, the County Planning Director said that, unless the County Council passes an ordinance, the County Planning Director cannot slow the processing of rezoning requests. The Planning Department is required to process requests in a timely manner. The Council did not pass an ordinance. Therefore, there is no moratorium on growth in Kona.

As an environmentally sustainable development, Kona Kai Ola includes many components and design features that manage growth in a way that would benefit the community, and the public agencies who own the land.

The theme of increasing the amount and access to open space was expressed by some participants in the Kona Community Development Plan (CDP) workshops. Including substantial amounts of open space in development projects is considered an important component in a smart growth, sustainable development project. Therefore, the Kona Kai Ola development includes substantial open space including a major shoreline park and improved public access to the shoreline and ocean.

The theme of no coastal development was expressed by some participants in the Kona CDP workshops. However, this means different things to different people, and has never been

presented as a consensus opinion of the community in the Kona CDP process. In an effort to respond to the sentiment of many community members to increase shoreline access and open park space, the shoreline setback for the Kona Kai Ola project was modified to increase the shoreline setback from the minimum required distance of 40 feet to a setback of at least 400 feet from the shoreline.

The theme of protecting viewplanes was expressed by some participants in the Kona CDP process. This has been expressed in various County plans as well, including the Hawaii County General Plan and the Keahole to Kailua Development Plan. The Kona Kai Ola plan includes designs to enhance the viewplanes from Queen Kaahumanu Highway, as well as minimize potential negative impacts on viewplanes from adjacent properties. The limitation on building height in Kona Kai Ola to a maximum of 4 stories (or palm tree height) was also done to specifically respond to the desire by the community to protect viewplanes.

The Kona CDP has continued to emphasize the principles of smart growth planning with mixed use urban areas where people can live, work, play, and learn in the same region. Kona Kai Ola has been specifically designed to be consistent with this policy in order to provide a stable employment base close to where people live in the mauka residential areas already planned for DHHL and HHFDC lands.

Since the publication of the DEIS, the Kona CDP has progressed to the development of plans for the major urban growth corridor north of Kailua-Kona. The Kona CDP has produced a draft plan, which is discussed in this letter as Alternative 1, showing a transit oriented development that includes a midlevel public transit corridor along the mauka residential elevation, and a makai transit corridor that runs along a proposed new frontage road just makai and parallel to Queen Kaahumanu Highway.

Also, since the publication of the DEIS, the developer has explored additional project alternatives that further address the themes of the Kona Community Development Plan.

As explained in the DEIS, the agreement between JDI and the State of Hawai‘i established a required scope and scale of the project for which the impact analysis was provided. Several comments have addressed the fact that alternatives other than the No Project Alternative were not addressed in the DEIS Section 2, Alternatives Analysis.

We are of the position that alternative actions other than a No Project alternative are not currently feasible without an amendment to the agreement with the State. Agency and public comments in response to the DEIS, as well as additional information generated as a result of inquiry into issues raised by the comments, have been helpful in identifying alternative actions that will serve the State’s goal of providing additional marina slips for the Kona area. These alternative actions also serve to reduce or mitigate anticipated effects of the proposed development.

Thus, agencies such as the Land Division of the Department of Land and Natural Resources, the U.S. Department of the Interior Fish and Wildlife Division, and the Planning Department of the County of Hawai‘i, the Office of Environmental Quality Control (OEQC), as well as community organizations, have commented that a reduced scale marina and related facilities should be considered. The OEQC has also asked that the alternative of a reduced scale project be evaluated under the assumption that DHHL may determine that a downsized project would be preferred.

In response to these comments on the DEIS and in consideration of measures to mitigate anticipated impacts, Section 2, Alternatives Analysis, has been revised to describe the following alternatives.

- Alternative 1 is a project involving a 400-slip marina, 400 hotel units, 1,100 time share units, and commercial and support facilities. This alternative would enhance water quality and avoid the need to widen the existing harbor entrance channel, as well as reduce traffic and socioeconomic impacts.

- Alternative 2 is an alternative that had been previously discussed, but not included in the proposed project that includes an 800-slip harbor and a golf course.

- Alternative 3 is the no-action alternative.

A comparison between impacts related to the proposed project concept and impacts related to Alternative 1 indicates that a reduction in the acreage and number of slips in the marina, as well as the reduction in hotel and timeshare units, would generate less environmental, traffic, social, and economic impacts. Although positive economic impacts would be reduced, Alternative 1 can be considered as a preferable alternative because of reduced environmental impacts. However, while it can be concluded that the 25-acre marina in Alternative 1 would be the preferred size, the DLNR agreement establishes the size of the marina at 45 acres and 800 slips. An amendment to the DLNR agreement is required in order to allow Alternative 1 to proceed. Hence, selection of Alternative 1 is an unresolved issue at this time. The additional EIS text that includes the added EIS Section 2, Alternative Analysis, is contained in Attachment 1 of this letter.

To ensure that Kona Kai Ola is consistent with this new Kona CDP transit oriented plan, Alternative 1 was prepared and includes the Kuakini Highway as part of this proposed frontage road and transit line from Kailua-Kona to the Kealakehe area, along with a transit stop at Kona Kai Ola. The Alternative 1 plan also includes a road that could be extended to be part of the proposed frontage road should it be approved and implemented.

Page 1, Paragraph 5

We have added the following text to Section 4.5.4.2, Issues Related to Project Scale and "Growth-Generating" Nature:

> Issues related to population growth are not unique to Kona Kai Ola. In 2002 and 2005, the Hawai`i Tourism Authority (HTA) included small "West Hawai'i" samples in its statewide "Survey of Resident Sentiments on Tourism in Hawai'i." Critical issues included cost of housing and traffic, followed by population growing too fast. The survey also found that almost everything – with the exception of availability of jobs – was more likely to be considered a "big problem" in 2005 than in 2002. The West Hawai'i results were similar to those from most other parts of the state.
>
> The survey also found an erosion from 2002 to 2005 in West Hawai'i resident support for tourism growth, belief in the overall benefits of tourism, although a majority still did feel tourism had brought more benefits than problems, and particularly in the need for more tourism jobs. Based on even earlier statewide survey results, the 2005 HTA report noted that resident support for expanded tourism employment is cyclical – it shrinks when tourism is strong (as at present) and then expands again when tourism has down times.
>
> In addition to the results shown in these two exhibits, the 2005 survey included a number of other questions. Several dealing with local government performance indicated a frustration with infrastructure overload from recent growth:

- 66% of West Hawai`i residents said government had done a "poor job" of building new infrastructure to keep up with growth in resident and visitor population.
- 45% gave government "poor" marks (vs. just 32% "good," and the rest unsure) for planning and controlling tourism-related growth.
- 40% said "poor" (vs. 20% "good") for balancing the economic benefits from tourism against the need to control problems caused by tourism.

Thus, it appears that much of the negative sentiment toward tourism growth may be rooted in the current perception of infrastructure overload.

Page 2, Paragraph 1

We acknowledge your statements regarding project impacts related to environmental and cultural resources south of Honokohau Harbor, although we note that the DEIS did not state that "all terrestrial and aquatic life south of the Harbor entrance will die off." Rather, the DEIS presented information stating that harbor construction would cause an increase in salinity in the anchialine pools makai of the proposed marina basin to become equivalent to the ocean at 35 ppt. and that the anchialine biology would then perish.

In response to DEIS comments and to further study the pools south of the entrance channel of Honokohau Harbor, a second study was conducted by David Chai of Aquatic Research Management and Design, in June 2007. The second survey focused on intensive diurnal and nocturnal biological surveys and limited water quality analysis of the southern group of anchialine pools exclusively. The report is contained in Appendix H-2 of the EIS and is summarized in EIS Sections 3.9.2.1 and 3.9.2.2. In addition, further comment on the groundwater hydrology effects on anchialine pools was prepared by Waimea Water Services and is contained in Appendix G-3 of the EIS.

The DEIS identified 22 anchialine pools. Further studies determined that three of these pools are actually part of an estuary complex with direct connection to the ocean. Of the 19 anchialine pools, six were considered high tide pools (exposed only at medium or high tide), seven were considered pool complexes (individual pools at low tide and interconnected at high tide), and six were single isolated pools. Of the 19 anchialine pools, three pools with a combined surface area of 20 m^2 would be eliminated due to the harbor construction.

The additional studies indicate that the remaining pools may not increase in salinity to levels unhealthy for anchialine pool fauna. Waimea Water Services found that harbor construction would cut off some of the fresher ground-water flow. However, predicting the extent of change in flow is difficult, if not impossible, even with numerous boreholes and intense sampling. The tides alone create a mixing system that increases salinity, as the flow approaches the point of discharge which will be either the channel or the shore. Another factor that could influence groundwater quality is the increased local recharge from irrigation between the channel and shore. This will add fresh water to the lens locall, but is not quantified at this time. Hence, the additional studies found that changes in groundwater quality may or may not impact biological communities in the anchialine and estuarine environment.

In either case, the developer is committed to practicing good stewardship over the pools to be preserved and eliminating or reducing alien species to the extent practical. The developer recognizes it is important to understand these relationships to effectively manage the resource. If there is significant deviation from the baseline, especially in regard to nutrients, pathogens, and toxins, a mitigation plan to determine the cause and take decisive appropriate action will be implemented.

Mitigation measures to facilitate the long term health of the remaining anchialine pools will be based on environmental monitoring. Mitigation would include measures to adjust salinity of the pools if they experience salinity levels unhealthy to 'opae 'ula and other fauna. These measures are described in detail in Section 3.9.2, Anchialine Pools. The additional EIS text that includes the added EIS Section 3.9.2, Anchialine Pools, is contained in Attachment 2 of this letter.

Page 2, Paragraph 2

In response to DEIS comments, a Harbor Water Quality Modeling Study was conducted to assess impacts of the project on harbor and nearshore waters. A three dimensional hydrodynamic and water quality model of Honokohau Harbor and its surrounding waters was developed using the Delft3D modeling suite. The model was driven at its offshore boundaries by tidal predictions, and calibrated to reproduce available measurements of water levels, currents, salinity ,and temperature.

The water quality model was applied to predict the post-project conditions after the addition of the Kona Kai Ola Marina. Per the Conceptual Master Plan, the marina consists of a 45 acre marina basin with 800 boat slips. Brackish groundwater inflows into the new marina basin were bracketed between 0 mgd and 60 mgd. The two simulated extremes represent scenarios where no additional brackish groundwater will be intercepted by the new marina, which is not consistent with the observed conditions, and when brackish groundwater inflow into the new marina is twice the amount that will be still flowing into the existing marina, respectively.

The model results demonstrated, relative to the increased area, that water quality within the proposed 45-acre marina basin system could not be maintained. Inflow of brackish groundwater to the new marina was found to be fundamental to the flushing and water quality of the proposed system. However, even for the largest simulated inflow of 60 additional mgd entering the new marina, water quality was still degraded post-expansion. This is primarily due to the fact that the proposed marina basin has five times the volume of the existing harbor. In addition, the geometry of the system led to internal circulation between the existing harbor and new marina basin. The 45-acre new marina basin only becomes viable from a water quality impact standpoint if the additional brackish groundwater inflow into the new marina exceeds 60 mgd.

Alternative 1, on the other hand, could maintain the flushing and water quality, as observed under existing conditions, where investigated. It was found that the reduction of the volume of the new marina basin by 45 percent significantly improved the flushing and water quality.

Page 2, Paragraphs 3 to 8; Page 3, Paragraph 1

We disagree with your interpretation of HRS Section 171-60 (a)(1)(C). That section provides only that the Board is to determine the uses proposed for the land that is the subject of the development agreement and to assure that such uses shall be in conformity with "applicable" state, county, zoning, and subdivision laws. The subsection cited does not contain language

that the uses must be in conformity with then "existing" laws or ordinances as your letter adds and suggests.

It is first recognized that HRS Section 171-60(a) provides in pertinent part that DLNR can "enter into a development agreement with a private developer or developers, for development and subdivision of the lands..."

Review of other subsections in this statute confirms the intent that the development agreement will anticipate and require the resulting development to comply with appropriate requirements. As in the case of the subject development agreement, Kona Kai Ola is not allowed to occur until necessary zoning and land use approvals are in place. To interpret the statute otherwise would require the State to obtain all zoning approvals, development permits, subdivision approval, etc., before entering into a development agreement. That is clearly inconsistent with the intent of the statute to allow the State to enter into such development agreements in order to require a developer to obtain such approvals for the uses that are prescribed and approved by DLNR.

Page 3, Paragraphs 1 and 2

We disagree with your comment that the traffic study "proves that the planned infrastructure improvements . . . will not mitigate increased traffic caused by the proposed project." The proposed improvements will mitigate project-generated traffic while improving roadway conditions on a regional level.

In Phase 1 of the project, JDI will not only provide access to the commercial parcel, but also address regional traffic issues through the improvements of the roadway system. JDI plans to improve the intersection of the Queen Ka'ahumanu Highway and the Kealakehe WWTP Access Road. The Kealakehe WWTP Access Road is planned to be realigned and widened to an 80-foot road right-of-way (ROW) that will serve the Commercial Parcel No. 1 and eventually intersect with the proposed Kuakini Highway Extension to the west. Such improvements will ensure that the project minimizes its own impacts while improving existing conditions. Further, with development of Kona Kai Ola, the Kuakini Highway extension road is anticipated to be built on a more accelerated schedule than would occur without the Kona Kai Ola project.

Page 3, Paragraph 3

Kona Kai Ola will increase public access to the property and enhance the public experience on these lands. Community-oriented features include various water features such as seawater lagoons with a marine wildlife park and a marine science center, a yacht club, fishing club, a canoe park, and a cultural park with a focus on Hawaiian maritime cultural heritage of the voyaging canoe. The coastal area would be protected with a shoreline park with trails and public access parking for walking and shoreline fishing, and a cultural park surrounding the heiau, the cultural sites and 'Alula for community use. Additional project community areas would include facilities and space for community use, including programs of the Kona Kai Ola Community Foundation, which supports community programs in health care, culture, education, and employment training for the local community, especially to native Hawaiians. Hence, public interest will be served through the development of the Kona Kai Ola project.

Page 3, Paragraph 4

Increasing public access to environmental and cultural resources is supported by the general community and this value is reflected in public policy. Public education regarding

environmental stewardship is an effective way to increase awareness and knowledge about these resources.

Page 3, Paragraphs 5 and 6

The use of pumping seawater into lagoons and as the source for seawater air conditioning is not unprecedented. These proposals are based on proven technology and environmentally sound principles.

Page 3, Paragraph 7

The Leadership in Energy and Environmental Design (LEED) Green Building Rating System is the nationally accepted benchmark for the design, construction, and operation of high performance green buildings. LEED gives building developers and operators the tools they need to have an immediate and measurable impact on their buildings' performance. It encourages developers to find innovative ways to protect and enhance the environment and is not "irrelevant."

Page 3, Paragraphs 8 and 9

The EIS does not state that the proposed project will provide additional homes for the Department of Hawaiian Home Lands (DHHL). However, revenues generated by the lease of the land for Kona Kai Ola will help to fund needed infrastructure to support DHHL development.

We have no comment regarding a DHHL land exchange.

Page 4, Paragraphs 1 to 7

The 2007 anchialine pool study notes that various scientists have measured groundwater nutrient concentrations from undeveloped sites in West Hawaii. The study found that average salinity in Kealakehe pools is relatively high at 13.5 ppt compared to most other pools along the West Hawai'i coastline, having an average of approximately 7 ppt. This high salinity appears to be characteristic of this region, and is similar to the average of most pools within the adjacent ahupua'a of Honokohau and Kaloko. The levels of nitrate-nitrogen levels are relatively high compared to other undeveloped areas, but fall in the range of some developed landscapes. Other water quality parameters, including pH and temperature, fall into normal ranges for anchialine pools. Further study of water quality in anchialine pools will be conducted as part of the mitigation plan to facilitate the long term health of the anchialine pools.

The nature of non-point source pollution in nearshore marine waters is that the source is not identifiably distinct, but comprises a combination of sources. An intensive non-point source management program is essential to maintaining water quality within the new system which is highly phosphorous limited. These sources include but are not limited to:

- Landscaping (fertilizers)
- Detergents from household and development use
- Other uses.

The anecdotal statements in the Cultural Impact Study and the findings of studies on anchialine pools need to be understood in a comprehensive context, but it is inappropriate to combine them in one study as they have distinct purposes.

Extensive water quality studies have been conducted for this EIS and do not conclude that degradation is inevitable.

Page 4, Paragraph 8 and 9

The Cultural Impact Study identifies Alula Bay as a cultural resource, and the EIS notes that kupuna and hula halau from the neighboring region also use 'Alula beach regularly for the cultural practices of a cleansing ceremony called "hiu wai." The Kona Kai Ola project includes a 400-foot setback, or buffer zone, along the entire length of the project's shoreline. Improvements within this buffer zone will be limited to lateral shoreline public trails, mauka-makai access trails from the project site, and cultural or environmental-related improvements relating to existing features within the buffer zone. No buildings or structures shall be proposed within the 400-foot shoreline setback area, with the possible exception of culturally-related structures. Alula Bay will therefore be protected in Kona Kai Ola.

Page 4, Paragraph 10

The Archaeological Impact Study recommends that specific plans for preservation and maintenance of the burial features at five sites would be detailed in a Burial Treatment Plan prepared for DLNR-SHPD and the Hawai'i Island Burial Council (HIBC) review and approval.

Page 5, Paragraphs 1 and 2

The desire to "Keep Kona Kona" is one facet of community input in interviews conducted in the Social Impact Assessment. As noted in Section 4.5.4.2, issues related to project scale and "growth generating" nature, interviewees were divided on whether to accept an urban future for Kona.

The EIS summarizes the compatibility concerns of Kaloko-Honokohau National Historic Park in Section 4.5.4.3, Project Compatibility with Existing and Emerging Community. This section was revised to expand discussion on compatibility issues, as follows:

> There is a general sense that the Park's intended experience for both visitors and Native Hawaiian cultural practitioners assumes a certain solitude. This concern is not just related to Kona Kai Ola but also various other projects that will surround the Park with urban activities. Kaloko-Honokohau National Historical Park is situated in the middle of the major urban growth corridor of Kailua-Kona, as identified in the Kona Community Development Plan. Compatibility of this urban growth adjacent to the park can be achieved through careful planning to prevent negative impacts on water quality, air quality, noise levels, and light levels at night, and other areas of concern to the Kaloko-Honokohau National Historical Park. In addition, areas within the legislative boundary of the National Historical Park that are located on part of the project site, can be managed in a compatible manner through a cooperative arrangement with the National Historical Park to ensure proper consultation and coordination for any management measures taken with the cultural sites and anchialine pools located along the shoreline. The 400-foot setback along the shoreline protects these National Historical Park resources in a cultural park that has a priority purpose of protection of these important cultural resources of structures and anchialine pools. A related concern is that staff resources could be overwhelmed with higher than expected visitation rates.

Page 5, Paragraph 3

Please refer to our response on how Kona Kai Ola is consistent with the Final Themes of the Kona Community Development Plan.

Page 6, Paragraph 4

We acknowledge your concern regarding boat traffic and note that subsequent analysis was conducted to explore alternatives that would lessen impacts related to boat traffic. As discussed on page 3 of this letter, one of the alternatives considered is the reduction of the marina to 25 acres with 400 slips. Section 4.8.2, Marina Boat Traffic, Anticipated Impacts and Proposed Mitigation, has been revised to present a comparison of boat traffic impacts between the proposed project and Alternative 1:

> In response to DEIS comments, the sensitivity of boat traffic to size of marina expansion was analyzed for Alternative 1, which features a 400-slip marina. The reduction of the marina from 800 to 400 slips results in a 21 percent reduction in boat traffic congestion under average existing conditions and ten percent during peak existing conditions. The LOS improves from E to D during average existing traffic condition, although remains at E during peak conditions

Your comment letter and this response are included in the Final Environmental Impact Statement. We appreciate your participation in the environmental review process. Please submit a request to our office if you would like to receive a printed or electronic copy of the Final Environmental Impact Statement, or portions thereof.

Sincerely,

Dayan Vithanage, P.E., PhD.
Director of Engineering

cc: Office of Environmental Quality Control
State Department of Hawaiian Homelands
Jacoby Development, Inc.

Attachment 1

2 Alternatives Analysis

~~In typical land development projects, the initial planning process includes the exploration of alternatives to development objectives. In the EIS process, these alternatives are presented with a disclosure of reasons for the dismissal of non-preferred alternatives.~~

~~Kona Kai Ola does not follow this same pattern of alternatives evaluation.~~ As discussed in Section 1.4, the proposed Kona Kai Ola project is the result of agreements between JDI and the State DLNR and DHHL. The agreements and leases between the State and JDI stipulate the parameters of development for this site in terms of uses, quantities and size of many features, resulting in a limited range of land uses. Unlike a private property project, JDI is required to meet the criteria outlined in the agreements, thereby affording less flexibility in options and uses. From the developer's perspective, the agreements must also provide sufficient flexibility to allow for a development product that responds to market needs and provides a reasonable rate of return on the private investment.

The agreements between JDI and DLNR specify that the proposed harbor basin is to be 45 acres and accommodate 800 slips. This development proposal is the subject of this EIS. In response to DEIS comments, additional water quality studies and modeling were conducted. These studies determined that the water circulation in a 45-acre 800-slip marina would be insufficient to maintain the required standard of water quality. The models of water circulation suggest that a new 25-acre harbor basin could successfully maintain required water quality in the new harbor. Comments on the DEIS from DLNR, from other government agencies, the neighbors and the general community also called for the consideration of alternatives in the EIS, including a project with a smaller harbor basin and less density of hotel and time-share units.

In response to these comments on the DEIS, three alternatives are evaluated in this Final EIS and include Alternative 1, which is a plan with a 25-acre 400-slip harbor basin including a decrease in hotel and time-share units; Alternative 2, which is an alternative that had been previously discussed but not included in the proposed project, that includes an 800-slip harbor and a golf course; and Alternative 3, the no-project alternative. Each alternative is included in the EIS with an evaluation of their potential impacts. These project alternatives are presented to compare the levels of impacts and mitigation measures of the proposed project and alternative development schemes pursuant to requirements set forth in Chapter 343, HRS.

~~JDI is required to provide a new marina basin not less than 45 acres and a minimum of 800 new boat slips. Further, the agreements provide the following options for land uses at the project site:~~

- ~~Golf Course~~
- ~~Retail Commercial Facilities~~
- ~~Hotel Development Parcels~~
- ~~Marina Development Parcels~~
- ~~Community Benefit Development Parcels~~

~~JDI is not pursuing the golf course option and is proposing instead to create various water features throughout the project site. All other optional uses have been incorporated in Kona Kai Ola.~~

2.1 Project Alternatives

2.1.1 Alternative 1: 400-Slip Marina

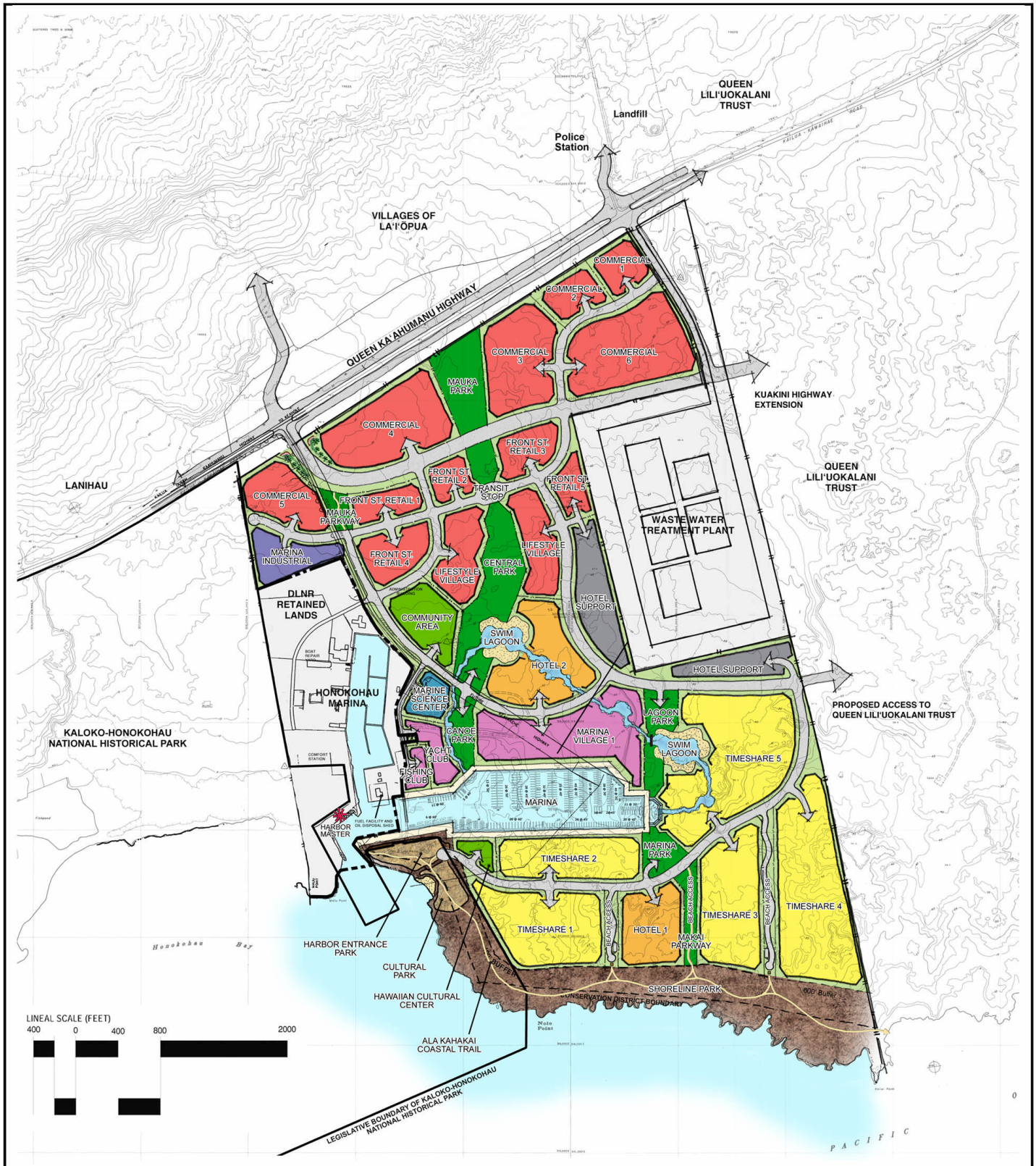
Studies conducted in response to DEIS comments found the construction and operation of an 800-slip marina may significantly impact the water quality within the marina and along the shoreline. Specifically, the Harbor Water Quality Modeling Study, as contained in Appendix U, found that the water circulation in a 45-acre 800-slip harbor was insufficient to maintain an acceptable level of water quality. Further, the existing harbor channel, which would serve both the existing and new harbors, could not adequately serve the increased boat traffic generated by an 800-slip marina during peak traffic. Mitigation measures to accommodate peak boat traffic included the widening of the existing channel, an action that would entail a complex process of Federal and State approvals and encounter significant environmental concern.

Concerns related to the proposed density of hotel and time-share units were also expressed in comments to the DEIS from members of the public, neighbors to the project site, especially the Kaniohale Community Association, and government agencies. Common themes in DEIS comments were related to impacts regarding traffic, project requirements of potable water and infrastructure systems, including sewer, drainage, utility and solid waste systems, and socioeconomic impacts.

In response to the water quality study results, and to the DEIS comments, an alternative plan was developed with a smaller marina with less boat slips, and a related decrease in hotel and time share units. Illustrated in Figure G, Alternative 1 reflects this lesser density project, and features a 400-slip marina encompassing 25 acres. For the purposes of the Alternative 1 analysis, JDI assumed 1,100 time-share units and 400 hotel rooms. Project components include:

- 400 hotel units on 34 acres
- 1,100 time-share units on 106 acres
- 143 acres of commercial uses
- 11 acres of marina support facilities
- 214 acres of parks, roads, open spaces, swim lagoons and community use areas

In addition, Alternative 1 would include the construction of a new intersection of Kealakehe Parkway with Queen Ka'ahumanu Highway, and the extension of Kealakehe Parkway to join Kuakini Highway to cross the lands of Queen Lili'uokalani Trust, and connecting with Kuakini Highway in Kailua-Kona. This is a significant off-site infrastructure improvement and is included in the agreements between the State and JDI.



Source: PBR HAWAII

Plan is conceptual only and subject to change

Figure G: Alternative 1: 400-Slip Marina

LEGEND

- TIME SHARE
- HOTEL
- RETAIL / COMMERCIAL
- MARINA RETAIL
- MARINA SUPPORT / COMMERCIAL
- MARINE SCIENCE CENTER
- COMMUNITY AREA / CULTURAL CENTER
- SWIM LAGOON
- MARINA
- UTILITIES
- PARKS & GREEN SPACE
- SHORELINE
- HARBOR ENTRANCE PARK / CULTURAL PARK

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Like the proposed project, Alternative 1 would have a strong ocean orientation, and project components that support this theme would include various water features including seawater lagoons and a marine science center. The new Alternative 1 harbor would include a yacht club, fishing club, a canoe park, and a cultural park with a focus on Hawaiian maritime cultural heritage of the voyaging canoe. The coastal area would be protected with a shoreline park with trails and public access parking for walking and shoreline fishing, and a cultural park surrounding the heiau, the cultural sites and 'Alula for community use. Additional Alternative 1 community areas would include facilities and space for community use, including programs of the Kona Kai Ola Community Foundation, which supports community programs in health care, culture, education, and employment training for the local community, especially to native Hawaiians. Like the original proposed plan, Alternative 1 includes 40 percent of the land in parks, roads, open spaces, swim lagoons and community use areas.

2.1.2 Alternative 2: Golf Course Feature

Alternative 2 was among the alternatives discussed at a community charrette in September 2003. It includes a golf course, which is a permitted use in the DLNR agreement and DHHL lease. As Figure H illustrates, an 18-hole championship golf course would occupy 222 acres on the southern portion of the project site. As with the proposed project, Alternative 2 includes an 800-slip marina on a minimum of 45 acres.

To support the economic viability of the project, other Alternative 2 uses include:

- Golf course clubhouse on three acres
- 1,570 visitor units on 88 acres fronting the marina
- 118 acres of commercial uses
- 23 acres of community uses

Community uses in Alternative 2 include an amphitheater, a canoe facilities park, a community health center, a Hawaiian cultural center and fishing village, a marine science center and employment training center. The sea water lagoon features contained in the proposed project and Alternative 1 are not included in this alternative.

2.1.3 Alternative 3: No Action

In Alternative 3, the project site would be left vacant, and the proposed marina, hotel and time-share facilities, commercial and marina industrial complexes, and community-oriented uses would not be realized.

~~The economic viability and sustainability of the project is determined by the density and uses proposed. Because JDI is obligated to develop an 800-slip marina for the State, complete road improvements, and provide various public enhancement features at its own expense, the density proposed for the income generating features of the development must be sufficient to provide an acceptable level of economic return for JDI. The market study, which is discussed in Section 4.6, reviewed various development schemes and determined that the currently proposed density and mix is the optimum to meet the anticipated financing and development cost obligations for the public features associated with the development.~~

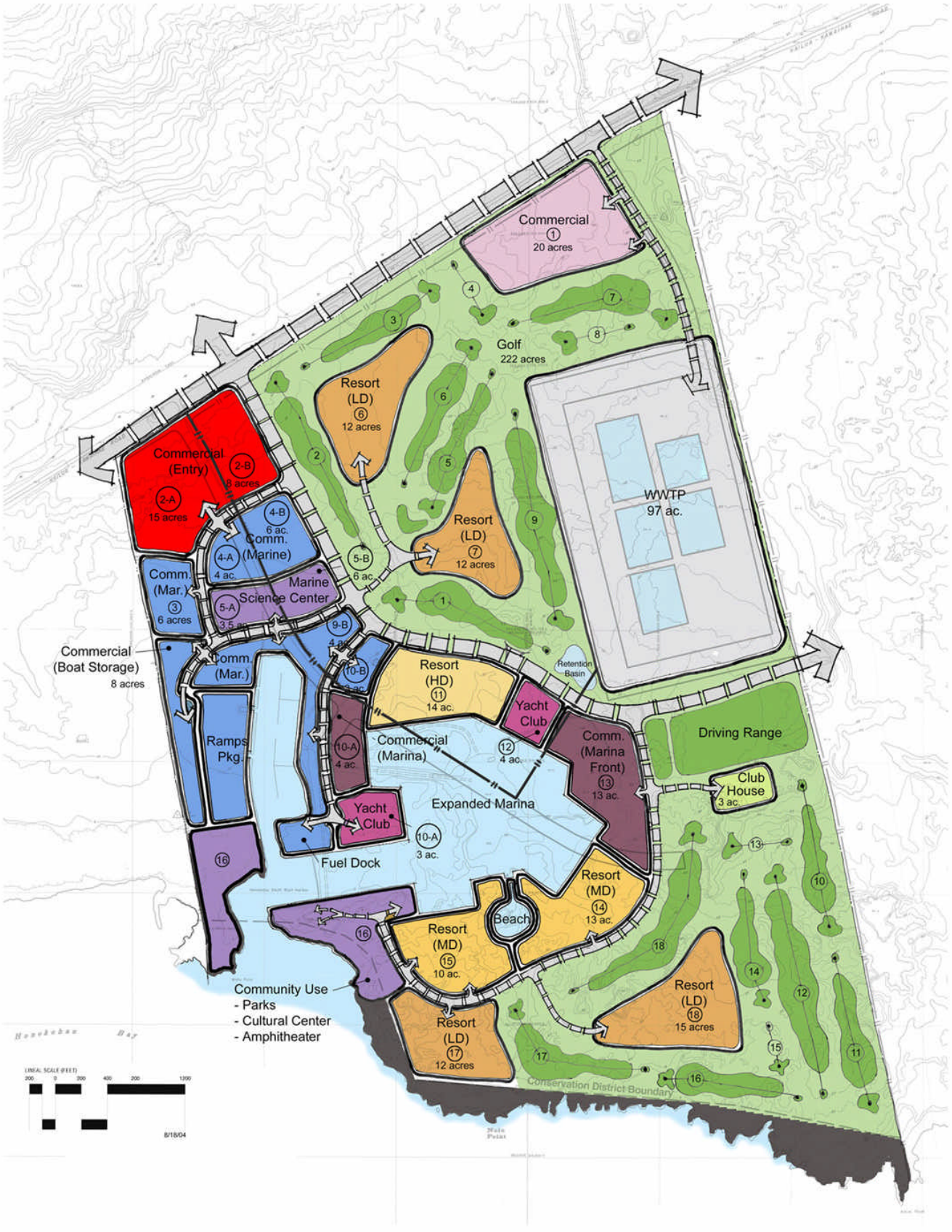

Figure H. Alternative 2: Golf Course Alternative

Legend

N E S W

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2.2 Alternatives Analysis

As discussed in Section 2.1, the proposed Kona Kai Ola project (also referred to as "proposed project") is defined by development requirements related for a marina and the related uses that would be needed to generate a reasonable rate of return that covers development costs.

Beginning with Section 2.2.1, the alternative development concepts are comparatively assessed for potential impacts that may reasonably be expected to result from each alternative. Following is an overview of the primary observations of such assessment.

Alternative 1 includes half of the State-required boat slips and 60 percent of the proposed hotel and time-share units and, due to the decreased density, this alternative would generate significantly less environmental and socio-economic impacts. A harbor water quality model found the reduction of the volume of the new marina basin by about half (approximately 25 acres) significantly improved the water circulation and quality. Further, the reduced number of boat slips would generate less boat traffic, thereby reducing congestion and the need to mitigate impacts further by the widening of the existing harbor channel.

A project with fewer hotel and time-share units and increased commercial space with a longer (14 years) absorption period would change the mix of employment offered by the project, and slightly increase the overall employment count. The public costs/benefits associated with Alternative 1 would change, compared to the proposed project, with a general increase in tax collections, and a general decrease in per capita costs. Detailed discussion of Alternative 1 potential economic impacts are provided in Section 4.6.6. Comparisons of levels of impact are presented throughout this FEIS.

While this analysis might indicate that the 25-acre marina in Alternative 1 would be the more prudent choice, the DLNR agreement establishes the minimum size and slip capacity of the marina at 45 acres and 800 slips, respectively. Amendments to the DLNR agreement would be required in order to allow Alternative 1 to proceed as the preferred alternative. Hence, selection of the preferred alternative is an unresolved issue at the writing of this FEIS.

Alternative 2, the golf course alternative, was not previously considered to be the preferred alternative primarily because market conditions at the time of project development might not likely support another golf course. Further, DHHL has a strategy goal to have more revenue-generating activities on the commercial lease lands within the project area. In addition, concerns have been expressed as to environmental impacts of coastal golf courses, including the potential adverse impact on Kona's water supply if potable water is used for golf course irrigation.

While Alternative 3, the no-project alternative, would not generate adverse impacts related to development of these lands associated with the construction and long-term operations, it would also not allow for an expanded public marina that would meet public need and generate income for the public sector. Further, the no-project alternative would foreclose the opportunity to create a master-planned State-initiated development that would result in increased tax revenue, recreation options and community facilities. Crucial privately-funded improvements, such as the marina, regional roadway and circulation improvements, and improvements to the existing wastewater treatment plant, would not be implemented. Private funds toward the development of community-oriented facilities such as parks, other recreational facilities, and public access would not be contributed.

~~Hence, the only valid alternative to the proposed project is the no-action alternative. In this alternative, the project site would be left vacant, and the proposed marina, hotel and time-share facilities, commercial and marina industrial complexes, and community-oriented uses would not be realized.~~

~~The no-project alternative would therefore not generate adverse impacts associated with the construction and long-term operations would not occur.~~

~~Likewise, the creation of a master-planned state-initiated development, resulting in increased employment, tax revenue, recreation options and community facilities, would not be created. Privately-funded improvements, such as the marina, regional roadway and circulation improvements, and improvements to the existing wastewater treatment plant, would not be implemented. Private funds toward the development of community-oriented facilities such as parks, other recreational facilities and public access would not be contributed.~~

Further, the creation of revenue-producing businesses on the DHHL property to fund homestead programs would not occur, resulting in fewer potential benefits for Hawaiians.

Hence, the agreements and leases between the State and JDI indicate that the no-action alternative is not in the public interest~~has been rejected at this time~~.

2.2.1 Impact Comparison

Grading and Excavation

The proposed project requires grading and excavation. Both actions may impact groundwater due to rainfall runoff during construction. Alternative 1 would require a significantly smaller excavation for the marina basin and would therefore carry a lesser risk of potential adverse effects on water quality. Alternative 2 would require the same basin excavation as the proposed project, and would also include extensive grading and filling to build the golf course, the latter of which would generate additional impacts. Alternative 3 would result in no change to the geography, topography and geology.

Further discussion on grading and excavation is contained in Section 3.3.

Natural Drainage

Most precipitation infiltrates into the porous ground at the site, and no significant sheet flow is likely. Alternative 1 would generate similar levels of impacts on natural drainage as those of the proposed project and thus require similar mitigation measures. The golf course in Alternative 2 would not be as porous since the site would be graded, soil would be placed, and grass and other landscaping would be grown. Sheet flow and runoff can occur on a golf course, and drainage patterns might change. Alternative 3 would result in no change to the existing natural drainage pattern. Further discussion on natural drainage is contained in Section 3.4.

Air Quality

Air quality will be affected by construction activities, as well as pollutants from vehicular, industrial, natural, and agricultural sources. Alternative 1 would generate less construction air quality impacts than the proposed project due to the reduced amount of intensive groundwork associated with the smaller marina basin and fewer long-term impacts by reducing traffic 35 and 40 percent during, respectively, AM and PM peak traffic times. Construction of Alternative 2 would result in fugitive dust and exhaust from equipment and is expected to generate the same level of air quality impact as the proposed project. Alternative 3 would result in no change to existing air quality. Further discussion on air quality is contained in Section 3.5.

Terrestrial Environment

To provide additional habitat for shorebirds and some visiting seabirds, the project proposes to construct a brackishwater pond area suitable for avian fauna, including stilts, coots and ducks. While habitat expansion is beneficial, there is also a possibility that these species may be exposed to activity that may harm them. Alternative 1 would not include a brackish water pond, but will include 5 acres of seawater features, which is 74 percent less than the 19 acres of seawater features in the proposed project. While this would reduce beneficial impacts, it would also decrease exposure to potentially harmful activity. Alternative 2 does not include the brackish water pond features, but would include drainage retention basins that would attract avian fauna and expose them to chemicals used to maintain golf course landscaping. While Alternative 3 would result in no increase in potentially harmful activity, it would also not provide additional habitat for avian fauna. Further discussion on the terrestrial environment is contained in Section 3.7.

Groundwater

Groundwater at the project site occurs as a thin basal brackish water lens. It is influenced by tides and varies in flow direction and salt content. The existing Honokōhau Harbor acts as a drainage point for local groundwater. Any impact to groundwater flow from the proposed harbor is likely to be localized. The proposed marina basin will not result in any significant increase in groundwater flow to the coastline, but rather a concentration and redirection of the existing flows to the harbor entrance.

There will be differences in the flow to the marina entrance between the proposed project and Alternative 1. Alternative 1, being smaller in size, will have less impact on groundwater flow than the proposed marina. Alternative 2 will have a similar impact to groundwater quality as the proposed project. Alternative 2 may also impact water quality by contributing nutrients and biocides to the groundwater from the golf course. Alternative 3 would result in no change in existing groundwater conditions. Further discussion on groundwater is contained in Section 3.8.1.

Surface Water

There are no significant natural freshwater streams or ponds at the site, but there are brackish anchialine pools. Surface water at the project site will be influenced by rainfall. Runoff typically percolates rapidly through the permeable ground. The proposed project will include some impermeable surfaces, which together with building roofs, will change runoff and seepage patterns.

Alternative 1 is a lower density project that is expected to have proportionally less impact on surface water and runoff patterns and less potential impact on water quality than the proposed project. Alternative 2 would have more impact on surface water quality than the proposed project due to fertilizers and biocides carried by runoff from the golf course. Alternative 3 would result in no change to surface water conditions. Further discussion on surface water is contained in Section 3.8.2.

Nearshore Environment and Coastal Waters

The potential adverse impacts to the marine environment from the proposed project are due to the construction of an 800-slip marina and the resulting inflow of higher salinity seawater and inadequate water circulation, both of which are anticipated to impair water quality to the extent of falling below applicable standards. One possible mitigation measure is to significantly reduce the size of the marina expansion.

The reduced marina size (from 45 to 25 acres) and reduced lagoon acreage in Alternative 1 are expected to result in a proportionate reduction in seawater discharging into the new harbor and increased water circulation. Alternative 2 includes the same marina basin size and is therefore subject to the same factors that are expected to adversely affect water quality.

In the existing Honokōhau Harbor, water quality issues focus on the potential for pollutants, sediments, mixing and discharge into the nearshore marine waters. Before the harbor was constructed, any pollutants entrained within the groundwater were believed to have been diffused over a broad coastline.

The water quality in the proposed harbor depends on several components. These include salinity, nutrients, and sediments that come from the ocean, rainfall runoff, water features with marine animals, and dust. The smaller project offered as Alternative 1 is expected to produce a reduced amount of pollutants and reduce the risk of adverse impact upon water quality.

It is notable that the 45-acre marina basin planned in the proposed project and Alternative 2 only becomes viable from a water quality impact standpoint if the additional brackish groundwater inflow into the new marina exceeds 60 mgd. The resulting flushing from such inflow would be expected to better maintain water quality. However, it is unclear whether 60 mgd of brackish groundwater would be available. As proposed in Alternative 1, reduction of the volume of the new marina basin by 45 percent will significantly improve the flushing and water quality because the lower volume can be flushed by the available groundwater flow.

In addition, there could be higher rainfall runoff from the Alternative 2 golf course into the harbor, because the grassed golf course will be less porous than the natural surface. The golf course will also require relatively high levels of fertilizer, biocides, and irrigation, all of which could contribute to adverse water quality impacts.

Further discussion on nearshore environment and coastal waters is contained in Section 3.9.1.

Anchialine Pools

Anchialine pools are located north of Honokōhau Harbor, and south of the harbor on the project site. The marine life in these pools is sensitive to groundwater quality, and changes due to construction and operation of the project could degrade the viability of the pool ecosystem. In the southern complex, 3 anchialine pools with a combined surface area of $20m^2$ would be eliminated due to the harbor construction in the proposed project and Alternatives 1 and 2.

Predicting the extent of change in groundwater flow is difficult if not impossible even with numerous boreholes and intense sampling. The actual flow of groundwater towards the sea is minimal today, and tidal measurements show that tide fluctuations represent more than 90 percent in actual harbor tides. The fluctuations occur simultaneous with the ocean/harbor tide, which indicate a vertical and horizontal pressure regime between bore hole 6 and the ocean and harbor. Hence, the tides alone create a mixing system that increases salinity, as the flow approaches the point of discharge which will be either the channel or the shore. Another factor that could influence groundwater quality is the increased local recharge from irrigation between the channel and shore. This will add fresh water to the lens locally but is not quantified at this time.

Quantification of these impacts, including the flow of groundwater through each pond, is therefore extremely difficult. The shallow lavas are of the pahoehoe type and have a relatively high horizontal permeability. In surface depressions or undulations, the pahoehoe lavas have a tendency to lose vertical permeability from sedimentation thus restricting water exchange within the individual pools. This is normally reflected in both the salinity and temperature and this information has been adequately studied in the pools.

Changes in groundwater quality may or may not impact biological communities in the anchialine and estuarine environment. In either case, it is important to understand these relationships to effectively manage the resource. If there is significant deviation from the baseline especially in regard to nutrients, pathogens, and toxins, a mitigation plan to determine the cause and take decisive appropriate action will be implemented.

Due to the uncertainty of changes in groundwater flow and quality due to marina construction, the variability in impacts between the proposed project and Alternatives 1 and 2 is unknown at this time. Alternative 3 would result in no change in groundwater flow. While this would eliminate the potential for adverse impacts, Alternative 3 would also continue the pattern of existing degradation related to human activity and the introduction of alien species. Further discussion on anchialine pools is contained in Section 3.9.2.

Marine Fishing Impacts

The proposed marina will increase the number of boats in the area and it is reasonable to assume that a portion of these new boats will engage in fishing activities. The increase in boats in the area would be primarily related to the marlin and tuna / pelagic fishery, coral reefs due to extractive fisheries, and SCUBA activities. The pressure on fish and invertebrate stocks is expected to increase with or without the marina. Harbor expansion provides the opportunity to address existing conditions to consolidate, focus, and fund management and enforcement activities at one location.

Compared to the proposed project, Alternative 1 would result in a 21 percent decrease in boat traffic, thereby lessening the potential for marine fishing impacts. The level of impacts in Alternative 2 would be similar to that of the proposed project. Alternative 3 would result in no change in existing marine fishing conditions, and no opportunity to address already existing pressure on fish and invertebrate stocks. Further discussion on marine fishing impacts is contained in Section 3.9.3.

Cultural and Archaeological Resources

The proposed project will integrate cultural and archaeological resources in the overall development. Archaeological sites recommended for preservation will be preserved, and cultural practices will be encouraged. Kona Kai Ola includes a canoe park, and a cultural park with a focus on Hawaiian maritime cultural heritage of the voyaging canoe. Proposed is a 400-foot shoreline setback that would serve as a buffer between the ocean and developed areas. This coastal area would be protected with a shoreline park with trails and public access parking for walking and shoreline fishing, and a cultural park surrounding the heiau, the cultural sites and ʻAlula for community use.

Alternative 1 would contain all of the cultural archaeological features and the shoreline setback area would be 400 feet in the northern portion of the site and increase to 600 feet in the southern portion. Alternative 2 would preserve cultural and archaeological resources, but does not include a 400-foot shoreline setback. Alternative 3 would result in no change to existing cultural and archaeological resources and no addition of cultural and community facilities and activities. Further discussion on cultural and archaeological resources is contained in, respectively, Sections 4.1 and 4.2.

Noise

Project-generated noise is due to construction equipment and blasting, boats, marina activities, vehicle traffic, and the Kealakehe Wastewater Treatment Plant operations. Alternative 1 would generate less noise impacts due to reduced construction activities, fewer boats, less traffic and less on-site activity. Alternative 2 would also generate less noise due to reduced traffic and less on-site activity, but noise related to the excavation of the marina basin and an increase in the number of boats would be similar to that of the proposed project. Further discussion on noise impacts is presented in Section 4.4.

Socioeconomic Impacts

The proposed project will generate an increase in de facto population of an estimated 5,321 persons due to the increase in hotel and time-share units. The estimated de facto population increase in Alternative 1 is 37 percent less, at 3,363 persons, than the proposed project. The de facto population increase in Alternative 2 is similar to Alternative 1.

Employment in the commercial components will nearly double in Alternative 1, from a stabilized level of 1,429 full-time equivalent (FTE) positions in the proposed project to 2,740 in the Alternative 1.

Under Alternative 1, the total operating economic activity at Kona Kai Ola will increase due to the added commercial space more than off-setting the fewer visitor units, moving upward from $557.6 million per year to circa $814.3 million annually. The total base economic impact resulting from development and operation of Alternative 1 will similarly be higher by between 35 and 45 percent than that of the proposed project.

Alternative 1, which has a reduced marina size of 25 acres, and fewer hotel and time-share units, would have a meaningful market standing, create significant economic opportunities, and provide a net benefit to State and County revenues. From a market perspective, a smaller Kona Kai Ola would still be the only mixed use community in the Keahole to Kailua-Kona Corridor offering competitive hotel and time-share product.

The estimated absorption periods for marketable components of Alternative 1 are generally shorter than those for the same components in the proposed project. Marina slips under Alternative 1 are estimated to be absorbed within 2 years after groundbreaking, as compared with 9 years for absorption of slips in the proposed project. Hotel rooms under Alternative 1 are estimated to be absorbed within 4 years after groundbreaking, as compared with 7 years under the proposed project. Time-share units would be absorbed within 10 years under Alternative 1, while 15 years are projected under the proposed project. Due to the planned increase in commercial facilities under Alternative 1, the absorption period of commercial space is estimated at 14 years, as compared with 8 years for absorption of such facilities under the proposed project.

The State and County will still both receive a net benefit (tax receipts relative to public expenditures) annually on a stabilized basis under the Alternative 1. The County net benefits will be some $12.2 million per year under the Alternative 1 versus $14.9 million under the proposed project. The State net benefits will increase under the Alternative 1 to about $37.5 million annually, up substantially from the $11.4 million in the proposed project.

Due to the lower de facto population at build-out, the effective stabilized public costs for both the State and County will decline meaningfully under the Alternative 1, dropping from $7.7 million annually for the County and $36.5 million for the State, to $4.9 million and $23 million per year, respectively.

Alternative 3 would result in no increase in de facto population and improvement to economic conditions. Further discussion on social and economic impacts are contained in, respectively, Sections 4.5 and 4.6.

Vehicular Traffic

The proposed project will impact the nearby road network that currently is congested during peak traffic times. The proposed project includes roadway improvements that would reduce the impact and improve roadway conditions for the regional community.

Alternative 1 includes the same roadway system improvements as the proposed project, yet would reduce vehicular traffic by 35 percent when compared to the proposed project. Alternative 2 would have similar traffic conditions and roadway improvements as Alternative 1. Alternative 3 would result in no increase in traffic and no roadway improvements.

Marina Traffic Study

The increase in boat traffic due to the proposed 800-slip marina would cause entrance channel congestion during varying combinations of existing and new marina peak traffic flow. Worst case conditions of active sport fishing weekend and summer holiday recreational traffic result in traffic volumes exceeding capacity over a short afternoon period. Mitigation to address boat traffic in the proposed project include widening the entrance channel, traffic control, implementation of a permanent traffic control tower, or limiting vessel size.

Alternative 1 would result in a 21 percent reduction in boat traffic congestion under average existing conditions and ten percent reduction during peak existing conditions. The reduction to 400 slips also reduces the impacts of congestion at the entrance channel, thereby reducing the need for any modifications to the entrance channel.

Alternative 2 would have the same level of boat traffic as the proposed project. Alternative 3 would not meet the demand for additional boat slips and would not generate additional boat traffic. Further discussion on marina traffic is contained in Section 4.8.

Police, Fire and Medical Services

The proposed project will impact police, fire and medical services due to an increase in de facto population and increased on-site activity. Alternatives 1 and 2 would have similar levels of impact as the proposed project due to increased on-site activity. Further discussion on police, fire and medical services are contained, respectively, in Sections 4.10.1, 4.10.2 and 4.10.3.

Drainage and Storm Water Facilities

The proposed project will increase drainage flows, quantities, velocities, erosion, and sediment runoff.

Alternative 1 involves a reduction of the project density that would reduce storm runoff from the various land uses due to a reduction in impervious surfaces associated with hotel and time-share development and to the creation of more open space. However, roadway areas will increase by about 30 percent in Alternative 1. Storm runoff from proposed streets would therefore increase; thus requiring additional drainage facilities and possibly resulting in no net savings. The golf course in Alternative 2 may also change drainage characteristics from those of the proposed project and may not reduce impacts. Alternative 3 would result in no change in existing conditions and no improvements to drainage infrastructure. Further discussion on drainage and storm water facilities is contained in Section 4.10.5

Wastewater Facilities

The proposed development is located within the service area of the Kealakehe WWTP and a sewer system will be installed that connects to the WWTP. The sewer system will be comprised of a network of gravity sewers, force mains, and pumping stations which collect and convey wastewater to the existing Kealakehe WWTP. Project improvements will incorporate the usage of recycled / R1 water. Improvements implemented by the proposed project will also accommodate the needs of the regional service population.

Alternative 1 would generate approximately 10 percent less wastewater flow than the proposed project. Wastewater flow in Alternative 2 is undetermined. Alternative 3 would result in no additional flow, as well as no improvements that will benefit the regional community. Further discussion on wastewater facilities is contained in Section 4.10.6.

Potable Water Facilities

The proposed project average daily water demand is estimated at 1.76 million gallons per day. Existing County sources are not adequate to meet this demand and source development is required. The developer is working with DLNR and two wells have been identified that will produce a sustainable yield that will serve the project. These wells will also serve water needs beyond the project.

Alternative 1 would result in net decrease of about five percent of potable water demand. Alternative 2 may have a lower water demand than the proposed project as long as potable water is not used for irrigation. Alternative 3 would result in no additional flow, as well as no source development that will benefit the regional community. Further discussion on potable water facilities is contained in Section 4.10.8.

Energy and Communications

Regarding Alternative 1, preliminary estimates for electrical, telecommunications, and cable resulted in a net demand load that remains similar to the proposed project. Further discussion on energy and communications is contained in Section 4.10.9.1.

The proposed project will increase the demand for electrical energy and telecommunications. The demand would be reduced in Alternative 1 because the number of boat slips and units would decrease. Similarly, Alternative 2 would have fewer units than the proposed project and therefore reduce energy demands. Further reduction in energy demand for either alternative could be achieved by using seawater air conditioning (SWAC) and other energy reduction measures, as planned by the developer. Further discussion on energy and telecommunications is contained in Section 4.10.9.2.

Water Features and Lagoons

The proposed project includes a brackishwater pond, lagoons, and marine life exhibits supplied by clean seawater. The water features in Alternative 1 would significantly decrease by 74 percent from 19 acres in the proposed project to five acres in Alternative 1. This decrease in water features would result in a corresponding decrease in water source requirements and seawater discharge. Alternative 2 does not include the seawater features. Alternative 3 would result in no additional demand for water source requirements and seawater discharge.

2.2.2 Conformance with Public Plans and Policies

State of Hawai'i

Chapter 343, Hawai'i Revised Statutes

Compliance with this chapter is effected, as described in Section 5.1.1 in regard to the proposed project and the alternatives discussed.

- State Land Use Law, Chapter 205, Hawai'i Revised Statutes

  The discussion in Section 5.1.2 is directly applicable to Alternative 1, the proposed project. Alternative 1 will involve a setback of 400 feet that increases to 600 feet along the southern portion of the project site's shoreline area. Alternative 2 does not provide for such a setback, but may still require approvals from DLNR for cultural, recreational, and community uses and structures within the Conservation district.

- Coastal Zone Management Program, Chapter 205A, Hawai'i Revised Statutes

  Recreational Resources:

  In addition to the discussion of consistency with the associated objective and policies, as described in Section 5.1.3, the reduction from the proposed project's 800-slip marina to a 400-slip marina under Alternative 1 will still expand the region's boating opportunities and support facilities. The existing harbor entrance will still be utilized under this alternative; however, potential risks relating to boat traffic and congestion in the marina entrance area will be reduced significantly. The 400-600 foot shoreline setback, public parks, trails, cultural areas, community facilities, and marine science center remain important recreational components under Alternative 1.

Alternative 2 includes a golf course component, which would add a more passive recreation to the active and social components, such as boating, fishing, swimming, trails, walkways, parks, marine life, educational and interactive areas that are also part of the project. The golf course would enhance the range of leisure and recreational opportunities offered at Kona Kai Ola.

Alternative 2, like the proposed project, will expand the region's boating opportunities and support facilities through its 800-slip marina. However, the potential adverse impacts of increased boat traffic from the size of the marina are significant enough to offset the benefits of increased boating opportunities.

Coastal Ecosystems:

The discussion in Section 5.1.3 is directly applicable to Alternative 1.

Alternative 1 not only reduces the number of slips proposed by 50 percent, but it also reduces the size of the marina from 45 acres to 25 acres. The 25-acre marina will increase the body of water within the existing harbor, but to a significantly lesser extent than the proposed project's estimated increase, which is also applicable to the 45-acre size that is proposed for the marina under Alternative 2.

The findings of the Harbor Water Quality Modeling Study conclude that a reduction in the size of the harbor expansion is an alternative that will mitigate the risk of significant impacts upon water quality within the marina and existing harbor. Accordingly, the reduction in both the number of slips and the size of the marina basin under Alternative 1, in combination with proper facilities design, public education, and enforcement of harbor rules and regulations, would result in fewer long-term impacts to water quality and coastal ecosystems. Short-term (construction-related) impacts would likely remain the same although the reduction in the total acreage of excavation is expected to result in a shorter duration of such impacts.

In addition to its 800-slip marina and potential adverse impacts upon water quality and the marine environment, Alternative 2 includes a golf course component, which has the potential to impact coastal ecosystems by increasing the nutrient loading in surface runoff and groundwater and also by introducing pesticides, herbicides, and other chemicals common in golf course use and management into the nearshore waters surrounding the project site.

Economic Uses

Although reduced in the number of slips, the smaller marina under Alternative 1 will nevertheless serve public demand for more boating facilities in West Hawai'i and is consistent with the objective and policies and discussion set forth in Section 5.1.3. The economic impacts of Alternative 2, while comparable to those of the proposed project's marina development, are notably marginal as to the golf course component, based on the marketability analysis that indicates a condition of saturation within the region.

Coastal Hazards

The discussion and considerations set forth in Section 5.1.3 are also applicable to Alternatives 1 and 2 and indicate compliance with the objective and policies addressed. Tsunami risks mainly affect the large shoreline setback area that is proposed for the project and Alternative 1. Alternative 2 projects a transient accommodation site that is partially within the tsunami hazard zone and thus carries a higher hazard risk. However, the essential requirement for these alternatives, as well as the proposed project, is a well-prepared and properly implemented evacuation plan.

Beach Protection

Discussion and considerations set forth in Section 5.1.3 are also applicable to Alternatives 1 and 2 and indicate compliance with the objective and policies addressed. Alternative 1 and, to a lesser extent, Alternative 2, will retain the shoreline area in its natural condition.

Similar to the proposed project, Alternative 1 provides for a shoreline setback of considerable width within which no structure, except for possible culturally-related structures, would be allowed. Alternatives 1 and 2 will thus be designed to avoid erosion of structures and minimize interference with natural shoreline processes.

Marine Resources

The discussion in Section 5.1.3 is also applicable to Alternative 1 which is described to be an alternative that is specifically projected to mitigate anticipated adverse impacts on water quality and the marine environment that might otherwise result from the original harbor design and scale, which is also incorporated in Alternative 2 . The reduced marina size under Alternative 1 is projected to meet water quality standards and enable greater compliance with the objective and policies addressed in this section.

Alternative 2 includes a golf course component and thus the potential to adversely impact marine resources by increasing the nutrient loading in surface runoff and groundwater and also by introducing pesticides, herbicides, and other chemicals common in golf course use and management into the nearshore waters surrounding the project site.

Hawai'i State Plans, Chapter 226, Hawai'i Revised Statutes

Section 226-4 (State goals), 5 (Objectives and policies for population, and 6 (Objective and policies for economy in general):

The discussion in Section 5.1.4 is applicable to Alternatives 1 and 2, in addition to the proposed project. These development concepts generally conform to the goals, objectives, and policies set forth in these sections because they will provide some degree of economic viability, stability, and sustainability for future generations. Kona Kai Ola will convert essentially vacant land into a mixed-use development with a distinctive marina and boating element, providing a wide range of recreational, business, and employment opportunities to the community.

Section 226-8 Objective and policies for the economy – the visitor industry:

Alternatives 1 and 2 will be consistent with the State's economic objective and policies relating to the tourism industry for the same reasons that are discussed in regard to the proposed project in Section 5.1.4. They will incorporate JDI's commitment to sustainability principles in the planning and design of the development concepts in Alternatives 1 and 2. Although the total hotel and time-share unit count is reduced to approximately 1,500 in Alternatives 1 and 2, the transient accommodations component of these alternatives will still further the State's objective and policies for increased visitor industry employment opportunities and training, foster better visitor understanding of Hawai'i's cultural values, and contribute to the synergism of this mixed-use project concept that addresses the needs of the neighboring community, as well as the visitor industry.

Section 226-11 Objectives and policies for the physical environment: land-based, shoreline and marine resources:

Alternative 1 is expected to involve less potential adverse impacts upon these environmental resources than the proposed project. Likewise, and Alternative 2 would have less adverse impact because of its reduction in the size of the marina and in the total hotel and time-share unit count. Alternative 1 carries less potential risk to water quality and related impacts upon the marine environment and anchialine pool ecosystems. Although approximately three anchialine pools are expected to be destroyed, the great majority of pools will be preserved within and outside of the proposed 400-foot shoreline setback.

The golf course component in Alternative 2 has the potential to impact marine resources by increasing the nutrient loading in surface runoff and groundwater and also by introducing pesticides, herbicides, and other chemicals common in golf course use and management into the marina basin and nearshore waters surrounding the project site. It also has the potential to adversely affect the anchialine pools by introducing the chemicals into the pond systems.

Section 226-12 Objective and policies for the physical environment: scenic, natural beauty, and historic resources:

The discussion in Section 5.1.4 is directly applicable to Alternative 1 and describes the compliance with the objective and policies addressed.

The golf course component of Alternative 2 would create a park-like view that would potentially enhance the beauty of the project site and surrounding areas when considered in combination with the existing rugged natural beauty of the area.

Just as with the proposed project, Alternatives 1 and 2 would also be designed to blend with the natural terrain and to honor and protect the cultural history, resources, and practices of these lands.

Section 226-13 Objectives and policies for the physical environment: land, air and water quality:

As stated above, because of the reduction in both the number of slips and the size of the marina basin, with proper facilities design, public education and enforcement of harbor rules and regulations, Alternative 1 is anticipated to cause fewer long-term impacts to water quality than either the proposed project or Alternative 2. Based on the findings of the Harbor Water Quality Modeling Study, water quality resulting from a reduced marina basin size as proposed under Alternative 1 is expected to be similar to existing conditions.

As previously noted, Alternative 2 has the potential to adversely impact water quality by increasing the nutrient loading in surface runoff and groundwater by introducing pesticides, herbicides and other chemicals common in golf course development and maintenance into the marina basin and nearshore waters surrounding the project site.

Section 226-14 Objectives and policies for facility systems - general:

Alternatives 1 and 2 will conform to the objective and policies of this section on the grounds that are discussed in regard to the proposed project in Section 5.1.4. The master-planning and phasing of the project concepts under these alternatives will be coordinated with associated public and private infrastructural planning and related private and public infrastructural financing. The cost of the marina construction and project-related infrastructure is to be borne by the developer, resulting in considerable savings for the public. In addition, the projected lease revenue from these public lands will provide additional public benefits by establishing a revenue stream for capital improvements and maintenance of a range of State facilities.

Section 226-15 Objectives and policies for facility systems - solid and liquid wastes:

In addition to the developer's commitment to sustainable development design, the project will involve upgrades to the County of Hawai'i's Kealakehe Wastewater Treatment Plant to meet current needs, as well as the project's future needs. This commitment is applicable to Alternatives 1 and 2, as well as the proposed project that is discussed in Section 5.1.4.

Section 226-16 Objectives and policies for facility systems – water:

The discussion of water conservation methods and the need to secure additional potable water sources in Section 5.1.4 is also applicable to Alternative 1 and demonstrates conformity to the objective and policies for water facilities. Alternative 2 involves greater irrigation demands in regard to its golf course component and greater potable water demands for human consumption than those for Alternative 1. Alternative 2 is expected to face more serious challenges in securing adequate and reliable sources of water.

Section 229-17 Objectives and policies for facility systems – transportation:

Alternatives 1 and 2 will conform to this objective and policies because they will present water transportation opportunities, including the possible use of transit water shuttles to Kailua-Kona, as described in regard to the proposed project in Section 5.1.4.

Section 226-18 Objectives and policies for facility systems – energy:

Alternatives 1 and 2 conform to these objective and policies through the use of energy efficient design and technology and commitment to the use and production of renewable energy to serve the project's needs. Solar energy production, solar hot water heating, and the use of deep cold seawater for cooling systems are currently identified as means of saving substantial electrical energy costs for the community and the developer.

Section 226-23 Objectives and policies for socio-cultural advancement – leisure:

Alternative 1 conforms to this objective and related policies for the reasons offered in Section 5.1.4 in regard to the proposed project. Alternative 1 will be of greater conformity with the policy regarding access to significant natural and cultural resources in light of the 400-600 foot shoreline setback that has been designed for this alternative.

Although it does not propose the considerable shoreline setback that is planned for Alternative 1, Alternative 2 is consistent with this objective and related policies in incorporating opportunities for shoreline-oriented activities, such as the walking trails. In addition, the golf course component adds a more passive recreation alternative to the active and social components, such as boating, fishing, swimming, trails, walkways, parks, marine life educational and interactive areas that are also part of the project. The golf course would enhance the range of leisure and recreational opportunities offered at Kona Kai Ola.

Section 226-25 Objectives and policies for socio-cultural advancement-culture:

The discussion in Section 5.1.4 is relevant to Alternatives 1 and 2 and demonstrate their conformity the objective and policies of this section.

Both alternatives involve the preservation and protection of cultural features that have been identified by the Cultural Impact Assessment and archaeological studies for the project area. Both provide for public shoreline access, and both will continue the policy of close consultation with the local Hawaiian community and cultural and lineal descendants in the planning of cultural resource preservation and protection.

Section 226-103 Economic priority guidelines:

Alternatives 1 and 2 conform to these guidelines for the same reasons that are set forth in Section 5.1.4. They involve private investment in a public project that will create economic diversification through a mix of marina, industrial, commercial, visitor, and cultural facilities. This presents a wide range of entrepreneurial opportunities, long-term employment opportunities, and job training opportunities.

Section 226-104 Population growth and land resources priority guidelines:

As described in Section 5.1.4, the policy support for the proposed project also extends to the similar development concepts considered in Alternatives 1 and 2. Those alternatives conform to the guidelines of this section because they involve an urban development under parameters and within geographical bounds that are supported by the County's General Plan, a preliminary form of the Kona Community Development Plan, the County's Keahole to Kailua Regional Development Plan, and the reality of being located along the primary commercial/industrial corridor between Keahole Airport and Kailua-Kona. As with the proposed project, the development concepts of Alternatives 1 and 2 are essentially alternatives for the implementation and "in-filling" of the urban expansion area in North Kona.

DHHL Hawai'i Island Plan

This 2002 plan projects DHHL's Honokōhau makai lands for commercial use. As compared to the proposed project and Alternative 2, Alternative 1 presents an expanded commercial component that provides greater compliance with the plan, while addressing certain beneficiaries' concerns about the scale of the marina originally required in the Project. Alternative 2 also conforms to the recommended commercial uses in the makai lands but to a lesser degree than Alternative 1 because of its more limited commercial component. Like the proposed project, its marina size and number of slips raise environmental issues, as more specifically discussed in Part 3, and community concerns.

County of Hawai'i General Plan

HCGP Section 4 – Environmental Quality Goals, Policies and Courses of Action:

Alternative 1 is consistent with this section. It presents a reduction in both the number of slips and the size of the marina basin that, in combination with proper facilities design, public education and enforcement of harbor rules and regulations, would result in very few long term impacts to water quality. Based on the findings of the Harbor Water Quality Modeling Study, water quality would remain similar to existing conditions.

Alternative 2 is the least consistent with this section. In addition to the potential significant impacts of its 800 slip marina basin, its golf course component has the potential to adversely impact marine resources by increasing the nutrient loading in surface runoff and groundwater and also by introducing pesticides, herbicides and other chemicals common in golf course use and management into the nearshore waters surrounding the project site. It also has the potential to adversely affect the anchialine pools beyond their current conditions by introducing such substances into the pool systems.

HCGP Section 7 – Natural Beauty Goals and Policies:

Alternative 2 conforms to some degree with this section. Its golf course component would create a park-like view that would potentially enhance the beauty of the project site and surrounding areas when considered in combination with the existing rugged natural beauty of the area, as demonstrated in other makai golf courses within the region.

HCGP Section 8 – Natural Resources and Shoreline:

Alternative 1 is most consistent with the goals and policies of this section. It would require considerably less marina excavation than the proposed project and Alternative 2 and would reduce the potential risk of long-term adverse impacts to water quality. Based on the findings of the Harbor Water Quality Modeling Study, water quality would remain similar to existing conditions with the degree of reduction in marina basin size that is proposed under Alternative 1. This reduction is also expected to reduce potential impacts upon anchialine pools and their ecosytems, as well as shoreline and marine resources that are affected by water quality. Alternative 1 also retains the shoreline preservation and protection concepts that are proposed in and described for the Project.

HCGP Section 10 – Public Facilities Goals and Policies:

The discussion in Section 5.2.1. in relation to the proposed project is applicable to Alternatives 1 and 2. Improvements to public facilities are are integral to the Kona Kai Ola development. The provision of additional boat slips and numerous road improvements, including a makai extension of Kuakini Highway south to Kailua-Kona are incorporated into plans for the project's development. In light of these elements, Alternatives 1 and 2 are consistent with the goals and policies of this section.

HCGP Section 11 – Public Utility Goals, Policies:

As with the proposed project, Alternatives 1 and 2 are consistent with the goals and policies of this section, based on the relevant grounds set forth in Section 5.2.1. The developer is committed to design, fund, and develop environmentally sensitive and energy efficient utility systems to the extent possible, as described previously in Part 5. Its master planning provides for the coordinated development of such systems with the objective of achieving significant savings for the public. As previously-mentioned example, the project development involves the upgrading of the Kealakehe Wastewater Treatment Plant.

HCGP Section 12 – Recreation:

Alternative 1 is consistent with the goals, policies, and courses of action for North Kona in this section.

Although the number of slips is reduced under Alternative 1, the region's boating opportunities and support facilities will still be expanded. The existing marina entrance would still be utilized under this alternative. However, concerns relating to increased activity leading to increased congestion in the marina entrance area would be mitigated to a certain extent. The 400-600 foot shoreline setback, public parks, trails, cultural areas, community facilities and marine science center remain important components of Alternative 1.

The golf course component of Alternative 2 would add a more passive recreation to the active and social components, such as boating, fishing, swimming, trails, walkways, parks, marine life, educational and interactive areas that are also part of the project. The golf course would enhance the range of leisure and recreational opportunities offered at Kona Kai Ola. Alternative 2 is also considered to be consistent with this section.

HCGP Section 13 and 13.2 – Transportation:

The reduced marina component under Alternative 1 will still provide transportation opportunities and provide for possible use of transit water shuttles to Kailua-Kona, although to a lesser degree than under the proposed project and Alternative 2 . However, in each scenario, internal people-movers are planned, and numerous roadway improvements are planned for coordination with public agencies, including but not limited to the construction of the Kuakini Highway extension between Honokōhau and Kailua-Kona. Accordingly, both Alternatives 1 and 2 are consistent with the goals, policies, and courses of action for North Kona under these sections of the General Plan.

HCGP Section 14.3 – Commercial Development:

For the reasons presented in the discussion under Section 226-104 of the State Plan, the planned commercial component under Alternatives 1 and 2 are consistent with this section.

HCGP Section 14.8 – Open Space:

Alternatives 1 and 2 are consistent with the goals and policies of this section. Alternative 1 provides a considerable (400-600 foot) shoreline setback along the entire ocean frontage of the project site as a means of protecting the area's scenic and open space resources, as well as natural and cultural resources. Although it does not incorporate the shoreline setback planned in Alternative 1, Alternative 2 provides a golf course component would contribute to the amount of open space that is currently proposed and allow additional view corridors to be created.

Community Development Plans

Community development plans are being formulated for different regions in the County in order to supplement the County's General Plan. The Kona Kai Ola project is located in the Kona Community Development Plan (CDP) area. Maps associated with the preliminary work phases

of the Kona CDP include the Kona Kai Ola project site within the "Preferred Urban Growth" boundary of the North Kona district. The Kona CDP process is guided by a Steering Committee composed of a broad cross-section of the community. The Steering Committee will eventually complete its work and recommend the CDP's adoption.

After the DEIS was published, the Kona CDP has progressed to the development of plans for the major urban growth corridor north of Kailua-Kona. The Kona CDP has produced a draft plan showing a transit oriented development that includes a midlevel public transit corridor along the mauka residential elevation, and a makai transit corridor that runs along a proposed new frontage road just makai and parallel to Queen Kaahumanu Highway. The development plan for Alternative 1 includes the Kuakini Highway as part of this proposed frontage road and transit line from Kailua Kona to the Kealakehe area, along with a transit stop at Kona Kai Ola. The Alternative 1 plan also includes a road that could be extended to be part of the proposed frontage road should it be approved and implemented. In addition, the Kona CDP has continued to emphasize the principles of smart growth planning with mixed use urban areas where people can live, work, play and learn in the same region. Kona Kai Ola has been specifically designed to be consistent with this policy in order to provide a stable employment base close to where people live in the mauka residential areas already planned for DHHL and HHFDC lands.

It should be noted that currently and over the years, the 1990 Keāhole to Kailua Development Plan (K-to-K Plan) guides land use actions by the public and private sectors. It is intended to carry out the General Plan goals and policies related to the development of the portion of North Kona area, including the Kona Kai Ola site. The "Preferred Growth Plan" of the Keāhole to Kailua Development Plan identifies the project site as a new regional urban center to include commercial, civic, and financial business related uses, an expanded "Harbor Complex," a shoreline road, and a shoreline park. The proposed project and the development concepts in Alternatives 1 and 2 are therefore consistent with the recommendations in the Keāhole to Kailua Development Plan.

Hawai'i County Zoning

As shown on Figure AA, the project site is zoned "Open". Under Section 25-5-160 of the Hawai'i County Code, "The O (Open) district applies to areas that contribute to the general welfare, the full enjoyment, or the economic well-being of open land type use which has been established, or is proposed. The object of this district is to encourage development around it such as a golf course and park, and to protect investments which have been or shall be made in reliance upon the retention of such open type use, to buffer an otherwise incompatible land use or district, to preserve a valuable scenic vista or an area of special historical significance, or to protect and preserve submerged land, fishing ponds, and lakes (natural or artificial tide lands)".

Some of the proposed uses at Kona Kai Ola are permitted uses in the Open zone such as:

- Heiau, historical areas, structures, and monuments;
- Natural features, phenomena, and vistas as tourist attractions;
- Private recreational uses involving no aboveground structure except dressing rooms and comfort stations;

- Public parks;
- Public uses and structures, as permitted under Section 25-4-11.

In addition to those uses permitted outright, the following uses are permitted after issuance of a use permit:

- Yacht harbors and boating facilities; provided that the use, in its entirety, is compatible with the stated purpose of the O district.
- Uses considered directly accessory to the uses permitted in this section shall also be permitted in the O district.

The proposed time-share and hotel units and commercial uses would not be consistent with the zoning designation of "Open". Project implementation therefore requires rezoning of portions of the project to the appropriate zoning category or use permits for certain uses.

Special Management Area

As shown in Figure AB, the entire project area up to the highway is within the coastal zone management zone known as the Special Management Area ("SMA"). At the County level, implementation of the CZM Program is through the review and administering of the SMA permit regulations. Kona Kai Ola complies with and implements the objectives and policies of the Coastal Zone Management (CZM) Program, and a full discussion is provided in Section 5.1.3. The development concepts in the proposed project and Alternatives 1 and 2 will be subject to applicable SMA rules and regulations.

Attachment 2

The conditions with the project constructed were found to be phosphorous limited. Several simulations were performed including and excluding the inflow from the marine exhibits which provides an additional nitrogen load and also varying the location of this inflow. It was found that the inflow from the marine exhibits can have a beneficial effect on flushing, especially when positioned within the existing harbor basin. However, its effect is significantly less than the effect due to the brackish groundwater inflow. When the exhibit inflow is excluded or positioned at the east end of the new marina, its effect is small in terms of flushing due to its high salinity. From a water quality perspective, since the loads from the exhibit inflow consist primarily of nitrogen, it does not cause increased algae growth. However, this exhibit inflow does raise the concentrations of ammonia and nitrate in the system.

Simulation results indicate that under the conditions when the post-expansion system receives an additional brackish inflow into the new 25-acre marina on the order of 30 mgd or more, water quality within the harbor system and in the surrounding waters remained similar to existing conditions. These conditions are expected to occur based on the findings reported by Waimea Water Services (2007), which states that the proposed marina would exhibit the same or similar flushing action as the existing marina.

An additional mitigation measure proposed by Waimea Water Services (2007), if sufficient inflow is not intercepted, consists of drilling holes in the bottom of the new marina to enhance this inflow and facilitate flushing within the proposed system.

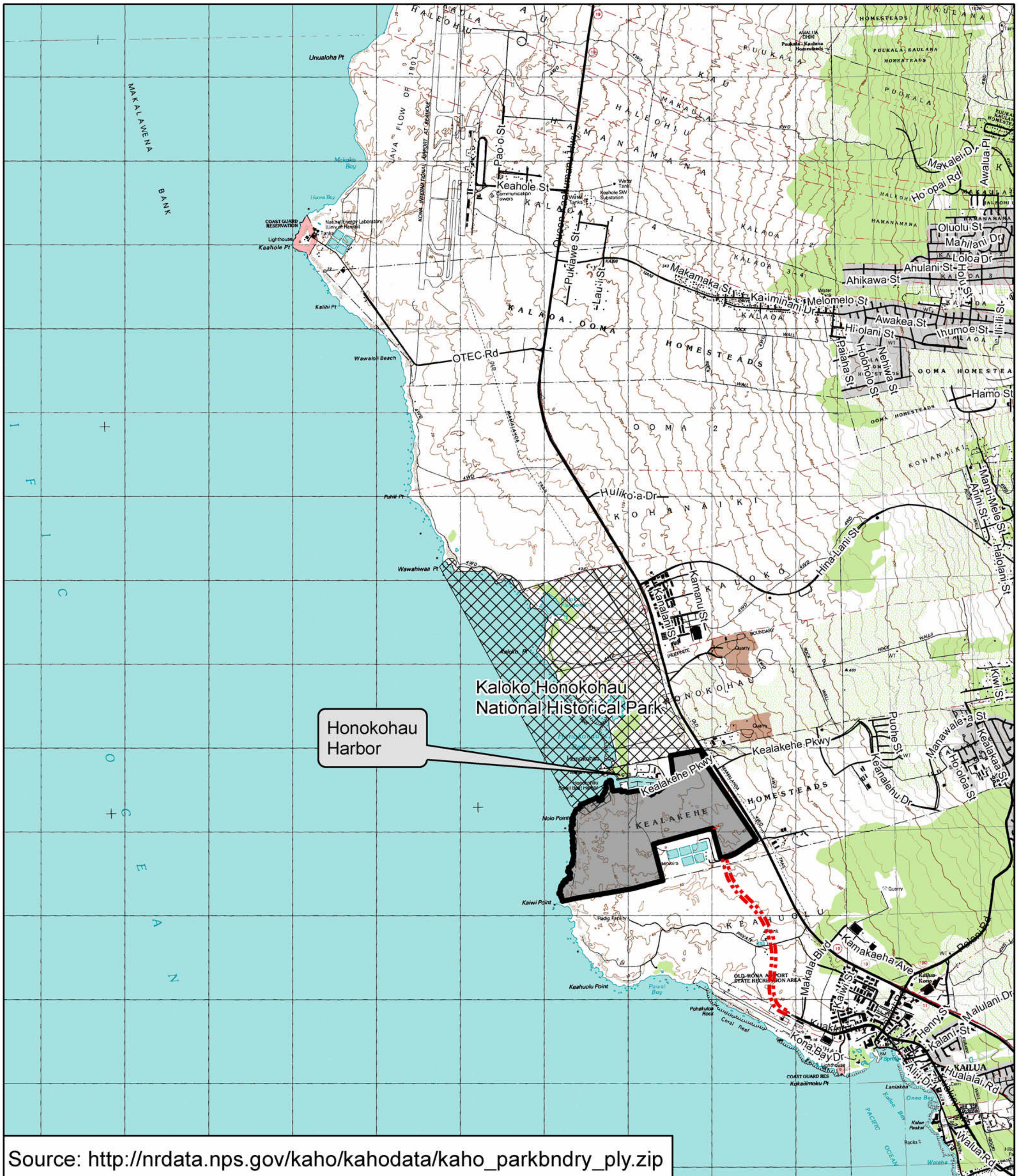
~~3.9.3~~3.9.2 Anchialine ~~Ponds~~ Pools

Two studies on anchialine pools were conducted in this EIS process. The anchialine ~~ponds~~ pools water quality studies and ~~biota surveys were conducted by David A. Ziemann, Ph.D. of the Oceanic Institute and is~~biota surveys were conducted by David A. Ziemann, Ph.D. of the Oceanic Institute in October 2006 and are included as Appendix ~~G~~H-1. That survey included pools located both north and south of Honokōhau Harbor. In response to DEIS comments and to further study the pools south of entrance channel of Honokōhau Harbor, a second study was conducted by David Chai of Aquatic Research Management and Design in June 2007. The second survey focused on intensive diurnal and nocturnal biological surveys and limited water quality analysis of the southern group of anchialine pools exclusively. The report is contained in Appendix H-2.

~~3.9.3.1~~3.9.2.1 Existing Conditions

Anchialine ~~ponds~~ pools exist in inland lava depressions near the ocean. Two anchialine ~~pond~~ pool complexes are located immediately to the north and south of the Honokōhau Harbor entrance channel. The complex to the north is located wholly within the designated boundaries of the Kaloko-Honokōhau National Historical Park as shown in Figure Q~~O~~. Many of the ~~ponds~~ pools in the southern complex are within the park administrative boundary as well. ~~Ponds~~ Pools in the northern complex show little evidence of anthropogenic impacts. Many contain typical vegetation and crustacean species in high abundance.

Figure R locates anchialine pools near the harbor entrance and pools~~Ponds~~ in the southern complex are depicted in Figure S.



Source: http://nrdata.nps.gov/kaho/kahodata/kaho_parkbndry_ply.zip

Figure Q: National Historical Park Service Legislative Boundary Map

Legend

- Project Site
- Proposed Parkway
- National Park Boundary

N W E S

0 2,500 5,000 Feet

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innovation through engineering & scientific excellence

JDI
JACOBY DEVELOPMENT, INC.

Source: Oceanic Institute

Figure R: Anchialine Pool Locations

N
W E
S

0 2,000 4,000 Feet

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Source: Aquatic Resources Management And Design

Figure S: Anchialine Pool Locations in Southern Complex

N
W
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JACOBY DEVELOPMENT, INC.

The 2006 study identified 22 pools in the southern complex. The 2007 study found that three of the 22 pools are part of an estuary complex with direct connection to the ocean. While there were several signs of direct human use and disturbance, such as trash receptacles and toilet facilities, the greatest degradation to the majority of the anchialine and estuarine resources was due to the presence of alien fish, including topminnows and tilapia, and introduced plants, predominantly pickleweed and mangrove. ~~are moderately to heavily impacted, with many containing exotic fish that exclude the anchialine crustaceans. The ponds also show evidence of human impact, including discarded bottles, cans, wrappers, diapers, toilet paper, etc. Water quality conditions within the ponds generally reflect the conditions of the underlying groundwater.~~

~~Figure P locates anchialine ponds near the harbor entrance. The study conducted as a part of this EIS show that the anchialine ponds south of the harbor entrance are moderately to heavily impacted by human activities and introduced fish populations. The study found that the nitrogen phosphorus concentrations in these ponds are significantly higher compared to the ponds north of the harbor entrance. The sources of these additional nutrients are not known. Continuous influx of nutrients will eventually degrade the water quality to levels that could alter the pond ecology.~~

Biota surveys in the two pond systems clearly indicate that counts of typical pond denizens show a remarkable difference between the northern and southern ~~ponds~~ pools. In the northern ~~ponds~~ pools the number of *Halocaridina rubra* ranged from a low of 20–25 to too numerous to count. The biota rich pond bottoms appeared red due to the *Halocaridina rubra* numbers. The only other species visible was the predatory shrimp *Metabetaeus lohena*. In contrast, only four out of the 22 ~~ponds~~ pools examined in the southern pond complex showed a decreased presence of *Halocaridina rubra* (6 to 200) individuals in the pond, and three ~~ponds~~ pools contained *Metabetaeus lohena*. Eight of the ~~ponds~~ pools contained numbers of introduced minnows which is an apparent predator of *Halocaridina rubra* and *Metabetaeus lohena*.

The 2007 study found three of the pools identified in the 2006 study were part of an estuary complex with direct connection to the ocean, and that the southern complex contained 19 anchialine pools. The study further found that a majority of the southern pools are degraded biologically and physically, primarily due to the effects of introduced fish and plant species. Six pools are currently devoid of alien fish, but they face a high level of threat due to the proximity of pools that have these species. Of the 19 anchialine pools, six were considered high tide pools (exposed only at medium or high tide), seven were considered pool complexes (individual pools at low tide and interconnected at high tide), and six were single isolated pools. Of the 19 anchialine pools, three pools with a combined surface area of $20m^2$ would be eliminated due to the harbor construction.

The DEIS presented information stating that harbor construction would cause an increase in salinity in the anchialine pools makai of the proposed marina basin to become equivalent to the ocean at 35 ppt. and that the anchialine biology would then perish. There is currently a level of uncertainty by professional hydrologists as to the exact movement of surface groundwater and final determination of anchialine salinity following the harbor construction. The assessment that all anchialine pools will be barren with the construction of the harbor may be premature. *Halocaridina rubra* (opae ula) are routinely drawn from high salinity wells at 30-32 ppt.

Within the 19 pools, native and non-native fauna included 14 species comprised of 5 fish, 2 mollusca, and 6 crustacea. Algae within the pools primarily consisted of a mixed assemblage of diatoms and cyanobacteria, with several pools dominated by matted filamentous *Cladophora*, sp. The darker cave/overhang pools and high tide pools had epilithic *Hildenbrandia* sp. covering the rock substrate. Riparian vegetation was dominated by introduced species consisting of Pickleweed (*Batis maritima*), Mangrove (*Rhyzophora mangle*), and Christmasberry (*Shinus terebenthifolius*). Only two species of native plants Akulikuli (*Sesuvium portulacastrum*) and Makaloa (*Cyperus laevigatus*) existed near the pools and comprised only few small patches and a single tuft (respectively).

Most of the hypogeal anchialine shrimp have adapted to the presence of minnows by foraging in the pools at night. During daylight hours, only the adult shrimp appear to coexist at low population levels with the smaller *P. reticulata*, but the larger *G. affinis* and *Oreochromis* prevent the daytime appearance of hypogeal shrimp due to predation.

The average salinity in Kealakehe pools is relatively high at 13.5 ppt compared to most other pools along the West Hawai'i coastline, having an average of approximately 7 ppt. This high salinity appears to be characteristic of this region, and is similar to the average of most pools within the adjacent ahupua'a of Honokōhau and Kaloko. The levels of nitrate-nitrogen levels are relatively high compared to other undeveloped areas, but fall in the range of some developed landscapes. Other water quality parameters, including pH and temperature, fall into normal ranges for anchialine pools.

This relatively high salinity is the likely reason aquatic insects were not found in any pools at Kealakehe. Though the rare damselfly *Megalagrion xanthomelas* has been observed and collected from Kaloko, a statewide assessment of its range has not found it to occur in water with salinity greater than 3ppt. However, there has been an unsubstantiated occurrence of the nymph in a pool of up to 8ppt (Polhemus, 1995).

Another species of concern is the hypogeal decapod shrimp *Metabetaeus lohena.* These shrimp are sometimes predatory on *H. rubra* but are more often opportunistic omnivores similar to *H. rubra.* Predusk and nocturnal sampling at high tide is clearly the optimal method to determine habitat range and population densities for this species. These shrimp were found in 13 of the 19 pools, 7 of which had *M. lohena* only at night. The occurrences of *H. rubra* were found in 16 of 19 sampled pools, 8 of which had 'Ōpae'ula observed only at night. Consequently, despite having numerous degraded anchialine resources at Kealakehe, there are opportunities for many of the pools to be restored and enhanced to a level where large populations of anchialine shrimp and other native species may return to inhabit the pools as they likely have in the past.

~~As mentioned earlier, the southern ponds also had elevated concentrations of nutrients indicating water quality degradation. These factors indicate that if no restoration or maintenance activities are instituted to reserve these ponds, these ecosystems will degrade beyond recovery.~~

~~3.9.3.2~~3.9.2.2 Anticipated Impacts and ~~Recommended~~ Proposed Mitigations

The anchialine ~~ponds~~ pools that are located north of the existing harbor are not likely to be impacted because no development activities are proposed north of the existing harbor. It is highly unlikely that existing groundwater flows to the Kaloko-Honokōhau pond system to the north of the existing harbor will be impacted by the proposed marina to the south.

Of the 19 pools in the southern complex, three would be eliminated due to harbor construction. Regarding the remaining pools, the DEIS noted that t~~T~~he change in the local groundwater flow pattern in the vicinity of the proposed marina ~~will~~ would impact the anchialine ~~ponds~~ pools that are located between the proposed marina and the shoreline south of the harbor entrance. The 2006 study (Appendix H-1) noted that t~~T~~he salinity of the anchialine ~~ponds~~ pools ~~will~~ would increase due to reduction of brackish groundwater, and that ~~. Some ponds will be excavated to make the new harbor basin. T~~those ~~ponds~~ pools that are not excavated will revert to full salinity, causing the loss of their habitat. ~~and associated aquatic flora and fauna. However, current investigations indicate that these ponds are already enriched by nutrients and the density of associated aquatic fauna is very low. In addition, trash from visitors, and introduction of minnows has already degraded the pond ecology.~~ Even without the potential impacts from the proposed marina construction, the pond ecology might change irreversibly from the nutrient input, human indifference and expansion of non native fauna species.

Further studies conducted in response to DEIS comments (Appendix H-2, and Appendix G-3) indicate that the remaining pools may not increase in salinity to levels unhealthy for *H. rubra* and *M. lohena* and other anchialine pool fauna. In addition, these studies determined that there are realistic mechanisms employed elsewhere that would mitigate changes due to groundwater changes. Waimea Water Services found that harbor construction would cut off some of the fresher ground-water flow. However, predicting the extent of change in flow is difficult if not impossible even with numerous boreholes and intense sampling. The actual flow of groundwater towards the sea is minimal today, and tidal measurements show that tide fluctuations represent more than 90 percent in actual harbor tides. The fluctuations occur simultaneous with the ocean/harbor tide, which indicate a vertical and horizontal pressure regime between bore hole 6 and the ocean and harbor. Hence, the tides alone create a mixing system that increases salinity, as the flow approaches the point of discharge which will be either the channel or the shore.

Another factor that could influence groundwater quality is the increased local recharge from irrigation between the channel and shore. This will add fresh water to the lens locally but is not quantified at this time.

Quantification of these impacts, including the flow of groundwater through each pond, is extremely difficult. The shallow lavas are of the pahoehoe type and have a relatively high horizontal permeability. In surface depressions or undulations, the pahoehoe lavas have a tendency to lose vertical permeability from sedimentation thus restricting water exchange within the individual pools. This is normally reflected in both the salinity and temperature and this information has been adequately studied in the pools.

Changes in groundwater quality may or may not impact biological communities in the anchialine and estuarine environment. In either case, it is important to understand these relationships to effectively manage the resource. If there is significant deviation from the baseline especially in regard to nutrients, pathogens, and toxins, a mitigation plan to determine the cause and take decisive appropriate action will be implemented. The mitigation plan will be based on the following objectives:

Objective 1 To preserve, maintain, and foster the long-term health and native ecological integrity of anchialine pools at Kealakehe.

Objective 2 To protect and promote cultural practices and traditions surrounding anchialine resources at Kealakehe.

Objective 3 To provide education, interpretation, and interactive opportunities for the community to learn about and appreciate the anchialine resources.

Objective 4 To acquire a pond manager to implement the program, conduct monitoring, research, and reporting, and provide education to the community about anchialine and estuarine resources.

Mitigation measures to facilitate the long-term health of the remaining anchialine pools will be based on environmental monitoring, which is vital as an early warning system to detect potential environmental degradation. A series of quantitative baseline analysis of the physio-chemical and biological components within the project site will provide a standard by which the effects of the development, anthropogenic activities, and natural phenomena on the environment can be measured. The framework for the mitigation plan will include three measures intended to meet these objectives, including bioretention, salinity adjustment and possible new pools.

As a mitigation measure, bioretention, which is a Best Management Practice (BMP) is a feasible application for the proposed development. There is a probability that nutrients and other potential pollutants will runoff landscaping and impermeable surfaces such as roadways and parking lots during medium or high rainfall events. Some of these pollutants could enter the groundwater table and into anchialine pools and ultimately the ocean. As an alternative to directing runoff into the ground through drywells, storm water should be directed into bioretention areas such as constructed surface or subsurface wetlands, vegetated filter strips, grass swales, and planted buffer areas. Storm water held and moved through these living filter systems are essentially stripped of most potential pollutants, and allowed to slowly infiltrate back to the groundwater table.

Bioretention is a Best Management Practice (BMP) that would be a highly appropriate application for the proposed development. Further, BMPs utilized in series may incorporate several storm water treatment mechanisms in a sequence to enhance the treatment of runoff. By combining structural and/or nonstructural treatment methods in series rather than singularly, raises the level and reliability of pollutant removal. Another means to reduce the potential for groundwater contamination is to increase soil depth above the standard in landscaped areas. This will allow chemicals to be held in the soils longer for more complete plant uptake and breakdown of these chemicals by soil microbes. A specific guide for chemical application by landscape maintenance personnel will be a beneficial tool to help avoid contamination of groundwater resources.

Another mitigation measure that may be included in the management plan is salinity adjustment. In the 2006 assessment regarding the impact to the southern pools from the proposed construction of the harbor, it was stated that this construction would cause the salinity in the anchialine pools to become equivalent to the ocean at 35ppt. It was then concluded that the anchialine biology would perish.

However, there is currently a level of uncertainty by professional hydrologists as to the exact movement of surface groundwater and a final determination of anchialine salinity following the harbor construction. The dynamics of groundwater movement through a porous lava medium both seaward and laterally along the coastline is an inexact science. This is compounded by the variations in water density, including stratification of salinity within the proposed harbor and capillary movement of low-density surface water through the substrata.

The assessment that all anchialine pools will be barren with the construction of the harbor may therefore be premature. *H. rubra* are routinely drawn from high salinity wells at 30 – 32 ppt and survive in this salinity for years. Further, high populations *H. rubra* and *M. lohena* have thrived and reproduced in pool salinities of 27ppt. If the pools do become full strength seawater at 35ppt, there exists uncertainty on the long-term effects to anchialine organisms, since there are no long-term studies or examples of native anchialine ecosystems at 35ppt. Native anchialine pool vegetation also has relatively high salinity tolerance.

If the salinity were expected to rise to 35 ppt, possible mitigation in the management plan will include methods to surcharge man-made anchialine pools created adjacent to or in the vicinity of natural pools with low salinity well water. If sufficient volume is used, it is theoretically possible to lower salinity in adjacent natural anchialine pools. This surcharge method has been successfully used to raise salinity in anchialine pools and cause the salinity rise in adjacent pools of at least up to 10 meters away. Surcharging with low salinity should work as well or better since the lower density water will essentially float atop the higher salinity water at the surface layer, and move throughout the complex of natural pools. Surcharging may also be a viable mitigation to dilute and more rapidly disperse any pollutants that may be detected in the pools.

Another mitigation measure includes the creation of new anchialine pools. There is significant opportunity to create new anchialine pools and greatly expand the native habitat and resource. It has been demonstrated at several projects in West Hawai'i that anchialine pools can be created and will be colonized with a full compliment of anchialine species endemic to the area. Anchialine pools are considered focal points of higher productivity relative to the subterranean groundwater habitat around them. Their productivity promotes an increase in population levels of anchialine species within the pools themselves and throughout the subterranean habitat surrounding them.

~~No realistic mechanisms are envisioned for re-injecting fresh water into these systems to maintain their ecological balance as an anchialine system. These ponds will be changed from a brackish water system to a marine system. But, those ponds in the area of the shoreline park and cultural park will be cleaned of vegetation and protected from other physical alteration. A buffer zone around these newly established marine ponds will be protected as well.~~

~~The anchialine pond shrimp (*Metabetaeus lohena)* and the orangeback damsel fly (*Megalagrion xanthomelas)* are listed as candidate endangered species in the Federal Register and were both recorded in surveys of these anchialine ponds done in 2004 by US Geological Survey Biological Resources Division and the NPS Inventory and Monitoring Program. Low numbers of *Metabetaeus lohena* were encountered in three of the 22 ponds surveyed in the southern pond complex. *Megalagrion xanthomelas* was not encountered in any of the southern pond complex ponds during the recent study. The low density of *Metabetaeus lohena* and the observed absence of *Megalagrion xanthomelas* may be due to the impacts from high nutrient input and general degradation of the ponds.~~

~~An attempt should be made to move as much of the existing population of *Metabetaeus lohena* from these anchialine ponds before they become too saline, to possible newly excavated ponds that may be developed off-site. These shrimp should not be introduced into existing populated ponds to avoid any potential pathogenic impacts to the healthy ponds.~~

~~Public education on the unique ecology of the anchialine ponds and the need for preserving their ecology will reduce future human impacts in other healthy ponds.~~

~~Further recommended mitigation includes restoration to degraded anchialine ponds off the project site, preferably those located at the adjacent Kaloko-Honokōhau National Historical Park.~~

Karlton Kau

From: Dayan Vithanage
Sent: Friday, February 09, 2007 11:54 AM
To: Berna Cabacungan; Karlton Kau; Robert Bourke
Subject: FW: Kona Kai Ola DEIS Comment Extension

This person called me before making this request.

Dayan

-----Original Message-----
From: J. C. Tyler III [mailto:jct3kona@hawaii.rr.com]
Sent: Friday, February 09, 2007 10:58 AM
To: Dayan Vithanage
Subject: Kona Kai Ola DEIS Comment Extension

Aloha Dayan,

Thank you for taking my call today regarding submission of my written comments on the subject DEIS.

As I reported to you, Laura Aquino of Current Events suggested I call you directly regarding a request for a brief time extension to submit these comments. I understood from her and, now from you, that such short extensions are being granted on a case-by-case basis, so please consider this email as such a formal request.

I expect to complete my DEIS review by Monday and, since I will be away on business all day Monday, I hope to be able submit my written comments to you by email not later than 2-3 days after that time.

By way of background, I am a Native Hawaiian and lifetime resident of Kona and was a four-term (1996-2004) member of the Hawaii County Council, representing the North Kona District. As then vice chair of the council and planning committee, I had first hand opportunities to meet with Mr. Jacoby and others regarding initial plans for the project. Additionally, I have been invited to participate in and have provided ongoing comment during numerous briefings with project consultants about the ongoing development plans of the project.

I do appreciate your favorable consideration of my request for this brief extension, and I thank you for your consideration.

Curtis

J. Curtis Tyler III

oceanit
innovation through engineering & scientific excellence

February 12, 2007

J. Curtis Tyler III
Email: jct3kona@hawaii.rr.com

Dear Mr. Tyler:

Subject: Kona Kai Ola Draft Environmental Impact Statement (DEIS)

This letter responds to your written request to extend the comment period for the Kona Kai Ola DEIS. I received your letter on February 9, 2007.

The DEIS was published in the Office of Environmental Quality Control Bulletin on December 23, 2006. The 45-day comment period ends on February 6, 2007.

Regarding your request, we will include your comments and our response in the Final EIS if your transmittal is postmarked by February 13, 2007. Please contact me if you would like hard copies or electronic files of the DEIS.

Thank you for your interest in the Kona Kai Ola project, and we look forward to receiving your comments.

Sincerely,

Dayan Vithanage, P.E., PhD.
Director of Engineering

cc: Office of Environmental Quality Control
State Department of Hawaiian Homelands
Jacoby Development, Inc.

Oceanit Center 828 Fort Street Mall, Suite 600 Honolulu, Hawaii 96813 Phone: 808.531.3017 Fax: 808.531.3177
www.oceanit.com

Karlton Kau

From: Diane Aoki [ddkaoki@mac.com]
Sent: Sunday, February 04, 2007 3:08 PM
To: condra@jacobydevelopment.com
Cc: konakaiola
Subject: Kona Kai Ola public comment

Dear Mr. Condra,
I am a fourth grade teacher at Kealakehe Elementary School and care deeply about the impacts that the Kona Kai Ola Development will have on our community. I was told that I was to write to you to tell you of my concerns.

I was recently at a luncheon hosted by your company to commemorate the partnership between your company, Indigo Learning Systems, and the Kona schools involved. I am very excited about this project and appreciate the opportunity. I was quoted in the paper highly praising the program. I hope you will share this letter with Mr. Jacoby. I personally met him and thanked him for providing the funds for the computers.

However, I wish I had known at the time how extensive the plans were for the Kona Kai Ola project. I was appalled to heqr that Alula Bay will be destroyed, as well as the anchialine ponds south of the harbor.

Alula Bay is a very special place. It has been used as a hiuwai (cleansing) site for many years by my Kumu Keala Ching (hula teacher) and by others before him since ancient times. There are very few calm, sandy bay areas like it in all of Kona. Taking away this precious resource from us will only breed ill will in our community and it was my impression that Mr. Jacoby did not want to leave that kind of legacy. He even said that,"We are in the same ahupua'a", indicating that he knew a little about Hawaiian culture.

I teach my students about the importance of the anchialine ponds, what a unique ecosystem they are, and how fortunate we are to have such natural wonders in our own ahupua'a. That the DEIS glosses over the special nature of the anchialine ponds is enough to question the legitimacy of the DEIS.

I beg you to change your plans so that Alula Bay and its surrounding anchialine ponds be preserved.

Thank you,
Diane Aoki
--

Diane Aoki
PO Box 991
Kealakekua, HI 96759
323-2030, 895-9040

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February 4, 2007

Dayan Vithanage
Oceanit Center
828 Fort Street Mall, 6th Fl
Honolulu HI 96813

Dear Mr.Vitanage,

I am a fourth grade teacher at Kealakehe Elementary School and care deeply about the impacts that the Kona Kai Ola (Jacoby Development) will have on our community. I was told that you were one of the people who will be interested in knowing of our concerns.

I was appalled to learn that Alula Bay will be destroyed, as well as the anchialine ponds south of the harbor.

Alula Bay is a very special place. It has been used as a hiuwai site (cleansing) for many years by my Kumu Keala Ching and by others before him since ancient times. There are very few calm, sandy bay areas like it in all of Kona. Taking away this precious resource from us will only breed ill will in our community.

I teach my students the importance of the anchialine ponds, what a unique ecosystem they are, and how fortunate we are to have such natural wonders in our own ahupua'a. That the DEIS does not include the special nature of the anchialine ponds is enough to question the legitimacy of the DEIS.

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Aloha,

Diane Aoki

Diane Aoki

THE OCEAN CONSERVANCY
ADVOCATES FOR WILD, HEALTHY OCEANS

Ms. Diane Aoki
PO Box 991
Kealakekua, HI 96750-0991

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FEB 06 2007

Dayan Vithanage
Oceanit Center
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Honolulu, HI 96813

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innovation through engineering & scientific excellence

July 23, 2007

Diane Aoki
P.O. Box 991
Kealakekua, Hawai'i 96759

Dear Ms. Aoki:

Subject: Kona Kai Ola Draft Environmental Impact Statement
Response to Your Comments from one e-mail and one letter
Dated February 4, 2007

Thank you for your comments on the Kona Kai Ola Draft Environmental Impact Statement.

We assure you that the development of Kona Kai Ola is not intended to destroy 'Alula Bay and the anchialine pools south of the harbor. In fact, the Kona Kai Ola project is designed to protect these resources and enhance community experience when you visit or encounter these resources.

The developer fully respects the value of 'Alula Bay, a small pocket beach located a short distance to the south. We understand that Alula provides the only safe ocean access during calm seas and that Alula beach is also used regularly by kupuna from the region, and hula halau for cleansing ceremonies, or hiu wai.

The Cultural Impact Study, which is summarized in EIS Section 4.1, Cultural Impacts, and contained in Appendix L-1, included 'Alula in its study, and notes that this white sand beach is known in chants and stories as 'Alula. In Emerson's map of 1888, 'Alula was a canoe and small boat landing. According to some interviewees in the Cultural Impact Study, the original name for the beach was 'Aulaula, which describes the broad current of the bay. 'Alula is susceptible to an inundation of northwest swells, which travel far inland. There is an 'ōpelu koa or 'ōpelu fishing ground in the bay.

The Kona Kai Ola project includes a 400-foot setback, or buffer zone, along the entire length of the project's shoreline. Improvements within this buffer zone will be limited to lateral shoreline public trails, mauka-makai access trails from the project site, and cultural or environmental-related improvements relating to existing features within the buffer zone. No buildings or structures shall be proposed within the 400-foot shoreline setback area, with the possible exception

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www.oceanit.com

of culturally-related structures. ‘Alula Bay will therefore be protected in Kona Kai Ola.

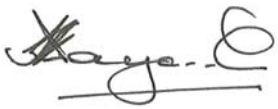
Every effort will also be made to protect, preserve and improve the anchialine pools to the south of the harbor. Two additional studies were conducted in response to DEIS comments, including your comments, and these additional studies are summarized in EIS Section 3.9.2 and presented in Appendices G-3 and H-2. Attachment 1 contains the EIS Sections 3.9.2.1 and 3.9.2.2.

These additional studies indicated that with the construction of the new harbor basin, the anchialine pools makai of the proposed basin may not necessarily be negatively impacted by the construction of the proposed project.

In addition, these studies determined that there are mechanisms to mitigate potential impacts. Mitigation measures to facilitate the long term health of the remaining anchialine pools will be based on environmental monitoring, which is vital as an early warning system to detect potential environmental degradation. As a mitigation measure, bioretention, which is a Best Management Practice (BMP), is a highly appropriate application for the proposed development to prevent any nonpoint source pollution of groundwater. Another mitigation measure that may be included in the management plan is salinity adjustment of the anchialine pools to maintain healthy habitat for the anchialine ecosystem by surcharging man-made anchialine pools created adjacent to or in the vicinity of natural pools with low salinity well water.

Your comment letter and this response are included in the Final Environmental Impact Statement. We appreciate your participation in the environmental review process. Please submit a request to our office if you would like to receive a printed or electronic copy of the Final Environmental Impact Statement, or portions thereof.

Sincerely,



Dayan Vithanage, P.E., PhD.
Director of Engineering

cc: Office of Environmental Quality Control
State Department of Hawaiian Home Lands
Jacoby Development, Inc.

Attachment 1

The conditions with the project constructed were found to be phosphorous limited. Several simulations were performed including and excluding the inflow from the marine exhibits which provides an additional nitrogen load and also varying the location of this inflow. It was found that the inflow from the marine exhibits can have a beneficial effect on flushing, especially when positioned within the existing harbor basin. However, its effect is significantly less than the effect due to the brackish groundwater inflow. When the exhibit inflow is excluded or positioned at the east end of the new marina, its effect is small in terms of flushing due to its high salinity. From a water quality perspective, since the loads from the exhibit inflow consist primarily of nitrogen, it does not cause increased algae growth. However, this exhibit inflow does raise the concentrations of ammonia and nitrate in the system.

Simulation results indicate that under the conditions when the post-expansion system receives an additional brackish inflow into the new 25-acre marina on the order of 30 mgd or more, water quality within the harbor system and in the surrounding waters remained similar to existing conditions. These conditions are expected to occur based on the findings reported by Waimea Water Services (2007), which states that the proposed marina would exhibit the same or similar flushing action as the existing marina.

An additional mitigation measure proposed by Waimea Water Services (2007), if sufficient inflow is not intercepted, consists of drilling holes in the bottom of the new marina to enhance this inflow and facilitate flushing within the proposed system.

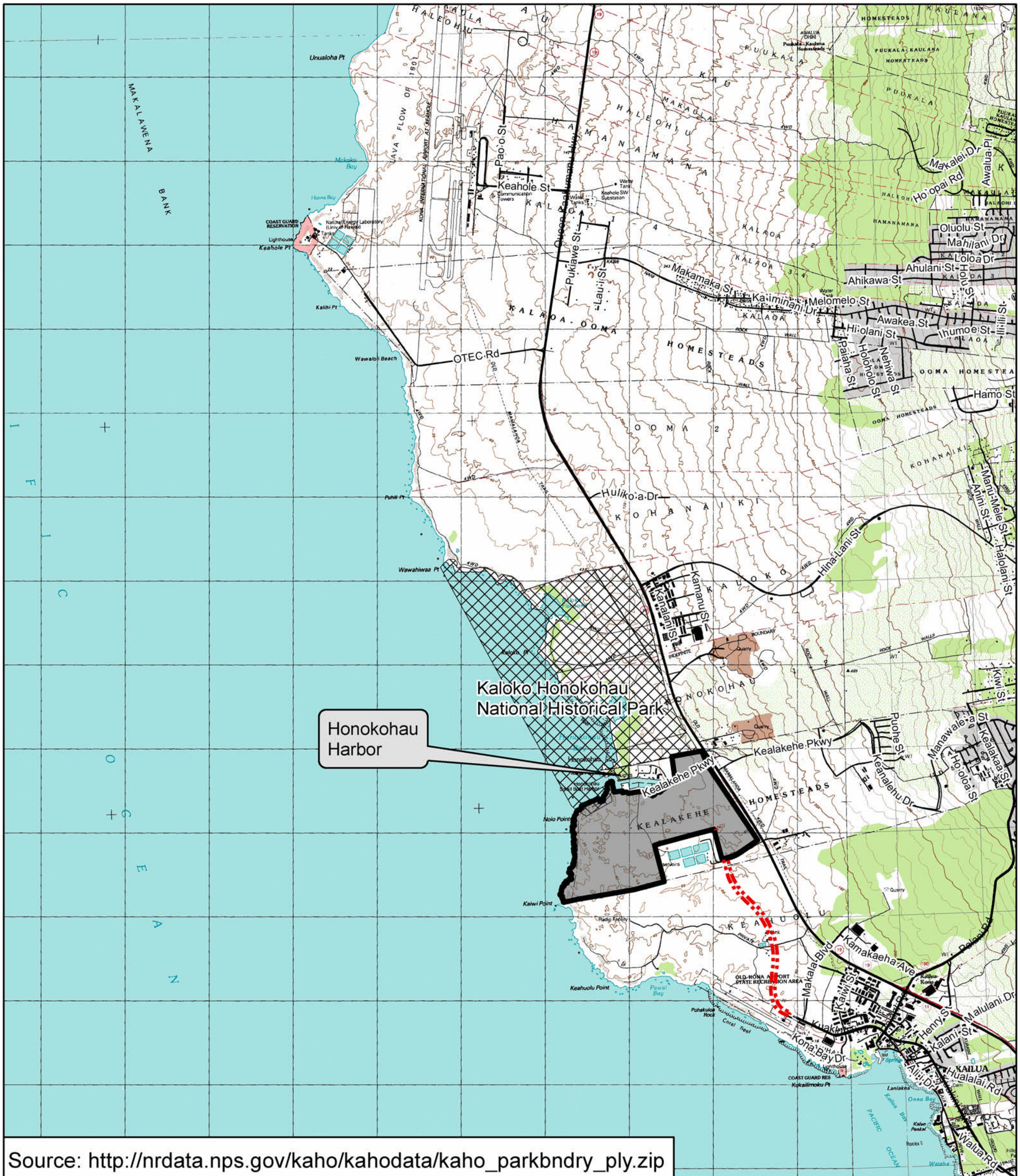
~~3.9.3~~3.9.2 Anchialine ~~Ponds~~ Pools

Two studies on anchialine pools were conducted in this EIS process. The anchialine ~~ponds~~ pools water quality studies and ~~biota surveys were conducted by David A. Ziemann, Ph.D. of the Oceanic Institute and is~~biota surveys were conducted by David A. Ziemann, Ph.D. of the Oceanic Institute in October 2006 and are included as Appendix ~~G~~H-1. That survey included pools located both north and south of Honokōhau Harbor. In response to DEIS comments and to further study the pools south of entrance channel of Honokōhau Harbor, a second study was conducted by David Chai of Aquatic Research Management and Design in June 2007. The second survey focused on intensive diurnal and nocturnal biological surveys and limited water quality analysis of the southern group of anchialine pools exclusively. The report is contained in Appendix H-2.

~~3.9.3.1~~3.9.2.1 Existing Conditions

Anchialine ~~ponds~~ pools exist in inland lava depressions near the ocean. Two anchialine ~~pond~~ pool complexes are located immediately to the north and south of the Honokōhau Harbor entrance channel. The complex to the north is located wholly within the designated boundaries of the Kaloko-Honokōhau National Historical Park as shown in Figure Q~~O~~. Many of the ~~ponds~~ pools in the southern complex are within the park administrative boundary as well. ~~Ponds~~ Pools in the northern complex show little evidence of anthropogenic impacts. Many contain typical vegetation and crustacean species in high abundance.

Figure R locates anchialine pools near the harbor entrance and pools~~Ponds~~ in the southern complex are depicted in Figure S.



Source: http://nrdata.nps.gov/kaho/kahodata/kaho_parkbndry_ply.zip

Figure Q: National Historical Park Service Legislative Boundary Map

Legend

- Project Site
- Proposed Parkway
- National Park Boundary

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Source: Oceanic Institute

Figure R: Anchialine Pool Locations

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Source: Aquatic Resources Management And Design

Figure S: Anchialine Pool Locations in Southern Complex

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JDI
JACOBY DEVELOPMENT, INC.

The 2006 study identified 22 pools in the southern complex. The 2007 study found that three of the 22 pools are part of an estuary complex with direct connection to the ocean. While there were several signs of direct human use and disturbance, such as trash receptacles and toilet facilities, the greatest degradation to the majority of the anchialine and estuarine resources was due to the presence of alien fish, including topminnows and tilapia, and introduced plants, predominantly pickleweed and mangrove. ~~are moderately to heavily impacted, with many containing exotic fish that exclude the anchialine crustaceans. The ponds also show evidence of human impact, including discarded bottles, cans, wrappers, diapers, toilet paper, etc. Water quality conditions within the ponds generally reflect the conditions of the underlying groundwater.~~

~~Figure P locates anchialine ponds near the harbor entrance. The study conducted as a part of this EIS show that the anchialine ponds south of the harbor entrance are moderately to heavily impacted by human activities and introduced fish populations. The study found that the nitrogen phosphorus concentrations in these ponds are significantly higher compared to the ponds north of the harbor entrance. The sources of these additional nutrients are not known. Continuous influx of nutrients will eventually degrade the water quality to levels that could alter the pond ecology.~~

Biota surveys in the two pond systems clearly indicate that counts of typical pond denizens show a remarkable difference between the northern and southern ~~ponds~~ pools. In the northern ~~ponds~~ pools the number of *Halocaridina rubra* ranged from a low of 20–25 to too numerous to count. The biota rich pond bottoms appeared red due to the *Halocaridina rubra* numbers. The only other species visible was the predatory shrimp *Metabetaeus lohena*. In contrast, only four out of the 22 ~~ponds~~ pools examined in the southern pond complex showed a decreased presence of *Halocaridina rubra* (6 to 200) individuals in the pond, and three ~~ponds~~ pools contained *Metabetaeus lohena*. Eight of the ~~ponds~~ pools contained numbers of introduced minnows which is an apparent predator of *Halocaridina rubra* and *Metabetaeus lohena*.

The 2007 study found three of the pools identified in the 2006 study were part of an estuary complex with direct connection to the ocean, and that the southern complex contained 19 anchialine pools. The study further found that a majority of the southern pools are degraded biologically and physically, primarily due to the effects of introduced fish and plant species. Six pools are currently devoid of alien fish, but they face a high level of threat due to the proximity of pools that have these species. Of the 19 anchialine pools, six were considered high tide pools (exposed only at medium or high tide), seven were considered pool complexes (individual pools at low tide and interconnected at high tide), and six were single isolated pools. Of the 19 anchialine pools, three pools with a combined surface area of $20m^2$ would be eliminated due to the harbor construction.

The DEIS presented information stating that harbor construction would cause an increase in salinity in the anchialine pools makai of the proposed marina basin to become equivalent to the ocean at 35 ppt. and that the anchialine biology would then perish. There is currently a level of uncertainty by professional hydrologists as to the exact movement of surface groundwater and final determination of anchialine salinity following the harbor construction. The assessment that all anchialine pools will be barren with the construction of the harbor may be premature. *Halocaridina rubra* (opae ula) are routinely drawn from high salinity wells at 30-32 ppt.

Within the 19 pools, native and non-native fauna included 14 species comprised of 5 fish, 2 mollusca, and 6 crustacea. Algae within the pools primarily consisted of a mixed assemblage of diatoms and cyanobacteria, with several pools dominated by matted filamentous *Cladophora*, sp. The darker cave/overhang pools and high tide pools had epilithic *Hildenbrandia* sp. covering the rock substrate. Riparian vegetation was dominated by introduced species consisting of Pickleweed (*Batis maritima*), Mangrove (*Rhyzophora mangle*), and Christmasberry (*Shinus terebenthifolius*). Only two species of native plants Akulikuli (*Sesuvium portulacastrum*) and Makaloa (*Cyperus laevigatus*) existed near the pools and comprised only few small patches and a single tuft (respectively).

Most of the hypogeal anchialine shrimp have adapted to the presence of minnows by foraging in the pools at night. During daylight hours, only the adult shrimp appear to coexist at low population levels with the smaller *P. reticulata*, but the larger *G. affinis* and *Oreochromis* prevent the daytime appearance of hypogeal shrimp due to predation.

The average salinity in Kealakehe pools is relatively high at 13.5 ppt compared to most other pools along the West Hawai'i coastline, having an average of approximately 7 ppt. This high salinity appears to be characteristic of this region, and is similar to the average of most pools within the adjacent ahupua'a of Honokōhau and Kaloko. The levels of nitrate-nitrogen levels are relatively high compared to other undeveloped areas, but fall in the range of some developed landscapes. Other water quality parameters, including pH and temperature, fall into normal ranges for anchialine pools.

This relatively high salinity is the likely reason aquatic insects were not found in any pools at Kealakehe. Though the rare damselfly *Megalagrion xanthomelas* has been observed and collected from Kaloko, a statewide assessment of its range has not found it to occur in water with salinity greater than 3ppt. However, there has been an unsubstantiated occurrence of the nymph in a pool of up to 8ppt (Polhemus, 1995).

Another species of concern is the hypogeal decapod shrimp *Metabetaeus lohena.* These shrimp are sometimes predatory on *H. rubra* but are more often opportunistic omnivores similar to *H. rubra.* Predusk and nocturnal sampling at high tide is clearly the optimal method to determine habitat range and population densities for this species. These shrimp were found in 13 of the 19 pools, 7 of which had *M. lohena* only at night. The occurrences of *H. rubra* were found in 16 of 19 sampled pools, 8 of which had 'Ōpae'ula observed only at night. Consequently, despite having numerous degraded anchialine resources at Kealakehe, there are opportunities for many of the pools to be restored and enhanced to a level where large populations of anchialine shrimp and other native species may return to inhabit the pools as they likely have in the past.

~~As mentioned earlier, the southern ponds also had elevated concentrations of nutrients indicating water quality degradation. These factors indicate that if no restoration or maintenance activities are instituted to reserve these ponds, these ecosystems will degrade beyond recovery.~~

~~3.9.3.2~~3.9.2.2 Anticipated Impacts and ~~Recommended~~ Proposed Mitigations

The anchialine ~~ponds~~ pools that are located north of the existing harbor are not likely to be impacted because no development activities are proposed north of the existing harbor. It is highly unlikely that existing groundwater flows to the Kaloko-Honokōhau pond system to the north of the existing harbor will be impacted by the proposed marina to the south.

Of the 19 pools in the southern complex, three would be eliminated due to harbor construction. Regarding the remaining pools, the DEIS noted that t~~T~~he change in the local groundwater flow pattern in the vicinity of the proposed marina ~~will~~ would impact the anchialine ~~ponds~~ pools that are located between the proposed marina and the shoreline south of the harbor entrance. The 2006 study (Appendix H-1) noted that t~~T~~he salinity of the anchialine ~~ponds~~ pools ~~will~~ would increase due to reduction of brackish groundwater, and that ~~. Some ponds will be excavated to make the new harbor basin. T~~those ~~ponds~~ pools that are not excavated will revert to full salinity, causing the loss of their habitat. ~~and associated aquatic flora and fauna. However, current investigations indicate that these ponds are already enriched by nutrients and the density of associated aquatic fauna is very low. In addition, trash from visitors, and introduction of minnows has already degraded the pond ecology.~~ Even without the potential impacts from the proposed marina construction, the pond ecology might change irreversibly from the nutrient input, human indifference and expansion of non native fauna species.

Further studies conducted in response to DEIS comments (Appendix H-2, and Appendix G-3) indicate that the remaining pools may not increase in salinity to levels unhealthy for *H. rubra* and *M. lohena* and other anchialine pool fauna. In addition, these studies determined that there are realistic mechanisms employed elsewhere that would mitigate changes due to groundwater changes. Waimea Water Services found that harbor construction would cut off some of the fresher ground-water flow. However, predicting the extent of change in flow is difficult if not impossible even with numerous boreholes and intense sampling. The actual flow of groundwater towards the sea is minimal today, and tidal measurements show that tide fluctuations represent more than 90 percent in actual harbor tides. The fluctuations occur simultaneous with the ocean/harbor tide, which indicate a vertical and horizontal pressure regime between bore hole 6 and the ocean and harbor. Hence, the tides alone create a mixing system that increases salinity, as the flow approaches the point of discharge which will be either the channel or the shore.

Another factor that could influence groundwater quality is the increased local recharge from irrigation between the channel and shore. This will add fresh water to the lens locally but is not quantified at this time.

Quantification of these impacts, including the flow of groundwater through each pond, is extremely difficult. The shallow lavas are of the pahoehoe type and have a relatively high horizontal permeability. In surface depressions or undulations, the pahoehoe lavas have a tendency to lose vertical permeability from sedimentation thus restricting water exchange within the individual pools. This is normally reflected in both the salinity and temperature and this information has been adequately studied in the pools.

Changes in groundwater quality may or may not impact biological communities in the anchialine and estuarine environment. In either case, it is important to understand these relationships to effectively manage the resource. If there is significant deviation from the baseline especially in regard to nutrients, pathogens, and toxins, a mitigation plan to determine the cause and take decisive appropriate action will be implemented. The mitigation plan will be based on the following objectives:

Objective 1 To preserve, maintain, and foster the long-term health and native ecological integrity of anchialine pools at Kealakehe.

Objective 2 To protect and promote cultural practices and traditions surrounding anchialine resources at Kealakehe.

Objective 3 To provide education, interpretation, and interactive opportunities for the community to learn about and appreciate the anchialine resources.

Objective 4 To acquire a pond manager to implement the program, conduct monitoring, research, and reporting, and provide education to the community about anchialine and estuarine resources.

Mitigation measures to facilitate the long-term health of the remaining anchialine pools will be based on environmental monitoring, which is vital as an early warning system to detect potential environmental degradation. A series of quantitative baseline analysis of the physio-chemical and biological components within the project site will provide a standard by which the effects of the development, anthropogenic activities, and natural phenomena on the environment can be measured. The framework for the mitigation plan will include three measures intended to meet these objectives, including bioretention, salinity adjustment and possible new pools.

As a mitigation measure, bioretention, which is a Best Management Practice (BMP) is a feasible application for the proposed development. There is a probability that nutrients and other potential pollutants will runoff landscaping and impermeable surfaces such as roadways and parking lots during medium or high rainfall events. Some of these pollutants could enter the groundwater table and into anchialine pools and ultimately the ocean. As an alternative to directing runoff into the ground through drywells, storm water should be directed into bioretention areas such as constructed surface or subsurface wetlands, vegetated filter strips, grass swales, and planted buffer areas. Storm water held and moved through these living filter systems are essentially stripped of most potential pollutants, and allowed to slowly infiltrate back to the groundwater table.

Bioretention is a Best Management Practice (BMP) that would be a highly appropriate application for the proposed development. Further, BMPs utilized in series may incorporate several storm water treatment mechanisms in a sequence to enhance the treatment of runoff. By combining structural and/or nonstructural treatment methods in series rather than singularly, raises the level and reliability of pollutant removal. Another means to reduce the potential for groundwater contamination is to increase soil depth above the standard in landscaped areas. This will allow chemicals to be held in the soils longer for more complete plant uptake and breakdown of these chemicals by soil microbes. A specific guide for chemical application by landscape maintenance personnel will be a beneficial tool to help avoid contamination of groundwater resources.

Another mitigation measure that may be included in the management plan is salinity adjustment. In the 2006 assessment regarding the impact to the southern pools from the proposed construction of the harbor, it was stated that this construction would cause the salinity in the anchialine pools to become equivalent to the ocean at 35ppt. It was then concluded that the anchialine biology would perish.

However, there is currently a level of uncertainty by professional hydrologists as to the exact movement of surface groundwater and a final determination of anchialine salinity following the harbor construction. The dynamics of groundwater movement through a porous lava medium both seaward and laterally along the coastline is an inexact science. This is compounded by the variations in water density, including stratification of salinity within the proposed harbor and capillary movement of low-density surface water through the substrata.

The assessment that all anchialine pools will be barren with the construction of the harbor may therefore be premature. *H. rubra* are routinely drawn from high salinity wells at 30 – 32 ppt and survive in this salinity for years. Further, high populations *H. rubra* and *M. lohena* have thrived and reproduced in pool salinities of 27ppt. If the pools do become full strength seawater at 35ppt, there exists uncertainty on the long-term effects to anchialine organisms, since there are no long-term studies or examples of native anchialine ecosystems at 35ppt. Native anchialine pool vegetation also has relatively high salinity tolerance.

If the salinity were expected to rise to 35 ppt, possible mitigation in the management plan will include methods to surcharge man-made anchialine pools created adjacent to or in the vicinity of natural pools with low salinity well water. If sufficient volume is used, it is theoretically possible to lower salinity in adjacent natural anchialine pools. This surcharge method has been successfully used to raise salinity in anchialine pools and cause the salinity rise in adjacent pools of at least up to 10 meters away. Surcharging with low salinity should work as well or better since the lower density water will essentially float atop the higher salinity water at the surface layer, and move throughout the complex of natural pools. Surcharging may also be a viable mitigation to dilute and more rapidly disperse any pollutants that may be detected in the pools.

Another mitigation measure includes the creation of new anchialine pools. There is significant opportunity to create new anchialine pools and greatly expand the native habitat and resource. It has been demonstrated at several projects in West Hawai'i that anchialine pools can be created and will be colonized with a full compliment of anchialine species endemic to the area. Anchialine pools are considered focal points of higher productivity relative to the subterranean groundwater habitat around them. Their productivity promotes an increase in population levels of anchialine species within the pools themselves and throughout the subterranean habitat surrounding them.

~~No realistic mechanisms are envisioned for re-injecting fresh water into these systems to maintain their ecological balance as an anchialine system. These ponds will be changed from a brackish water system to a marine system. But, those ponds in the area of the shoreline park and cultural park will be cleaned of vegetation and protected from other physical alteration. A buffer zone around these newly established marine ponds will be protected as well.~~

~~The anchialine pond shrimp (*Metabetaeus lohena)* and the orangeback damsel fly (*Megalagrion xanthomelas)* are listed as candidate endangered species in the Federal Register and were both recorded in surveys of these anchialine ponds done in 2004 by US Geological Survey Biological Resources Division and the NPS Inventory and Monitoring Program. Low numbers of *Metabetaeus lohena* were encountered in three of the 22 ponds surveyed in the southern pond complex. *Megalagrion xanthomelas* was not encountered in any of the southern pond complex ponds during the recent study. The low density of *Metabetaeus lohena* and the observed absence of *Megalagrion xanthomelas* may be due to the impacts from high nutrient input and general degradation of the ponds.~~

~~An attempt should be made to move as much of the existing population of *Metabetaeus lohena* from these anchialine ponds before they become too saline, to possible newly excavated ponds that may be developed off-site. These shrimp should not be introduced into existing populated ponds to avoid any potential pathogenic impacts to the healthy ponds.~~

~~Public education on the unique ecology of the anchialine ponds and the need for preserving their ecology will reduce future human impacts in other healthy ponds.~~

~~Further recommended mitigation includes restoration to degraded anchialine ponds off the project site, preferably those located at the adjacent Kaloko-Honokōhau National Historical Park.~~

Feb. 5, 2007
To Whom It May Concern,

In reference to the Jacoby project on the Kona Coast of the Big Island, it is significant that Hawaii County Planning is opposed to this project, as are the Hawaii General Plan and the Community Development Plan for this area.

One reason is the infrastructure deficit, which is destroying quality of life and productivity for West Hawaii. Adding to it would be fool hardy.

My major concern, however, is inadequate examination of potential adverse environmental risks. By law,West Hawaii's pristine waters must be protected!

Time and again, we have seen mainland coastal communities and our own islands, allow projects to forge ahead, assuming developers knew what they were doing in terms of environmental risk, only to have time expose their ignorance causing ecological damage.

We already have reports coming in of development causing degradation of pristine West Hawaii waters. Already, bad decisions have caused ecological damage.

The present level of environmental risk assessment for the Jacoby Project is not adequate. There are so many factors that are not addressed IN DEPTH, e.g.,

What will happen to fresh water outlets?

How will that affect Coral Reef Ecosystems?

How will algae bloom cycles be impacted?
(Look at Moro Bay,Ca., now suddenly experiencing 10 times the annual rate of toxic algae blooms generating domoic acid, killing pelicans and sea lions. Suspected causes include marine pollution and sewage from development.)

It is clear we continue to put the developer's cart before the horse, announcing the trail is safe, until we find the environment has been degraded and damaged.

Environmentally, the effects of development on this massive scale must be assessed thoroughly by independent researchers NOT EMPLOYED by the developer.

Fresh water outlets, Submarine Groundwater Discharge, full analysis of Endangered Species, Impact on coral ecosystems, potential for Toxic Algae bloom, generation of Non-Point Source Pollution and attendant Cumulative Secondary Effects from replacing natural terrain with concrete, structures, and increasing vehicular pollution…

The EIS must be totally comprehensive. Our island and waters deserve that respect and level of responsibility.
Sincerely, Dore Dokos-Loewenthal, P.O. Box 503, Captain Cook, Hi. 96704

PO BOX 503
96704

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OCEANIT CENTER
828 FORT STREET MALL
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HONOLULU, HI 96813

ATTN:
DAWN
VIRANAGE,
PLEASE
RE JACOBY DEIS

96813$4321 C025

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innovation through engineering & scientific excellence

July 23, 2007

Dore Dokos-Loewenthal
P.O. Box 503
Captain Cook, Hawai'i 96704

Dear Mr./Ms. Dokos-Loewenthal:

Subject: Kona Kai Ola Draft Environmental Impact Statement
Response to Your Comments Dated February 5, 2007

Thank you for your comments on the Kona Kai Ola Draft Environmental Impact Statement. This letter responds to your comment by the sequence of paragraphs.

As development approval applications have not previously been submitted to the County of Hawai'i, no formal or final decisions have yet been made by the County of Hawai'i.

Regarding the General Plan, Kona Kai Ola is consistent with the Urban Expansion Area designation. In December 2005, the Hawai? County Planning Director proposed that the DLNR portion of the Kona Kai Ola project that was designated "Open" in the 2005 General Plan, be amended to "Urban Expansion Area." On November 29, 2006, the Hawai'i County Council approved this amendment.

The agreement between the developer and the State identifies hotel and time-share uses as possible development at Kona Kai Ola. The project is not a resort. A resort is a concept in which visitors are attracted to spend most, if not all, of their stay within the resort area through the design of amenities that fulfill the needs of a particular visitor market segment. This self-containment is achieved to varying degrees in resort development, depending on the natural, historic/cultural, and recreational resources within a resort site and the intended scale of the resort.

State and County laws recognize this distinction between a "resort" and a "hotel" or "time-share unit." Section 514E-5, Hawai'i Revised Statutes, authorizes time-share units to be located in a resort area or any other area in which a county may by ordinance allow a hotel unit. The Hawai'i County Code correspondingly permits hotels and time share units in non-resort zoning districts. The proposed project may include up to 700 hotel units and 1,803 time-share units, and depending on the eventual location of these project components, rezoning may be required for implementation.

Kona Kai Ola is also being planned to be consistent with the Kona Community Development Plan. Since the DEIS was published, JDI has considered alternatives to

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the proposed project. Alternative 1, which is discussed below, is consistent with the current draft of the Kona CDP and the community vision for the proposed development area.

In response to your comment that the EIS must be totally comprehensive, we note that the EIS is a comprehensive document that addresses project impacts. Further, we have responded to all comments to the EISPN and the DEIS. Every effort was made to fully investigate issues raised in DEIS comments. Several additional studies were conducted to expand our understanding of existing conditions, identify project impacts and proposed appropriate mitigation measures. Additional studies conducted in response to DEIS comments included:

- An Inventory and Assessment of Anchialine Pools Including Management and Mitigation Recommendations
- Marina Harbor Water Quality Study
- Evidence and Implications of Saline Cold Groundwater
- Groundwater Effects on Anchialine Pools
- Supplemental Groundwater Sampling and Analyses for Priority Pollutants
- Description of Marine Mammal and Sea Turtle Species
- Acoustic Analysis of Potential Impacts (related to construction-generated underwater acoustics)
- Ambient Noise Measurements and Estimation Study
- Workforce Housing Impacts Assessment

In addition to these studies, the EIS also expanded the analysis of alternatives. As explained in the DEIS, the agreement between JDI and the State of Hawai‘i established a required scope and scale of the project for which the impact analysis was provided. Several comments have addressed the fact that alternatives other than the No Project Alternative were not addressed in the DEIS Section 2, Alternatives Analysis.

We are of the position that alternative actions other than a No Project alternative are not currently feasible without an amendment to the agreement with the State. Agency and public comments in response to the DEIS, as well as additional information generated as a result of inquiry into issues raised by the comments, have been helpful in identifying alternative actions that will serve the State's goal of providing additional marina slips for the Kona area. These alternative actions also serve to reduce or mitigate anticipated effects of the proposed development.

Thus, agencies such as the Land Division of the Department of Land and Natural Resources, the U.S. Department of the Interior Fish and Wildlife Service, the Planning Department of the County of Hawai‘i, and the Office of Environmental Quality Control (OEQC), as well as community organizations have commented that a reduced scale marina and related facilities should be considered. The OEQC has also asked that the alternative of a reduced scale project be evaluated under the assumption that DHHL may determine that a downsized project would be preferred.

In response to these comments on the DEIS and in consideration of measures to mitigate anticipated impacts, the EIS Section 2, Alternatives Analysis, has been revised to describe the following alternatives, which are discussed in more detail in the EIS:

- Alternative 1 is a project involving a 400-slip marina, 400 hotel units, 1,100 time-share units, and commercial and support facilities. This alternative would enhance water quality and avoid the need to widen the existing harbor entrance channel, as well as reduce traffic and socioeconomic impacts.
- Alternative 2 is an alternative that had been previously discussed, but not included in the proposed project that includes an 800-slip harbor and a golf course.
- Alternative 3 is the no-action alternative.

A comparison between impacts related to the proposed project concept and impacts related to Alternative 1 indicates that a reduction in the acreage and number of slips in the marina, as well as the reduction in hotel and timeshare units, would generate less environmental, traffic, social and economic impacts. Although positive economic impacts would be reduced, Alternative 1 can be considered as a preferable alternative because of reduced environmental impacts. However, while it can be concluded that the 25-acre marina in Alternative 1 would be the preferred size, the DLNR agreement establishes the size of the marina at 45 acres and 800 slips. An amendment to the DLNR agreement is required in order to allow Alternative 1 to proceed. Hence, selection of Alternative 1 is an unresolved issue at this time. The additional EIS text that includes the added EIS Section 2, Alternative Analysis, is contained in Attachment 1 of this letter.

You raise several water issues. In response to DEIS comments, a Harbor Water Quality Modeling Study was conducted to assess impacts of the project on harbor and nearshore waters. A three dimensional hydrodynamic and water quality model of Honokohau Harbor and its surrounding waters was developed using the Delft3D modeling suite and is described in detail in Appendix U. The model was driven at its offshore boundaries by tidal predictions, and calibrated to reproduce available measurements of water levels, currents, salinity and temperature.

The water quality model was applied to predict the post-project conditions after the addition of the Kona Kai Ola Marina. Per the Conceptual Master Plan, the marina consists of a 45 acre marina basin with 800 boat slips. Brackish groundwater inflows into the new marina basin were bracketed between 0 mgd and 60 mgd. The two simulated extremes represent scenarios where no additional brackish groundwater will be intercepted by the new marina, which is not consistent with the observed conditions, and when brackish groundwater inflow into the new marina is twice the amount that will be still flowing into the existing marina, respectively.

The model results demonstrated, relative to the increased area, that water quality within the proposed 45-acre marina basin system could not be maintained. Inflow of brackish groundwater to the new marina was found to be fundamental to the flushing and water quality of the proposed system. However, even for the largest simulated inflow of 60 additional mgd entering the new marina, water quality was still degraded post-expansion. This is primarily due to the fact that the proposed marina basin has five times the volume of the existing harbor. In addition, the geometry of the system led to internal circulation between the existing harbor and new marina basin. The 45-acre new marina basin only becomes viable from a water quality impact standpoint if the additional brackish groundwater inflow into the new marina exceeds 60 mgd.

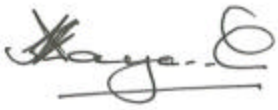
Alternatives to the aforementioned system that could maintain the flushing and water quality, as observed under existing conditions, were investigated. It was found that the reduction of the volume of the new marina basin by 45 percent significantly improved the flushing and water quality.

This study was instrumental in the development of Alternative 1 that includes a 25-acre marina and 400 boat slips. Alternative 1 also includes a reduction of hotel and timeshare units to 1,500 units.

Other studies have significantly increased the EIS discussion on the affected marine environment and noise impacts that may be generated by the proposed project. Information sources are accurately represented, and modeling techniques provide a reliable indication of possible project-related impacts. We are including Section 3.9.4, Marine Mammals and Sea Turtles, as Attachment 2 in this letter.

Your comment letter and this response are included in the Final Environmental Impact Statement. We appreciate your participation in the environmental review process. Please submit a request to our office if you would like to receive a printed or electronic copy of the Final Environmental Impact Statement, or portions thereof.

Sincerely,



Dayan Vithanage, P.E., PhD.
Director of Engineering

cc: Office of Environmental Quality Control
State Department of Hawaiian Home Lands
Jacoby Development, Inc.

Attachment 1

2 Alternatives Analysis

~~In typical land development projects, the initial planning process includes the exploration of alternatives to development objectives. In the EIS process, these alternatives are presented with a disclosure of reasons for the dismissal of non-preferred alternatives.~~

~~Kona Kai Ola does not follow this same pattern of alternatives evaluation.~~ As discussed in Section 1.4, the proposed Kona Kai Ola project is the result of agreements between JDI and the State DLNR and DHHL. The agreements and leases between the State and JDI stipulate the parameters of development for this site in terms of uses, quantities and size of many features, resulting in a limited range of land uses. Unlike a private property project, JDI is required to meet the criteria outlined in the agreements, thereby affording less flexibility in options and uses. From the developer's perspective, the agreements must also provide sufficient flexibility to allow for a development product that responds to market needs and provides a reasonable rate of return on the private investment.

The agreements between JDI and DLNR specify that the proposed harbor basin is to be 45 acres and accommodate 800 slips. This development proposal is the subject of this EIS. In response to DEIS comments, additional water quality studies and modeling were conducted. These studies determined that the water circulation in a 45-acre 800-slip marina would be insufficient to maintain the required standard of water quality. The models of water circulation suggest that a new 25-acre harbor basin could successfully maintain required water quality in the new harbor. Comments on the DEIS from DLNR, from other government agencies, the neighbors and the general community also called for the consideration of alternatives in the EIS, including a project with a smaller harbor basin and less density of hotel and time-share units.

In response to these comments on the DEIS, three alternatives are evaluated in this Final EIS and include Alternative 1, which is a plan with a 25-acre 400-slip harbor basin including a decrease in hotel and time-share units; Alternative 2, which is an alternative that had been previously discussed but not included in the proposed project, that includes an 800-slip harbor and a golf course; and Alternative 3, the no-project alternative. Each alternative is included in the EIS with an evaluation of their potential impacts. These project alternatives are presented to compare the levels of impacts and mitigation measures of the proposed project and alternative development schemes pursuant to requirements set forth in Chapter 343, HRS.

~~JDI is required to provide a new marina basin not less than 45 acres and a minimum of 800 new boat slips. Further, the agreements provide the following options for land uses at the project site:~~

- ~~Golf Course~~
- ~~Retail Commercial Facilities~~
- ~~Hotel Development Parcels~~
- ~~Marina Development Parcels~~
- ~~Community Benefit Development Parcels~~

~~JDI is not pursuing the golf course option and is proposing instead to create various water features throughout the project site. All other optional uses have been incorporated in Kona Kai Ola.~~

2.1 Project Alternatives

2.1.1 Alternative 1: 400-Slip Marina

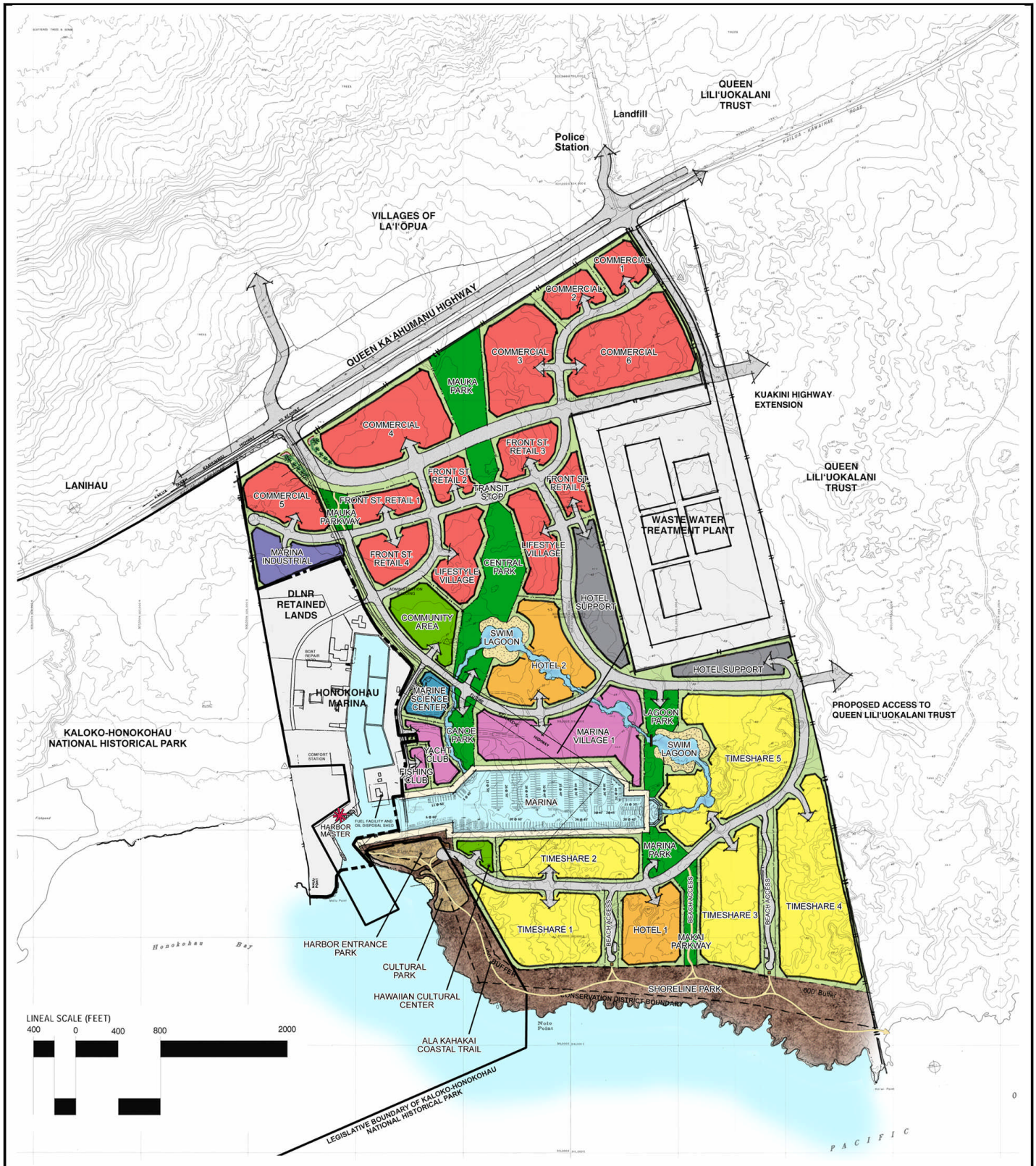
Studies conducted in response to DEIS comments found the construction and operation of an 800-slip marina may significantly impact the water quality within the marina and along the shoreline. Specifically, the Harbor Water Quality Modeling Study, as contained in Appendix U, found that the water circulation in a 45-acre 800-slip harbor was insufficient to maintain an acceptable level of water quality. Further, the existing harbor channel, which would serve both the existing and new harbors, could not adequately serve the increased boat traffic generated by an 800-slip marina during peak traffic. Mitigation measures to accommodate peak boat traffic included the widening of the existing channel, an action that would entail a complex process of Federal and State approvals and encounter significant environmental concern.

Concerns related to the proposed density of hotel and time-share units were also expressed in comments to the DEIS from members of the public, neighbors to the project site, especially the Kaniohale Community Association, and government agencies. Common themes in DEIS comments were related to impacts regarding traffic, project requirements of potable water and infrastructure systems, including sewer, drainage, utility and solid waste systems, and socioeconomic impacts.

In response to the water quality study results, and to the DEIS comments, an alternative plan was developed with a smaller marina with less boat slips, and a related decrease in hotel and time share units. Illustrated in Figure G, Alternative 1 reflects this lesser density project, and features a 400-slip marina encompassing 25 acres. For the purposes of the Alternative 1 analysis, JDI assumed 1,100 time-share units and 400 hotel rooms. Project components include:

- 400 hotel units on 34 acres
- 1,100 time-share units on 106 acres
- 143 acres of commercial uses
- 11 acres of marina support facilities
- 214 acres of parks, roads, open spaces, swim lagoons and community use areas

In addition, Alternative 1 would include the construction of a new intersection of Kealakehe Parkway with Queen Ka'ahumanu Highway, and the extension of Kealakehe Parkway to join Kuakini Highway to cross the lands of Queen Lili'uokalani Trust, and connecting with Kuakini Highway in Kailua-Kona. This is a significant off-site infrastructure improvement and is included in the agreements between the State and JDI.



Source: PBR HAWAII

Plan is conceptual only and subject to change

Figure G: Alternative 1: 400-Slip Marina

LEGEND

- TIME SHARE
- HOTEL
- RETAIL / COMMERCIAL
- MARINA RETAIL
- MARINA SUPPORT / COMMERCIAL
- MARINE SCIENCE CENTER
- COMMUNITY AREA / CULTURAL CENTER
- SWIM LAGOON
- MARINA
- UTILITIES
- PARKS & GREEN SPACE
- SHORELINE
- HARBOR ENTRANCE PARK / CULTURAL PARK

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Like the proposed project, Alternative 1 would have a strong ocean orientation, and project components that support this theme would include various water features including seawater lagoons and a marine science center. The new Alternative 1 harbor would include a yacht club, fishing club, a canoe park, and a cultural park with a focus on Hawaiian maritime cultural heritage of the voyaging canoe. The coastal area would be protected with a shoreline park with trails and public access parking for walking and shoreline fishing, and a cultural park surrounding the heiau, the cultural sites and 'Alula for community use. Additional Alternative 1 community areas would include facilities and space for community use, including programs of the Kona Kai Ola Community Foundation, which supports community programs in health care, culture, education, and employment training for the local community, especially to native Hawaiians. Like the original proposed plan, Alternative 1 includes 40 percent of the land in parks, roads, open spaces, swim lagoons and community use areas.

2.1.2 Alternative 2: Golf Course Feature

Alternative 2 was among the alternatives discussed at a community charrette in September 2003. It includes a golf course, which is a permitted use in the DLNR agreement and DHHL lease. As Figure H illustrates, an 18-hole championship golf course would occupy 222 acres on the southern portion of the project site. As with the proposed project, Alternative 2 includes an 800-slip marina on a minimum of 45 acres.

To support the economic viability of the project, other Alternative 2 uses include:

- Golf course clubhouse on three acres
- 1,570 visitor units on 88 acres fronting the marina
- 118 acres of commercial uses
- 23 acres of community uses

Community uses in Alternative 2 include an amphitheater, a canoe facilities park, a community health center, a Hawaiian cultural center and fishing village, a marine science center and employment training center. The sea water lagoon features contained in the proposed project and Alternative 1 are not included in this alternative.

2.1.3 Alternative 3: No Action

In Alternative 3, the project site would be left vacant, and the proposed marina, hotel and time-share facilities, commercial and marina industrial complexes, and community-oriented uses would not be realized.

~~The economic viability and sustainability of the project is determined by the density and uses proposed. Because JDI is obligated to develop an 800-slip marina for the State, complete road improvements, and provide various public enhancement features at its own expense, the density proposed for the income generating features of the development must be sufficient to provide an acceptable level of economic return for JDI. The market study, which is discussed in Section 4.6, reviewed various development schemes and determined that the currently proposed density and mix is the optimum to meet the anticipated financing and development cost obligations for the public features associated with the development.~~

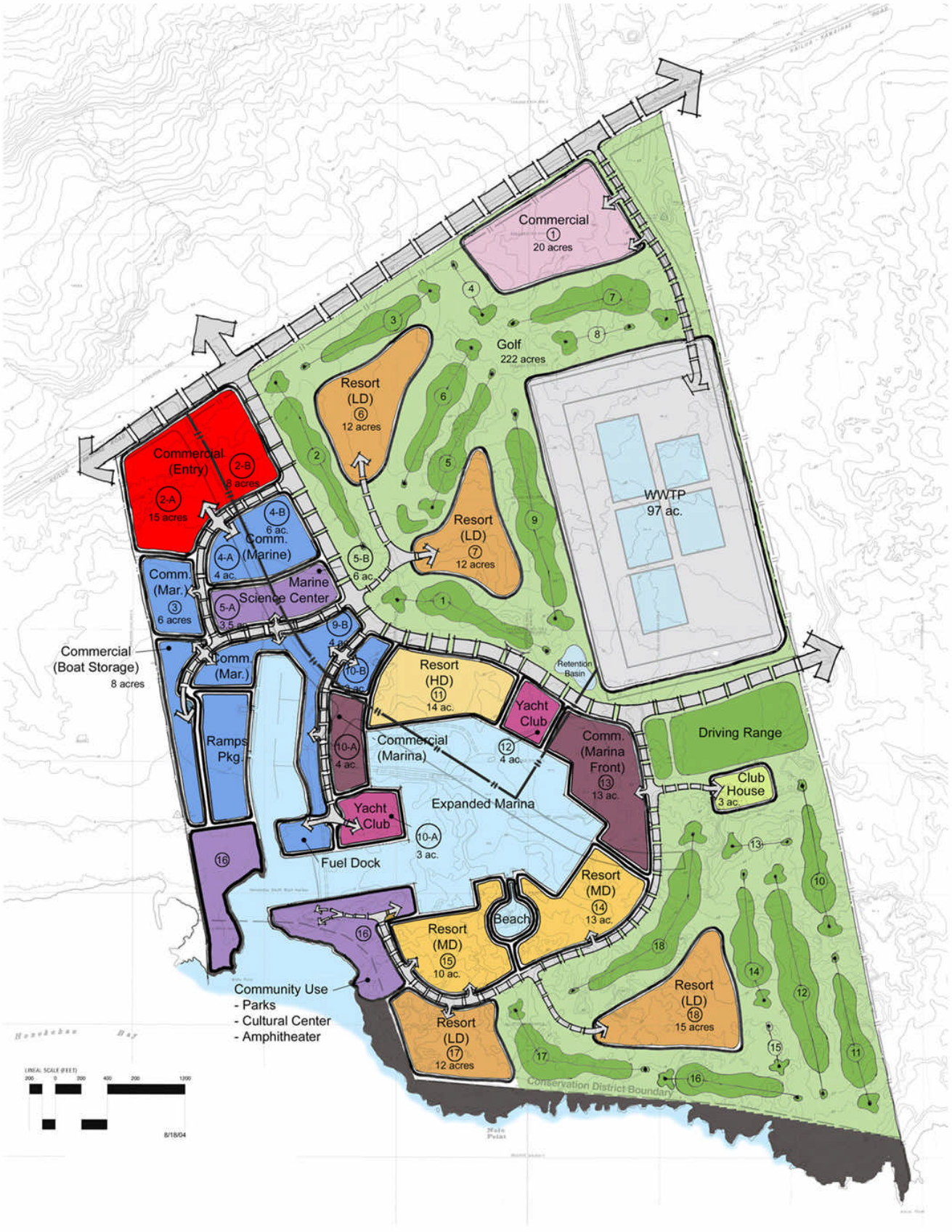

Figure H. Alternative 2: Golf Course Alternative

Legend

N E S W

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2.2 Alternatives Analysis

As discussed in Section 2.1, the proposed Kona Kai Ola project (also referred to as "proposed project") is defined by development requirements related for a marina and the related uses that would be needed to generate a reasonable rate of return that covers development costs.

Beginning with Section 2.2.1, the alternative development concepts are comparatively assessed for potential impacts that may reasonably be expected to result from each alternative. Following is an overview of the primary observations of such assessment.

Alternative 1 includes half of the State-required boat slips and 60 percent of the proposed hotel and time-share units and, due to the decreased density, this alternative would generate significantly less environmental and socio-economic impacts. A harbor water quality model found the reduction of the volume of the new marina basin by about half (approximately 25 acres) significantly improved the water circulation and quality. Further, the reduced number of boat slips would generate less boat traffic, thereby reducing congestion and the need to mitigate impacts further by the widening of the existing harbor channel.

A project with fewer hotel and time-share units and increased commercial space with a longer (14 years) absorption period would change the mix of employment offered by the project, and slightly increase the overall employment count. The public costs/benefits associated with Alternative 1 would change, compared to the proposed project, with a general increase in tax collections, and a general decrease in per capita costs. Detailed discussion of Alternative 1 potential economic impacts are provided in Section 4.6.6. Comparisons of levels of impact are presented throughout this FEIS.

While this analysis might indicate that the 25-acre marina in Alternative 1 would be the more prudent choice, the DLNR agreement establishes the minimum size and slip capacity of the marina at 45 acres and 800 slips, respectively. Amendments to the DLNR agreement would be required in order to allow Alternative 1 to proceed as the preferred alternative. Hence, selection of the preferred alternative is an unresolved issue at the writing of this FEIS.

Alternative 2, the golf course alternative, was not previously considered to be the preferred alternative primarily because market conditions at the time of project development might not likely support another golf course. Further, DHHL has a strategy goal to have more revenue-generating activities on the commercial lease lands within the project area. In addition, concerns have been expressed as to environmental impacts of coastal golf courses, including the potential adverse impact on Kona's water supply if potable water is used for golf course irrigation.

While Alternative 3, the no-project alternative, would not generate adverse impacts related to development of these lands associated with the construction and long-term operations, it would also not allow for an expanded public marina that would meet public need and generate income for the public sector. Further, the no-project alternative would foreclose the opportunity to create a master-planned State-initiated development that would result in increased tax revenue, recreation options and community facilities. Crucial privately-funded improvements, such as the marina, regional roadway and circulation improvements, and improvements to the existing wastewater treatment plant, would not be implemented. Private funds toward the development of community-oriented facilities such as parks, other recreational facilities, and public access would not be contributed.

~~Hence, the only valid alternative to the proposed project is the no-action alternative. In this alternative, the project site would be left vacant, and the proposed marina, hotel and time-share facilities, commercial and marina industrial complexes, and community-oriented uses would not be realized.~~

~~The no-project alternative would therefore not generate adverse impacts associated with the construction and long-term operations would not occur.~~

~~Likewise, the creation of a master-planned state-initiated development, resulting in increased employment, tax revenue, recreation options and community facilities, would not be created. Privately-funded improvements, such as the marina, regional roadway and circulation improvements, and improvements to the existing wastewater treatment plant, would not be implemented. Private funds toward the development of community-oriented facilities such as parks, other recreational facilities and public access would not be contributed.~~

Further, the creation of revenue-producing businesses on the DHHL property to fund homestead programs would not occur, resulting in fewer potential benefits for Hawaiians.

Hence, the agreements and leases between the State and JDI indicate that the no-action alternative is not in the public interest~~has been rejected at this time~~.

2.2.1 Impact Comparison

Grading and Excavation

The proposed project requires grading and excavation. Both actions may impact groundwater due to rainfall runoff during construction. Alternative 1 would require a significantly smaller excavation for the marina basin and would therefore carry a lesser risk of potential adverse effects on water quality. Alternative 2 would require the same basin excavation as the proposed project, and would also include extensive grading and filling to build the golf course, the latter of which would generate additional impacts. Alternative 3 would result in no change to the geography, topography and geology.

Further discussion on grading and excavation is contained in Section 3.3.

Natural Drainage

Most precipitation infiltrates into the porous ground at the site, and no significant sheet flow is likely. Alternative 1 would generate similar levels of impacts on natural drainage as those of the proposed project and thus require similar mitigation measures. The golf course in Alternative 2 would not be as porous since the site would be graded, soil would be placed, and grass and other landscaping would be grown. Sheet flow and runoff can occur on a golf course, and drainage patterns might change. Alternative 3 would result in no change to the existing natural drainage pattern. Further discussion on natural drainage is contained in Section 3.4.

Air Quality

Air quality will be affected by construction activities, as well as pollutants from vehicular, industrial, natural, and agricultural sources. Alternative 1 would generate less construction air quality impacts than the proposed project due to the reduced amount of intensive groundwork associated with the smaller marina basin and fewer long-term impacts by reducing traffic 35 and 40 percent during, respectively, AM and PM peak traffic times. Construction of Alternative 2 would result in fugitive dust and exhaust from equipment and is expected to generate the same level of air quality impact as the proposed project. Alternative 3 would result in no change to existing air quality. Further discussion on air quality is contained in Section 3.5.

Terrestrial Environment

To provide additional habitat for shorebirds and some visiting seabirds, the project proposes to construct a brackishwater pond area suitable for avian fauna, including stilts, coots and ducks. While habitat expansion is beneficial, there is also a possibility that these species may be exposed to activity that may harm them. Alternative 1 would not include a brackish water pond, but will include 5 acres of seawater features, which is 74 percent less than the 19 acres of seawater features in the proposed project. While this would reduce beneficial impacts, it would also decrease exposure to potentially harmful activity. Alternative 2 does not include the brackish water pond features, but would include drainage retention basins that would attract avian fauna and expose them to chemicals used to maintain golf course landscaping. While Alternative 3 would result in no increase in potentially harmful activity, it would also not provide additional habitat for avian fauna. Further discussion on the terrestrial environment is contained in Section 3.7.

Groundwater

Groundwater at the project site occurs as a thin basal brackish water lens. It is influenced by tides and varies in flow direction and salt content. The existing Honokōhau Harbor acts as a drainage point for local groundwater. Any impact to groundwater flow from the proposed harbor is likely to be localized. The proposed marina basin will not result in any significant increase in groundwater flow to the coastline, but rather a concentration and redirection of the existing flows to the harbor entrance.

There will be differences in the flow to the marina entrance between the proposed project and Alternative 1. Alternative 1, being smaller in size, will have less impact on groundwater flow than the proposed marina. Alternative 2 will have a similar impact to groundwater quality as the proposed project. Alternative 2 may also impact water quality by contributing nutrients and biocides to the groundwater from the golf course. Alternative 3 would result in no change in existing groundwater conditions. Further discussion on groundwater is contained in Section 3.8.1.

Surface Water

There are no significant natural freshwater streams or ponds at the site, but there are brackish anchialine pools. Surface water at the project site will be influenced by rainfall. Runoff typically percolates rapidly through the permeable ground. The proposed project will include some impermeable surfaces, which together with building roofs, will change runoff and seepage patterns.

Alternative 1 is a lower density project that is expected to have proportionally less impact on surface water and runoff patterns and less potential impact on water quality than the proposed project. Alternative 2 would have more impact on surface water quality than the proposed project due to fertilizers and biocides carried by runoff from the golf course. Alternative 3 would result in no change to surface water conditions. Further discussion on surface water is contained in Section 3.8.2.

Nearshore Environment and Coastal Waters

The potential adverse impacts to the marine environment from the proposed project are due to the construction of an 800-slip marina and the resulting inflow of higher salinity seawater and inadequate water circulation, both of which are anticipated to impair water quality to the extent of falling below applicable standards. One possible mitigation measure is to significantly reduce the size of the marina expansion.

The reduced marina size (from 45 to 25 acres) and reduced lagoon acreage in Alternative 1 are expected to result in a proportionate reduction in seawater discharging into the new harbor and increased water circulation. Alternative 2 includes the same marina basin size and is therefore subject to the same factors that are expected to adversely affect water quality.

In the existing Honokōhau Harbor, water quality issues focus on the potential for pollutants, sediments, mixing and discharge into the nearshore marine waters. Before the harbor was constructed, any pollutants entrained within the groundwater were believed to have been diffused over a broad coastline.

The water quality in the proposed harbor depends on several components. These include salinity, nutrients, and sediments that come from the ocean, rainfall runoff, water features with marine animals, and dust. The smaller project offered as Alternative 1 is expected to produce a reduced amount of pollutants and reduce the risk of adverse impact upon water quality.

It is notable that the 45-acre marina basin planned in the proposed project and Alternative 2 only becomes viable from a water quality impact standpoint if the additional brackish groundwater inflow into the new marina exceeds 60 mgd. The resulting flushing from such inflow would be expected to better maintain water quality. However, it is unclear whether 60 mgd of brackish groundwater would be available. As proposed in Alternative 1, reduction of the volume of the new marina basin by 45 percent will significantly improve the flushing and water quality because the lower volume can be flushed by the available groundwater flow.

In addition, there could be higher rainfall runoff from the Alternative 2 golf course into the harbor, because the grassed golf course will be less porous than the natural surface. The golf course will also require relatively high levels of fertilizer, biocides, and irrigation, all of which could contribute to adverse water quality impacts.

Further discussion on nearshore environment and coastal waters is contained in Section 3.9.1.

Anchialine Pools

Anchialine pools are located north of Honokōhau Harbor, and south of the harbor on the project site. The marine life in these pools is sensitive to groundwater quality, and changes due to construction and operation of the project could degrade the viability of the pool ecosystem. In the southern complex, 3 anchialine pools with a combined surface area of $20m^2$ would be eliminated due to the harbor construction in the proposed project and Alternatives 1 and 2.

Predicting the extent of change in groundwater flow is difficult if not impossible even with numerous boreholes and intense sampling. The actual flow of groundwater towards the sea is minimal today, and tidal measurements show that tide fluctuations represent more than 90 percent in actual harbor tides. The fluctuations occur simultaneous with the ocean/harbor tide, which indicate a vertical and horizontal pressure regime between bore hole 6 and the ocean and harbor. Hence, the tides alone create a mixing system that increases salinity, as the flow approaches the point of discharge which will be either the channel or the shore. Another factor that could influence groundwater quality is the increased local recharge from irrigation between the channel and shore. This will add fresh water to the lens locally but is not quantified at this time.

Quantification of these impacts, including the flow of groundwater through each pond, is therefore extremely difficult. The shallow lavas are of the pahoehoe type and have a relatively high horizontal permeability. In surface depressions or undulations, the pahoehoe lavas have a tendency to lose vertical permeability from sedimentation thus restricting water exchange within the individual pools. This is normally reflected in both the salinity and temperature and this information has been adequately studied in the pools.

Changes in groundwater quality may or may not impact biological communities in the anchialine and estuarine environment. In either case, it is important to understand these relationships to effectively manage the resource. If there is significant deviation from the baseline especially in regard to nutrients, pathogens, and toxins, a mitigation plan to determine the cause and take decisive appropriate action will be implemented.

Due to the uncertainty of changes in groundwater flow and quality due to marina construction, the variability in impacts between the proposed project and Alternatives 1 and 2 is unknown at this time. Alternative 3 would result in no change in groundwater flow. While this would eliminate the potential for adverse impacts, Alternative 3 would also continue the pattern of existing degradation related to human activity and the introduction of alien species. Further discussion on anchialine pools is contained in Section 3.9.2.

Marine Fishing Impacts

The proposed marina will increase the number of boats in the area and it is reasonable to assume that a portion of these new boats will engage in fishing activities. The increase in boats in the area would be primarily related to the marlin and tuna / pelagic fishery, coral reefs due to extractive fisheries, and SCUBA activities. The pressure on fish and invertebrate stocks is expected to increase with or without the marina. Harbor expansion provides the opportunity to address existing conditions to consolidate, focus, and fund management and enforcement activities at one location.

Compared to the proposed project, Alternative 1 would result in a 21 percent decrease in boat traffic, thereby lessening the potential for marine fishing impacts. The level of impacts in Alternative 2 would be similar to that of the proposed project. Alternative 3 would result in no change in existing marine fishing conditions, and no opportunity to address already existing pressure on fish and invertebrate stocks. Further discussion on marine fishing impacts is contained in Section 3.9.3.

Cultural and Archaeological Resources

The proposed project will integrate cultural and archaeological resources in the overall development. Archaeological sites recommended for preservation will be preserved, and cultural practices will be encouraged. Kona Kai Ola includes a canoe park, and a cultural park with a focus on Hawaiian maritime cultural heritage of the voyaging canoe. Proposed is a 400-foot shoreline setback that would serve as a buffer between the ocean and developed areas. This coastal area would be protected with a shoreline park with trails and public access parking for walking and shoreline fishing, and a cultural park surrounding the heiau, the cultural sites and ʻAlula for community use.

Alternative 1 would contain all of the cultural archaeological features and the shoreline setback area would be 400 feet in the northern portion of the site and increase to 600 feet in the southern portion. Alternative 2 would preserve cultural and archaeological resources, but does not include a 400-foot shoreline setback. Alternative 3 would result in no change to existing cultural and archaeological resources and no addition of cultural and community facilities and activities. Further discussion on cultural and archaeological resources is contained in, respectively, Sections 4.1 and 4.2.

Noise

Project-generated noise is due to construction equipment and blasting, boats, marina activities, vehicle traffic, and the Kealakehe Wastewater Treatment Plant operations. Alternative 1 would generate less noise impacts due to reduced construction activities, fewer boats, less traffic and less on-site activity. Alternative 2 would also generate less noise due to reduced traffic and less on-site activity, but noise related to the excavation of the marina basin and an increase in the number of boats would be similar to that of the proposed project. Further discussion on noise impacts is presented in Section 4.4.

Socioeconomic Impacts

The proposed project will generate an increase in de facto population of an estimated 5,321 persons due to the increase in hotel and time-share units. The estimated de facto population increase in Alternative 1 is 37 percent less, at 3,363 persons, than the proposed project. The de facto population increase in Alternative 2 is similar to Alternative 1.

Employment in the commercial components will nearly double in Alternative 1, from a stabilized level of 1,429 full-time equivalent (FTE) positions in the proposed project to 2,740 in the Alternative 1.

Under Alternative 1, the total operating economic activity at Kona Kai Ola will increase due to the added commercial space more than off-setting the fewer visitor units, moving upward from $557.6 million per year to circa $814.3 million annually. The total base economic impact resulting from development and operation of Alternative 1 will similarly be higher by between 35 and 45 percent than that of the proposed project.

Alternative 1, which has a reduced marina size of 25 acres, and fewer hotel and time-share units, would have a meaningful market standing, create significant economic opportunities, and provide a net benefit to State and County revenues. From a market perspective, a smaller Kona Kai Ola would still be the only mixed use community in the Keahole to Kailua-Kona Corridor offering competitive hotel and time-share product.

The estimated absorption periods for marketable components of Alternative 1 are generally shorter than those for the same components in the proposed project. Marina slips under Alternative 1 are estimated to be absorbed within 2 years after groundbreaking, as compared with 9 years for absorption of slips in the proposed project. Hotel rooms under Alternative 1 are estimated to be absorbed within 4 years after groundbreaking, as compared with 7 years under the proposed project. Time-share units would be absorbed within 10 years under Alternative 1, while 15 years are projected under the proposed project. Due to the planned increase in commercial facilities under Alternative 1, the absorption period of commercial space is estimated at 14 years, as compared with 8 years for absorption of such facilities under the proposed project.

The State and County will still both receive a net benefit (tax receipts relative to public expenditures) annually on a stabilized basis under the Alternative 1. The County net benefits will be some $12.2 million per year under the Alternative 1 versus $14.9 million under the proposed project. The State net benefits will increase under the Alternative 1 to about $37.5 million annually, up substantially from the $11.4 million in the proposed project.

Due to the lower de facto population at build-out, the effective stabilized public costs for both the State and County will decline meaningfully under the Alternative 1, dropping from $7.7 million annually for the County and $36.5 million for the State, to $4.9 million and $23 million per year, respectively.

Alternative 3 would result in no increase in de facto population and improvement to economic conditions. Further discussion on social and economic impacts are contained in, respectively, Sections 4.5 and 4.6.

Vehicular Traffic

The proposed project will impact the nearby road network that currently is congested during peak traffic times. The proposed project includes roadway improvements that would reduce the impact and improve roadway conditions for the regional community.

Alternative 1 includes the same roadway system improvements as the proposed project, yet would reduce vehicular traffic by 35 percent when compared to the proposed project. Alternative 2 would have similar traffic conditions and roadway improvements as Alternative 1. Alternative 3 would result in no increase in traffic and no roadway improvements.

Marina Traffic Study

The increase in boat traffic due to the proposed 800-slip marina would cause entrance channel congestion during varying combinations of existing and new marina peak traffic flow. Worst case conditions of active sport fishing weekend and summer holiday recreational traffic result in traffic volumes exceeding capacity over a short afternoon period. Mitigation to address boat traffic in the proposed project include widening the entrance channel, traffic control, implementation of a permanent traffic control tower, or limiting vessel size.

Alternative 1 would result in a 21 percent reduction in boat traffic congestion under average existing conditions and ten percent reduction during peak existing conditions. The reduction to 400 slips also reduces the impacts of congestion at the entrance channel, thereby reducing the need for any modifications to the entrance channel.

Alternative 2 would have the same level of boat traffic as the proposed project. Alternative 3 would not meet the demand for additional boat slips and would not generate additional boat traffic. Further discussion on marina traffic is contained in Section 4.8.

Police, Fire and Medical Services

The proposed project will impact police, fire and medical services due to an increase in de facto population and increased on-site activity. Alternatives 1 and 2 would have similar levels of impact as the proposed project due to increased on-site activity. Further discussion on police, fire and medical services are contained, respectively, in Sections 4.10.1, 4.10.2 and 4.10.3.

Drainage and Storm Water Facilities

The proposed project will increase drainage flows, quantities, velocities, erosion, and sediment runoff.

Alternative 1 involves a reduction of the project density that would reduce storm runoff from the various land uses due to a reduction in impervious surfaces associated with hotel and time-share development and to the creation of more open space. However, roadway areas will increase by about 30 percent in Alternative 1. Storm runoff from proposed streets would therefore increase; thus requiring additional drainage facilities and possibly resulting in no net savings. The golf course in Alternative 2 may also change drainage characteristics from those of the proposed project and may not reduce impacts. Alternative 3 would result in no change in existing conditions and no improvements to drainage infrastructure. Further discussion on drainage and storm water facilities is contained in Section 4.10.5

Wastewater Facilities

The proposed development is located within the service area of the Kealakehe WWTP and a sewer system will be installed that connects to the WWTP. The sewer system will be comprised of a network of gravity sewers, force mains, and pumping stations which collect and convey wastewater to the existing Kealakehe WWTP. Project improvements will incorporate the usage of recycled / R1 water. Improvements implemented by the proposed project will also accommodate the needs of the regional service population.

Alternative 1 would generate approximately 10 percent less wastewater flow than the proposed project. Wastewater flow in Alternative 2 is undetermined. Alternative 3 would result in no additional flow, as well as no improvements that will benefit the regional community. Further discussion on wastewater facilities is contained in Section 4.10.6.

Potable Water Facilities

The proposed project average daily water demand is estimated at 1.76 million gallons per day. Existing County sources are not adequate to meet this demand and source development is required. The developer is working with DLNR and two wells have been identified that will produce a sustainable yield that will serve the project. These wells will also serve water needs beyond the project.

Alternative 1 would result in net decrease of about five percent of potable water demand. Alternative 2 may have a lower water demand than the proposed project as long as potable water is not used for irrigation. Alternative 3 would result in no additional flow, as well as no source development that will benefit the regional community. Further discussion on potable water facilities is contained in Section 4.10.8.

Energy and Communications

Regarding Alternative 1, preliminary estimates for electrical, telecommunications, and cable resulted in a net demand load that remains similar to the proposed project. Further discussion on energy and communications is contained in Section 4.10.9.1.

The proposed project will increase the demand for electrical energy and telecommunications. The demand would be reduced in Alternative 1 because the number of boat slips and units would decrease. Similarly, Alternative 2 would have fewer units than the proposed project and therefore reduce energy demands. Further reduction in energy demand for either alternative could be achieved by using seawater air conditioning (SWAC) and other energy reduction measures, as planned by the developer. Further discussion on energy and telecommunications is contained in Section 4.10.9.2.

Water Features and Lagoons

The proposed project includes a brackishwater pond, lagoons, and marine life exhibits supplied by clean seawater. The water features in Alternative 1 would significantly decrease by 74 percent from 19 acres in the proposed project to five acres in Alternative 1. This decrease in water features would result in a corresponding decrease in water source requirements and seawater discharge. Alternative 2 does not include the seawater features. Alternative 3 would result in no additional demand for water source requirements and seawater discharge.

2.2.2 Conformance with Public Plans and Policies

State of Hawai'i

Chapter 343, Hawai'i Revised Statutes

Compliance with this chapter is effected, as described in Section 5.1.1 in regard to the proposed project and the alternatives discussed.

- State Land Use Law, Chapter 205, Hawai'i Revised Statutes

  The discussion in Section 5.1.2 is directly applicable to Alternative 1, the proposed project. Alternative 1 will involve a setback of 400 feet that increases to 600 feet along the southern portion of the project site's shoreline area. Alternative 2 does not provide for such a setback, but may still require approvals from DLNR for cultural, recreational, and community uses and structures within the Conservation district.

- Coastal Zone Management Program, Chapter 205A, Hawai'i Revised Statutes

  Recreational Resources:

  In addition to the discussion of consistency with the associated objective and policies, as described in Section 5.1.3, the reduction from the proposed project's 800-slip marina to a 400-slip marina under Alternative 1 will still expand the region's boating opportunities and support facilities. The existing harbor entrance will still be utilized under this alternative; however, potential risks relating to boat traffic and congestion in the marina entrance area will be reduced significantly. The 400-600 foot shoreline setback, public parks, trails, cultural areas, community facilities, and marine science center remain important recreational components under Alternative 1.

Alternative 2 includes a golf course component, which would add a more passive recreation to the active and social components, such as boating, fishing, swimming, trails, walkways, parks, marine life, educational and interactive areas that are also part of the project. The golf course would enhance the range of leisure and recreational opportunities offered at Kona Kai Ola.

Alternative 2, like the proposed project, will expand the region's boating opportunities and support facilities through its 800-slip marina. However, the potential adverse impacts of increased boat traffic from the size of the marina are significant enough to offset the benefits of increased boating opportunities.

Coastal Ecosystems:

The discussion in Section 5.1.3 is directly applicable to Alternative 1.

Alternative 1 not only reduces the number of slips proposed by 50 percent, but it also reduces the size of the marina from 45 acres to 25 acres. The 25-acre marina will increase the body of water within the existing harbor, but to a significantly lesser extent than the proposed project's estimated increase, which is also applicable to the 45-acre size that is proposed for the marina under Alternative 2.

The findings of the Harbor Water Quality Modeling Study conclude that a reduction in the size of the harbor expansion is an alternative that will mitigate the risk of significant impacts upon water quality within the marina and existing harbor. Accordingly, the reduction in both the number of slips and the size of the marina basin under Alternative 1, in combination with proper facilities design, public education, and enforcement of harbor rules and regulations, would result in fewer long-term impacts to water quality and coastal ecosystems. Short-term (construction-related) impacts would likely remain the same although the reduction in the total acreage of excavation is expected to result in a shorter duration of such impacts.

In addition to its 800-slip marina and potential adverse impacts upon water quality and the marine environment, Alternative 2 includes a golf course component, which has the potential to impact coastal ecosystems by increasing the nutrient loading in surface runoff and groundwater and also by introducing pesticides, herbicides, and other chemicals common in golf course use and management into the nearshore waters surrounding the project site.

Economic Uses

Although reduced in the number of slips, the smaller marina under Alternative 1 will nevertheless serve public demand for more boating facilities in West Hawai'i and is consistent with the objective and policies and discussion set forth in Section 5.1.3. The economic impacts of Alternative 2, while comparable to those of the proposed project's marina development, are notably marginal as to the golf course component, based on the marketability analysis that indicates a condition of saturation within the region.

Coastal Hazards

The discussion and considerations set forth in Section 5.1.3 are also applicable to Alternatives 1 and 2 and indicate compliance with the objective and policies addressed. Tsunami risks mainly affect the large shoreline setback area that is proposed for the project and Alternative 1. Alternative 2 projects a transient accommodation site that is partially within the tsunami hazard zone and thus carries a higher hazard risk. However, the essential requirement for these alternatives, as well as the proposed project, is a well-prepared and properly implemented evacuation plan.

Beach Protection

Discussion and considerations set forth in Section 5.1.3 are also applicable to Alternatives 1 and 2 and indicate compliance with the objective and policies addressed. Alternative 1 and, to a lesser extent, Alternative 2, will retain the shoreline area in its natural condition.

Similar to the proposed project, Alternative 1 provides for a shoreline setback of considerable width within which no structure, except for possible culturally-related structures, would be allowed. Alternatives 1 and 2 will thus be designed to avoid erosion of structures and minimize interference with natural shoreline processes.

Marine Resources

The discussion in Section 5.1.3 is also applicable to Alternative 1 which is described to be an alternative that is specifically projected to mitigate anticipated adverse impacts on water quality and the marine environment that might otherwise result from the original harbor design and scale, which is also incorporated in Alternative 2 . The reduced marina size under Alternative 1 is projected to meet water quality standards and enable greater compliance with the objective and policies addressed in this section.

Alternative 2 includes a golf course component and thus the potential to adversely impact marine resources by increasing the nutrient loading in surface runoff and groundwater and also by introducing pesticides, herbicides, and other chemicals common in golf course use and management into the nearshore waters surrounding the project site.

Hawai'i State Plans, Chapter 226, Hawai'i Revised Statutes

Section 226-4 (State goals), 5 (Objectives and policies for population, and 6 (Objective and policies for economy in general):

The discussion in Section 5.1.4 is applicable to Alternatives 1 and 2, in addition to the proposed project. These development concepts generally conform to the goals, objectives, and policies set forth in these sections because they will provide some degree of economic viability, stability, and sustainability for future generations. Kona Kai Ola will convert essentially vacant land into a mixed-use development with a distinctive marina and boating element, providing a wide range of recreational, business, and employment opportunities to the community.

Section 226-8 Objective and policies for the economy – the visitor industry:

Alternatives 1 and 2 will be consistent with the State's economic objective and policies relating to the tourism industry for the same reasons that are discussed in regard to the proposed project in Section 5.1.4. They will incorporate JDI's commitment to sustainability principles in the planning and design of the development concepts in Alternatives 1 and 2. Although the total hotel and time-share unit count is reduced to approximately 1,500 in Alternatives 1 and 2, the transient accommodations component of these alternatives will still further the State's objective and policies for increased visitor industry employment opportunities and training, foster better visitor understanding of Hawai'i's cultural values, and contribute to the synergism of this mixed-use project concept that addresses the needs of the neighboring community, as well as the visitor industry.

Section 226-11 Objectives and policies for the physical environment: land-based, shoreline and marine resources:

Alternative 1 is expected to involve less potential adverse impacts upon these environmental resources than the proposed project. Likewise, and Alternative 2 would have less adverse impact because of its reduction in the size of the marina and in the total hotel and time-share unit count. Alternative 1 carries less potential risk to water quality and related impacts upon the marine environment and anchialine pool ecosystems. Although approximately three anchialine pools are expected to be destroyed, the great majority of pools will be preserved within and outside of the proposed 400-foot shoreline setback.

The golf course component in Alternative 2 has the potential to impact marine resources by increasing the nutrient loading in surface runoff and groundwater and also by introducing pesticides, herbicides, and other chemicals common in golf course use and management into the marina basin and nearshore waters surrounding the project site. It also has the potential to adversely affect the anchialine pools by introducing the chemicals into the pond systems.

Section 226-12 Objective and policies for the physical environment: scenic, natural beauty, and historic resources:

The discussion in Section 5.1.4 is directly applicable to Alternative 1 and describes the compliance with the objective and policies addressed.

The golf course component of Alternative 2 would create a park-like view that would potentially enhance the beauty of the project site and surrounding areas when considered in combination with the existing rugged natural beauty of the area.

Just as with the proposed project, Alternatives 1 and 2 would also be designed to blend with the natural terrain and to honor and protect the cultural history, resources, and practices of these lands.

Section 226-13 Objectives and policies for the physical environment: land, air and water quality:

As stated above, because of the reduction in both the number of slips and the size of the marina basin, with proper facilities design, public education and enforcement of harbor rules and regulations, Alternative 1 is anticipated to cause fewer long-term impacts to water quality than either the proposed project or Alternative 2. Based on the findings of the Harbor Water Quality Modeling Study, water quality resulting from a reduced marina basin size as proposed under Alternative 1 is expected to be similar to existing conditions.

As previously noted, Alternative 2 has the potential to adversely impact water quality by increasing the nutrient loading in surface runoff and groundwater by introducing pesticides, herbicides and other chemicals common in golf course development and maintenance into the marina basin and nearshore waters surrounding the project site.

Section 226-14 Objectives and policies for facility systems - general:

Alternatives 1 and 2 will conform to the objective and policies of this section on the grounds that are discussed in regard to the proposed project in Section 5.1.4. The master-planning and phasing of the project concepts under these alternatives will be coordinated with associated public and private infrastructural planning and related private and public infrastructural financing. The cost of the marina construction and project-related infrastructure is to be borne by the developer, resulting in considerable savings for the public. In addition, the projected lease revenue from these public lands will provide additional public benefits by establishing a revenue stream for capital improvements and maintenance of a range of State facilities.

Section 226-15 Objectives and policies for facility systems - solid and liquid wastes:

In addition to the developer's commitment to sustainable development design, the project will involve upgrades to the County of Hawai'i's Kealakehe Wastewater Treatment Plant to meet current needs, as well as the project's future needs. This commitment is applicable to Alternatives 1 and 2, as well as the proposed project that is discussed in Section 5.1.4.

Section 226-16 Objectives and policies for facility systems – water:

The discussion of water conservation methods and the need to secure additional potable water sources in Section 5.1.4 is also applicable to Alternative 1 and demonstrates conformity to the objective and policies for water facilities. Alternative 2 involves greater irrigation demands in regard to its golf course component and greater potable water demands for human consumption than those for Alternative 1. Alternative 2 is expected to face more serious challenges in securing adequate and reliable sources of water.

Section 229-17 Objectives and policies for facility systems – transportation:

Alternatives 1 and 2 will conform to this objective and policies because they will present water transportation opportunities, including the possible use of transit water shuttles to Kailua-Kona, as described in regard to the proposed project in Section 5.1.4.

Section 226-18 Objectives and policies for facility systems – energy:

Alternatives 1 and 2 conform to these objective and policies through the use of energy efficient design and technology and commitment to the use and production of renewable energy to serve the project's needs. Solar energy production, solar hot water heating, and the use of deep cold seawater for cooling systems are currently identified as means of saving substantial electrical energy costs for the community and the developer.

Section 226-23 Objectives and policies for socio-cultural advancement – leisure:

Alternative 1 conforms to this objective and related policies for the reasons offered in Section 5.1.4 in regard to the proposed project. Alternative 1 will be of greater conformity with the policy regarding access to significant natural and cultural resources in light of the 400-600 foot shoreline setback that has been designed for this alternative.

Although it does not propose the considerable shoreline setback that is planned for Alternative 1, Alternative 2 is consistent with this objective and related policies in incorporating opportunities for shoreline-oriented activities, such as the walking trails. In addition, the golf course component adds a more passive recreation alternative to the active and social components, such as boating, fishing, swimming, trails, walkways, parks, marine life educational and interactive areas that are also part of the project. The golf course would enhance the range of leisure and recreational opportunities offered at Kona Kai Ola.

Section 226-25 Objectives and policies for socio-cultural advancement-culture:

The discussion in Section 5.1.4 is relevant to Alternatives 1 and 2 and demonstrate their conformity the objective and policies of this section.

Both alternatives involve the preservation and protection of cultural features that have been identified by the Cultural Impact Assessment and archaeological studies for the project area. Both provide for public shoreline access, and both will continue the policy of close consultation with the local Hawaiian community and cultural and lineal descendants in the planning of cultural resource preservation and protection.

Section 226-103 Economic priority guidelines:

Alternatives 1 and 2 conform to these guidelines for the same reasons that are set forth in Section 5.1.4. They involve private investment in a public project that will create economic diversification through a mix of marina, industrial, commercial, visitor, and cultural facilities. This presents a wide range of entrepreneurial opportunities, long-term employment opportunities, and job training opportunities.

Section 226-104 Population growth and land resources priority guidelines:

As described in Section 5.1.4, the policy support for the proposed project also extends to the similar development concepts considered in Alternatives 1 and 2. Those alternatives conform to the guidelines of this section because they involve an urban development under parameters and within geographical bounds that are supported by the County's General Plan, a preliminary form of the Kona Community Development Plan, the County's Keahole to Kailua Regional Development Plan, and the reality of being located along the primary commercial/industrial corridor between Keahole Airport and Kailua-Kona. As with the proposed project, the development concepts of Alternatives 1 and 2 are essentially alternatives for the implementation and "in-filling" of the urban expansion area in North Kona.

DHHL Hawai'i Island Plan

This 2002 plan projects DHHL's Honokōhau makai lands for commercial use. As compared to the proposed project and Alternative 2, Alternative 1 presents an expanded commercial component that provides greater compliance with the plan, while addressing certain beneficiaries' concerns about the scale of the marina originally required in the Project. Alternative 2 also conforms to the recommended commercial uses in the makai lands but to a lesser degree than Alternative 1 because of its more limited commercial component. Like the proposed project, its marina size and number of slips raise environmental issues, as more specifically discussed in Part 3, and community concerns.

County of Hawai'i General Plan

HCGP Section 4 – Environmental Quality Goals, Policies and Courses of Action:

Alternative 1 is consistent with this section. It presents a reduction in both the number of slips and the size of the marina basin that, in combination with proper facilities design, public education and enforcement of harbor rules and regulations, would result in very few long term impacts to water quality. Based on the findings of the Harbor Water Quality Modeling Study, water quality would remain similar to existing conditions.

Alternative 2 is the least consistent with this section. In addition to the potential significant impacts of its 800 slip marina basin, its golf course component has the potential to adversely impact marine resources by increasing the nutrient loading in surface runoff and groundwater and also by introducing pesticides, herbicides and other chemicals common in golf course use and management into the nearshore waters surrounding the project site. It also has the potential to adversely affect the anchialine pools beyond their current conditions by introducing such substances into the pool systems.

HCGP Section 7 – Natural Beauty Goals and Policies:

Alternative 2 conforms to some degree with this section. Its golf course component would create a park-like view that would potentially enhance the beauty of the project site and surrounding areas when considered in combination with the existing rugged natural beauty of the area, as demonstrated in other makai golf courses within the region.

HCGP Section 8 – Natural Resources and Shoreline:

Alternative 1 is most consistent with the goals and policies of this section. It would require considerably less marina excavation than the proposed project and Alternative 2 and would reduce the potential risk of long-term adverse impacts to water quality. Based on the findings of the Harbor Water Quality Modeling Study, water quality would remain similar to existing conditions with the degree of reduction in marina basin size that is proposed under Alternative 1. This reduction is also expected to reduce potential impacts upon anchialine pools and their ecosytems, as well as shoreline and marine resources that are affected by water quality. Alternative 1 also retains the shoreline preservation and protection concepts that are proposed in and described for the Project.

HCGP Section 10 – Public Facilities Goals and Policies:

The discussion in Section 5.2.1. in relation to the proposed project is applicable to Alternatives 1 and 2. Improvements to public facilities are are integral to the Kona Kai Ola development. The provision of additional boat slips and numerous road improvements, including a makai extension of Kuakini Highway south to Kailua-Kona are incorporated into plans for the project's development. In light of these elements, Alternatives 1 and 2 are consistent with the goals and policies of this section.

HCGP Section 11 – Public Utility Goals, Policies:

As with the proposed project, Alternatives 1 and 2 are consistent with the goals and policies of this section, based on the relevant grounds set forth in Section 5.2.1. The developer is committed to design, fund, and develop environmentally sensitive and energy efficient utility systems to the extent possible, as described previously in Part 5. Its master planning provides for the coordinated development of such systems with the objective of achieving significant savings for the public. As previously-mentioned example, the project development involves the upgrading of the Kealakehe Wastewater Treatment Plant.

HCGP Section 12 – Recreation:

Alternative 1 is consistent with the goals, policies, and courses of action for North Kona in this section.

Although the number of slips is reduced under Alternative 1, the region's boating opportunities and support facilities will still be expanded. The existing marina entrance would still be utilized under this alternative. However, concerns relating to increased activity leading to increased congestion in the marina entrance area would be mitigated to a certain extent. The 400-600 foot shoreline setback, public parks, trails, cultural areas, community facilities and marine science center remain important components of Alternative 1.

The golf course component of Alternative 2 would add a more passive recreation to the active and social components, such as boating, fishing, swimming, trails, walkways, parks, marine life, educational and interactive areas that are also part of the project. The golf course would enhance the range of leisure and recreational opportunities offered at Kona Kai Ola. Alternative 2 is also considered to be consistent with this section.

HCGP Section 13 and 13.2 – Transportation:

The reduced marina component under Alternative 1 will still provide transportation opportunities and provide for possible use of transit water shuttles to Kailua-Kona, although to a lesser degree than under the proposed project and Alternative 2 . However, in each scenario, internal people-movers are planned, and numerous roadway improvements are planned for coordination with public agencies, including but not limited to the construction of the Kuakini Highway extension between Honokōhau and Kailua-Kona. Accordingly, both Alternatives 1 and 2 are consistent with the goals, policies, and courses of action for North Kona under these sections of the General Plan.

HCGP Section 14.3 – Commercial Development:

For the reasons presented in the discussion under Section 226-104 of the State Plan, the planned commercial component under Alternatives 1 and 2 are consistent with this section.

HCGP Section 14.8 – Open Space:

Alternatives 1 and 2 are consistent with the goals and policies of this section. Alternative 1 provides a considerable (400-600 foot) shoreline setback along the entire ocean frontage of the project site as a means of protecting the area's scenic and open space resources, as well as natural and cultural resources. Although it does not incorporate the shoreline setback planned in Alternative 1, Alternative 2 provides a golf course component would contribute to the amount of open space that is currently proposed and allow additional view corridors to be created.

Community Development Plans

Community development plans are being formulated for different regions in the County in order to supplement the County's General Plan. The Kona Kai Ola project is located in the Kona Community Development Plan (CDP) area. Maps associated with the preliminary work phases

of the Kona CDP include the Kona Kai Ola project site within the "Preferred Urban Growth" boundary of the North Kona district. The Kona CDP process is guided by a Steering Committee composed of a broad cross-section of the community. The Steering Committee will eventually complete its work and recommend the CDP's adoption.

After the DEIS was published, the Kona CDP has progressed to the development of plans for the major urban growth corridor north of Kailua-Kona. The Kona CDP has produced a draft plan showing a transit oriented development that includes a midlevel public transit corridor along the mauka residential elevation, and a makai transit corridor that runs along a proposed new frontage road just makai and parallel to Queen Kaahumanu Highway. The development plan for Alternative 1 includes the Kuakini Highway as part of this proposed frontage road and transit line from Kailua Kona to the Kealakehe area, along with a transit stop at Kona Kai Ola. The Alternative 1 plan also includes a road that could be extended to be part of the proposed frontage road should it be approved and implemented. In addition, the Kona CDP has continued to emphasize the principles of smart growth planning with mixed use urban areas where people can live, work, play and learn in the same region. Kona Kai Ola has been specifically designed to be consistent with this policy in order to provide a stable employment base close to where people live in the mauka residential areas already planned for DHHL and HHFDC lands.

It should be noted that currently and over the years, the 1990 Keāhole to Kailua Development Plan (K-to-K Plan) guides land use actions by the public and private sectors. It is intended to carry out the General Plan goals and policies related to the development of the portion of North Kona area, including the Kona Kai Ola site. The "Preferred Growth Plan" of the Keāhole to Kailua Development Plan identifies the project site as a new regional urban center to include commercial, civic, and financial business related uses, an expanded "Harbor Complex," a shoreline road, and a shoreline park. The proposed project and the development concepts in Alternatives 1 and 2 are therefore consistent with the recommendations in the Keāhole to Kailua Development Plan.

Hawai'i County Zoning

As shown on Figure AA, the project site is zoned "Open". Under Section 25-5-160 of the Hawai'i County Code, "The O (Open) district applies to areas that contribute to the general welfare, the full enjoyment, or the economic well-being of open land type use which has been established, or is proposed. The object of this district is to encourage development around it such as a golf course and park, and to protect investments which have been or shall be made in reliance upon the retention of such open type use, to buffer an otherwise incompatible land use or district, to preserve a valuable scenic vista or an area of special historical significance, or to protect and preserve submerged land, fishing ponds, and lakes (natural or artificial tide lands)".

Some of the proposed uses at Kona Kai Ola are permitted uses in the Open zone such as:

- Heiau, historical areas, structures, and monuments;
- Natural features, phenomena, and vistas as tourist attractions;
- Private recreational uses involving no aboveground structure except dressing rooms and comfort stations;

- Public parks;
- Public uses and structures, as permitted under Section 25-4-11.

In addition to those uses permitted outright, the following uses are permitted after issuance of a use permit:

- Yacht harbors and boating facilities; provided that the use, in its entirety, is compatible with the stated purpose of the O district.
- Uses considered directly accessory to the uses permitted in this section shall also be permitted in the O district.

The proposed time-share and hotel units and commercial uses would not be consistent with the zoning designation of "Open". Project implementation therefore requires rezoning of portions of the project to the appropriate zoning category or use permits for certain uses.

Special Management Area

As shown in Figure AB, the entire project area up to the highway is within the coastal zone management zone known as the Special Management Area ("SMA"). At the County level, implementation of the CZM Program is through the review and administering of the SMA permit regulations. Kona Kai Ola complies with and implements the objectives and policies of the Coastal Zone Management (CZM) Program, and a full discussion is provided in Section 5.1.3. The development concepts in the proposed project and Alternatives 1 and 2 will be subject to applicable SMA rules and regulations.

Attachment 2

The increased level of fisheries knowledge has spawned an atmosphere of stewardship in the general charter-boat fishing community. With catch and release programs returning upwards of 40 percent of the Kona catch back to the ocean there is an obvious awareness that the value of catching the fish is often far greater than the value of selling it. It is ~~recommended~~ proposed that facilities and programs to foster continued stewardship, fisheries science, tracking of all fish catch, and educational programs be implemented in the design of the new marina facilities.

The proposed marina, marina support facilities, public marina promenade, fishing club, and marine science center will provide a venue for implementing the following efforts:

- Efforts to promote tag and release will be fostered through public education and the implementation of more "Catch and Release – Only" tournaments.
- Promote management through catch limits to possibly include slot weight catch limits, ~~ie.~~i.e. must tag & release animals between 250–950 pounds
- Promote various other stewardship measures relating to fisheries conservation.

~~3.9.5~~3.9.4 Marine Mammals and Sea Turtles

In addition to water quality, which is discussed in Section 3.9.1.3, other environmental impacts that may affect marine mammals and sea turtles include noise and vessel collisions. The following sections describe existing conditions, potential impacts and suggested mitigations to prevent negative impacts to marine mammals and sea turtles from noise and vessel collisions.

~~3.9.5.1~~3.9.4.1 ~~Existing Conditions~~Affected Environment

A number of marine mammal and turtle species are found in Hawaiian waters near the Kona Kai Ola project site. Detailed information on the abundance, behavior, threats to the species, hearing ability and vocalization data is provided for all species in Appendix S. Data on the most prevalent endangered species and species of particular interest are summarized here.

Humpback Whales: The population of h~~H~~umpback whales (*Megaptera novaeangliae*) around Hawai'i was estimated to be between ~~are mammals and belong to the baleen whale suborder, *mysticeti*. An estimated~~ 4,500-6,500 in 2000 ~~whales migrate between subpolar Alaska and Hawai'i each year~~ (Mobley et al 2001). The population growth rate between 1993 and 2000 is estimated to be seven percent indicating that the population is recovering from its dramatic reduction due to commercial whaling. It is worth noting that this is considered a high rate of increase for a mammalian species.

The highest densities of animals are found within the 100 fathom isobath. ~~and seek refuge in shallow waters close to shore.~~ Most humpbacks off Hawai'i are found north of Honokōhau in the waters of the Hawaiian Islands Humpback Whale National Marine Sanctuary. Nevertheless, they are commonly seen off Honokōhau in winter months. Humpbacks are not deep diving animals. Whales in Hawai'i typically dive to less than 100 feet, although occasional deeper dives are possible (Hamilton et al. 1997)The whales breed and give birth while in Hawai'i during the winter months, and migrate north to feed each spring.

~~Humpback whales found in Hawai'i's waters are part of a global population of Humpback whales that was reduced by over 250,000 individuals, or 90 percent, due to hunting (Johnson et al 1984). In 1966, the International Whaling Commission instituted a moratorium on all hunting of whales globally, and populations have begun to rebound. The North Pacific population of humpback whales, with a population of approximately 15,000 prior to hunting, is recovering from an estimated low of 1,000 individuals (Rice 1978, Johnson et al 1984). Humpback whales are also protected under the Federal Endangered Species Act. It is estimated that Hawai'i's population of Humpback whales is growing by 7% annually (Mobley et al 2001).~~

Congress designated the Hawaiian Islands Humpback Whale National Marine Sanctuary (HINMS) on November 4, 1992, and was followed by the Governor of Hawai'i's formal approval in 1997. The Sanctuary's purpose includes protecting humpback whales and their habitat within the Sanctuary, educating the public about the relationship of humpback whales to the Hawaiian Islands marine environment, managing the human uses of the Sanctuary, and providing for the identification of marine resources and ecosystems of national significance for possible inclusion in the Sanctuary. The sanctuary is approximately four nautical miles north of Honokōhau Harbor.

~~While waters surrounding the main Hawaiian islands constitute one of the world's most important North Pacific humpback whale habitats (Calambokidis et al. 1997), the Sanctuary actually encompasses five noncontiguous marine protected areas across the Main Hawaiian Islands, totaling 1370 square miles. Almost half of this area surrounds the islands of Maui, Lāna'i and Moloka'i. Smaller areas are designated on the North shore of Kaua'i, North and Southeast shores of O'ahu, and Hawai'i's Kona Coast. On Hawai'i's Kona Coast, the Sanctuary encompasses the entire northwest-facing coast, consisting of submerged lands and waters seaward of the shoreline to the 100-fathom (183 meter) isobath from 'Upolu Point southward to Keāhole Point, which is approximately four nautical miles north of Honokōhau Harbor.~~

Whales have very sensitive hearing, so any loud underwater sound has ~~may have~~ the potential to disturb these animals. ~~Vessel collisions are also a concern with whales.~~ Playback experiments have estimated that humpback whales will respond to biologically meaningful sound at levels as low as 102 dB re 1 µPa, a level that is similar to background ambient noise (Frankel et al. 1995). Increases in vessel numbers will lead to an increase in noise from operating boats. However, even at its greatest predicted increase, the median sound level from active boats is not expected to raise sound levels to an intensity that would be considered an impact (Level B take) to marine mammal population (See Appendices T-2 and T-3). Humpback whale song ranges from 20 Hz to over 10,000 Hz, with most acoustic energy typically concentrated in the 100-1000 Hz range. This vocal production and the anatomy of their inner ear indicate that these animals are most sensitive to low-frequency sound (Ketten 1992).

Numerous studies have shown that human activity can affect humpback whale behavior, including vessel activity (Bauer 1986; Norris 1994; Corkeron 1995; McCauley et al. 1996; Scheidat et al. 2004), oceanographic research (Frankel and Clark 2000; Frankel and Clark 2002), and sonar (Miller et al. 2000; Fristrup et al. 2003). If the humpback whale population continues to expand at its present rate (8%/year) it can be expected that greater numbers of whales will extend into waters off the Kona Coast. This is likely to increase the demand for whale watching vessels from the new harbor and this increase will have a negative impact on the whale population expansion. The increase in both the number of vessels and number of whales increases the chance for collisions.

Vessel collisions are also a major concern. The majority of whale strikes occur~~red~~ where whales and boats are most common, such as in ~~and boats watching are common as in~~ shallow waters between Lāna‘i and Maui. In a recent study, three of ~~conducted by NMFS on~~ 22 ~~27~~ recorded whale-vessel collisions ~~strikes~~ in the main Hawaiian Islands ~~, only two were recorded~~ occurred off the Kona coast. (Lammers et al. 2003). That study also found that 14 of the 22 collisions were reported between 1995 and 2003. This observed increase may result from more awareness of the issue, or from the greater number of both whales and vessels in Hawaiian waters. In Hawai‘i, data from 1972 to 1996 reveal at least six entanglements of humpback whales in commercial fishing equipment (Mazzuca et al. 1998). These data also indicate an increasing trend of entanglement since 1992 and a three-fold increase in death and entanglement occurrences related to human activity in 1996.

It is highly unlikely that humpback whales will approach to within the Level A or Level B impact “take” zones created by the explosive blasts of harbor construction. However, the sounds generated by these explosions will be within the frequency hearing range of humpback whales and could potentially be heard by whales between Kona and Maui. Modeling predicts that the maximum sound level two miles offshore the site is less than 150 dB re1 µPa, which is less than the threshold for Level B impacts. As the explosions are planned to occur daily for up to 9 months, the cumulative impact of this noise must be considered if construction is anticipated when whales are expected in the area (December 15 – March 30).~~In one instance, a fishing boat was pulling in a catch and was lifted by a whale. In the other instance, a whale was struck by a dive boat heading towards its diving spot.~~

Dolphins: A number of dolphin species are found in the waters near Honokōhau Harbor. Detailed information on all of these can be found in Appendix S. Spinner dolphins (*Stenella longirostris*) are regularly seen in shallow water and in close proximity to the project site. ~~Spinner dolphins (*Stenella longirostris*), often inhabit waters within Honokōhau Bay and at times intentionally congregate near the harbor channel to take advantage by bow-riding outgoing vessels. "Spinners" common name stems from their habit of leaping clear of the water and twirling in the air.~~ They are the smallest dolphins typically seen in Hawai‘i, with a mature size of 6 feet in length and 160 pounds.

Spinners school in pods of a few animals to ~~100~~ 180 or more, with pod sizes of 1-20 being most common (Östman-Lind et al. 2004). They ~~and show community behavior when~~ feed~~ing in~~ on mesopelagic fish, squid and shrimp in deep water at night, and rest in nearshore shallow waters during the day (Norris and Dohl 1980; Benoit-Bird et al. 2001). ~~when they come near shore to play and rest. On the Island of Hawai'i, Kealakekua Bay is one location of almost daily spinner visits, but they frequent many other bays along the coast and regularly rest in Honokōhau Bay.~~ There are seven primary resting areas along the Kona coast of Hawai'i, including Honokōhau Bay, where spinners are regularly seen near the harbor entrance (Östman-Lind et al. 2004). There is some evidence that the spinner dolphins may be resident to the area (Östman-Lind et al. 2004), making them more susceptible to repeated disturbance.

The hearing ability of spinner dolphins has not been measured. However, hearing of the related striped dolphin (*Stenella coeruleoalba*) was measured between 500 Hz and 160 kHz, with maximum sensitivity at 64 kHz (Kastelein et al. 2003). The hearing response of this single dolphin was less sensitive below 32 kHz than other dolphins. ~~As all marine mammals have very sensitive hearing, any loud underwater sounds have the potential to disturb dolphins as well. Given the sporting habit of spinners and other dolphins of bow-riding ships and small boat wakes, they are apparently not overtly impacted by vessel traffic noises.~~

Despite their limited sensitivity to low frequency sound, spinner dolphins have been shown to be impacted by human activity. Examples include interruption of resting activity and increases in the number of higher energy behaviors (Luna-Valiente and Bazúa-Durán 2006). Numerous studies describe changes in distribution (Haviland-Howell et al. in press) and short-term behavioral changes of dolphins in response to vessel traffic (Bejder et al. 1999; Scarpaci et al. 2000; Gregory and Rowden 2001; Nowacek et al. 2001; Van Parijs and Corkeron 2001; Ritter 2002; Lusseau 2003; Ng and Leung 2003). However, it has been established that for at least one population of bottlenose dolphins, these repeated short-term effects translate into long-term detrimental effects on the affected population (Bejder et al. 2006a; Bejder et al. 2006b).

In Hawai'i, some entanglements of spinner dolphins have been observed (Nitta and Henderson 1993; Rickards et al. 2001) but no estimate of annual human-caused mortality and serious injury is available. A habitat issue of increasing concern is the potential effect of swim-with-dolphin programs and other tourism activities focused on spinner dolphins around the main Hawaiian Islands (Östman-Lind et al. 2004).

Hawaiian Monk Seals: Endangered Hawaiian Monk Seals (*Monachus schauinslandi*, Hawaiian Name: 'Ilio holo I ka uaua) ~~are on the endangered species list . They~~ are rare, but not unknown along the Kona Coast. ~~Fortunately, monk seals are air breathing and spend the majority of their time above water where they are easily observed. If a monk seal is reported observed in the area, Kona Kai Ola would work with relevant agencies to protect the seal.~~ Most monk seals are found in the Northwest Hawaiian Islands, but recent aerial surveys estimated that there are 52 seals in the main Hawaiian Islands (Baker and Johanos 2004). There have been 13 sightings between 2003 and 2006 in the vicinity of Kaloko-Honokōhau National Historical Park (NOAA protected species division data) indicating regular, albeit low-level use of these areas by monk seals. ~~One~~Two birth on the Island of Hawai'i have~~s~~ been reported (Baker and Johanos 2004).

The best population estimates for Hawaiian monk seals (as of 2003) was 1,244 (Carretta et al. 2004). However the population is currently showing a decline that has been continuing since the 1950s (Antonelis et al. 2006).

Underwater hearing in the Hawaiian monk seal has been measured between 300 Hz to 40 kHz. Their most sensitive hearing is at 12 to 28 kHz, which is a narrower range compared to other phocids. Above 30 kHz, their hearing sensitivity drops markedly (Thomas et al. 1990).

Monk seals are very intolerant of human activity and are easily disturbed. When the U.S. military inhabited Sand Island and the Midway Islands and Kure Atoll, the monk seals disappeared until after the military left. Monk seals prefer to be solitary animals (Reeves et al., 2002).

Sea Turtles: Five species of sea turtles are known to frequent Hawaiian waters, with Hawaiian green sea turtles (*Chelonia mydas*) by far the most abundant at 97% of the total numbers, hawksbill turtles (*Eretmochelys imbricata*, 1.7% of total), olive ridley turtles (*Lepidochelys olivacea*, 0.8%), and occasional sightings of leatherback (*Dermochelys coriacea*) and loggerhead sea turtles (*Caretta caretta*, Chaloupka, et al, 2006, from stranding reports). Green sea turtles are the most plentiful large marine herbivore in the world and have experienced a very successful population recovery in Hawaiian waters since 1974 when harvest was outlawed in Hawai'~~i~~i, and 1978 when they became protected under the Endangered Species Act (Balazs, et al. 2004). Both green sea turtles and hawksbills are known to breed and nest on beaches within the main Hawaiian Islands, and have a 25-30 year generation time with a life span of 60-70 years (Balazs et al 2004). Total population numbers of green sea turtles in the Hawaiian archipelago have not been estimated, but the population has at least tripled since the 1970s and may now be approaching the carrying capacity of the islands (Chaloupka, et al. 2006).

Bartol et al. (1999) measured the hearing of juvenile loggerhead sea turtles using auditory evoked potentials to low-frequency tone bursts found the range of hearing to be from at least 250 to 750 Hz. The frequency range that was presented to the turtles was from 250 Hz to 1000 Hz (Bartol et al. 1999).

Most recently, Bartol and Ketten (2006) used auditory evoked potentials to determine the hearing capabilities of subadult green sea turtles and juvenile Kemp's ridleys. Subadult Hawaiian green sea turtles detected frequencies between 100 and 500 Hz, with their most sensitive hearing between 200 and 400 Hz. However, two juvenile green turtles tested in Maryland had a slightly expanded range of hearing when compared to the subadult greens tested in Hawai'i. These juveniles responded to sounds ranging from 100 to 800 Hz, with their most sensitive hearing range from 600 to 700 Hz. The two juvenile Kemp's ridleys had a more restricted range (100 to 500 Hz) with their most sensitive hearing falling between 100 and 200 Hz (Bartol and Ketten 2006).

Adult ~~G~~green turtles are primarily herbivorous often seen on reefs as deep as 100+ feet but much more common in shallower waters. Foraging behavior of green turtles is well documented and in Hawai‘i is typically characterized by numerous short dives (4 to 8 min) in shallow water (typically less than 3 m) with short surface intervals (less than 5 sec) (Rice et al. 1999).Resting periods are characterized by longer dives (over 20 min) in deeper water (4 to 40 m) with surface intervals averaging 2.8 min (Rice et al. 1999). The amount of time that turtles spend foraging versus resting is still largely unknown. Green turtles in Hawai‘i frequently use small caves and crevices in the sides of reefs as resting areas, and spend significant amounts of time on the tops of reefs (Balazs et al. 1987). Green turtles are known to be resident in Kiholo Bay, Hawai‘i (Balazs et al. 2000), and presumably other areas as well, potentially increasing their susceptibility to vessel collision and/or repeated disturbance. Two turtle “cleaning stations” have been reported near the mouth of Honokōhau Harbor. ~~During periods of calm water green sea turtles are often seen over very shallow reef flats where the choicest of algae are to be found. While some turtles may "rest" upon the surface, it is much more common to find them in small caves or wedged between coral heads where they are less subject to shark attacks. Green sea turtles may occasionally be seen far at sea (they nest in French Frigate Shoals in the NW Hawaiian Islands), but they are much more prevalent over the shallow shoreline areas where they forage for food.~~

Vessel collisions and potential noise impacts are a concern with regard to turtles. In a study of 3,861 turtle strandings in the main Hawaiian Islands from 1982 – 2003 (Chaloupka, et al. 2006), boat strikes accounted for only about 2.7 percent of the cases and were almost always fatal (95 percent). Entanglement in gill nets accounted for about six percent of strandings and also had a high rate of mortality (75 perce~~d~~nt). Hook and line entanglement (seven percent of strandings) was much less likely to result in the death of the turtle (52 percent mortality). At least 20 green sea turtles have stranded in Honokōhau Harbor or along the boundaries of Kaloko- Honokōhau National Historical Park. ~~Of all 3,861 strandings recorded in the Main Hawaiian Islands since 1982 only three occurred within 10 miles north or south of Honokōhau Harbor (Balazs, personal communication from NMFS database).~~

Recent increases in longline fisheries may be a serious source of mortality. Greens comprised 14% of the annual observed take of all species of turtles by the Hawai‘i-based longline fishery between 1990 to 1994 (NMFS 1998a). Over the period of 1994 to 1999, it was estimated that an annual average of 40 green sea turtles were caught by the Hawai‘i-based longline fishery (McCracken 2000).

Recent proliferation of a tumorous disease known as fibropapillomatosis (Herbst 1994) may reverse improvements in the status of the Hawaiian stock (NMFS 1998a), although recent modeling suggests that population levels continue to increase despite the disease (Chaloupka and Balazs 2005). The disease is characterized by grayish tumors of various sizes, particularly in the axial regions of the flippers and around the eyes. This debilitating condition can be fatal and neither a cause nor a cure has been identified.

Hawksbill turtles (Eretmochelys imbricate) are observed less often than green sea turtles near Honokōhau. About 20-30 female hawksbills nest annually in the Main Hawaiian Islands (NMFS 1998b). In 20 years of netting and hand-capturing turtles at numerous nearshore sites in Hawai‘i, only eight hawksbills (all immatures) have been encountered at capture sites including Kiholo Bay and Ka‘u (Hawai‘i), Palo‘ou (Moloka‘i) and Makaha (O‘ahu) (NMFS 1998b). It was only recently discovered that hawksbills appear to be specialist sponge carnivores (Meylan 1988). Previously they had been classified as opportunistic feeders on a wide variety of marine invertebrates and algae.

Increasing human populations and the concurrent destruction of habitat are also a major concern for the Pacific hawksbill populations (NMFS 1998b). Hawksbill turtles appear to be rarely caught in pelagic fisheries (McCracken, 2000). However, incidental catches of hawksbill turtles in Hawai‘i do occur, primarily in nearshore gillnets (NMFS 1998b). The primary threats to hawksbills in Hawai‘i are increased human presence, beach erosion and nest predation (*e.g.,* by mongooses) (NMFS 1998b).

~~3.9.5.2~~3.9.4.2 Anticipated Impacts and ~~Recommended~~ Proposed Mitigation

A complete analysis of the in-air and in-water potential acoustic impacts from the construction of the Kona Kai Ola small boat harbor was completed by Marine Acoustics, Inc.(MAI) and is included in this document as Appendix T-3. In conducting this analysis, the best available scientific, environmental, geologic, and meteorological data were obtained and used to calculate the acoustic transmission loss (TL) and subsequently to predict the received levels (RLs) at the five receiver sites. State of the art acoustic propagation models were employed in this analysis to determine in-air and in-water TL. MAI used the Acoustic Integration Model© (AIM©) to assess the impact of the predicted acoustic sound field on the species of marine mammals that could conceivably occur near the Kona Kai Ola project site.

The conclusion of that report determined that the criteria for Level A impacts to marine mammals for either in-air or in-water conditions at the receiver sites were never exceeded for the model source and receiver locations for non-blasting activities. However, these thresholds could be exceeded by the explosive blasting used to create the new harbor. For both in-air or in-water acoustic propagation, this only occurred when an animal was within about 200 meters (656 ft) of the explosion, This condition could only occur when the explosive source was at locations farthest north in the new harbor and closest to the existing harbor. This condition mandates that a safety range out to at least 200 meters (656 ft) of the source be shown to be clear of all marine mammals and sea turtle prior to each blast to preclude potential Level A takes.

The MAI report indicated that the in-air RLs for the explosive sources would exceed the assumed 100 dBA threshold for Level B harassment of pinnipeds (seals) for ranges out to about 0.4 nm (i.e., 800 yds [731 m]). This threshold is nominally for pinnipeds, but it should be extended to surface resting marine mammals and basking or beached sea turtles. Therefore, an in-air safety buffer of at least 731m from any explosive source is proposed, that should be maintained and found clear of marine mammals and basking or beached sea turtles prior to any blasts. It should be noted that although a receiver site was not modeled specifically in the existing harbor, that area is often within the range of this safety buffer and that extra care should be taken to ensure that no marine mammals or sea turtle are in the existing harbor prior to any blast. Analysis of the most restrictive Level B in-water explosive threshold shows that it is only exceeded when an animal is closer than 300 m (984 ft) from the explosive source.

Although the possibility exists for Level B impacts to marine mammals, based purely on the sound fields produced by the explosive blasts, analysis is the marine mammal distribution and movement as predicted by the AIM model, indicates that this is very unlikely situation. Therefore, it is expected that there will be much less than 0.5 Level B takes, with or without mitigation. But the mitigation safety buffer must still be enforced to preclude the unlikely possibility of marine mammals or sea turtle being near the explosive sources when they are used.

It should be recognized that several mitigation measures are already built into the proposed project. For example, the proposed practice to maintain a rock "dam" separating the construction site from the existing harbor reduces acoustic energy propagating to area potentially containing marine mammals or sea turtles. Also, this dam precludes animals from entering the construction area. This dam or land-bridge will be in place for all drilling and dredging activities, except for the removal of the land bridge itself.

Several other possible methods of mitigation are available to the Kona Kai Ola project, and feasibility, practicality, and benefit will be discussed with the National Marine Fisheries Service (NMFS) during consultation, and may be implemented subsequent to that consultation. The first possible mitigation technique is to acoustically monitor the potentially impacted areas during construction to: a) assess the accuracy of the modeling and b) to interact proactively with construction personnel to ensure that the identified threshold levels are not exceeded. Although the best available science and data was used to model the acoustics of the area, numerous conservative assumptions needed to be built into the modeling. By monitoring the actual levels received, in-situ corrections/updates to modeled parameters could potentially reduce the built--in conservativeness and reduce the potentially impacted areas. For example, the modeling assumes that all of the small voids in the bedrock are water-filled and therefore impart minimum attenuation on the acoustic signal as it propagates through. If even a small percentage of the voids are gas-filled, this attenuation would increase greatly and the impacted area would be reduced.

Another possible mitigation technique would be to augment the land-based visual observer, who it is assumed would verify that the area was clear the animals, with boat-based observers. This would increase the effectiveness of recognizing the presence of marine mammals and sea turtles in the potentially affected areas.

Additionally, interactions with the construction teams to alter the blasting methods modeled could potentially mitigate and reduce acoustic impacts to marine animals. A blasting expert will be consulted to develop a discontinuous non-linear blasting plan that will optimize cancellation of the explosion pressure wave into the marine environment. Examples of possible changes include: reducing charge size, reducing the depth drilled and blasted during any blast, reducing the number of blast holes or the volume of each blast, etc. The combination of these techniques with acoustic monitoring could potentially allow a large portion of the northern third of the harbor to be excavated with little or no potential impact to marine animals.

Interactions with NMFS during the consultation period will be used to examine these or any other techniques which may be identified. Also, the project is requesting help in identifying any possible method known to NMFS to establish and maintain turtle exclusion areas, especially in the existing harbor, without harassing the turtles. It may become apparent during those consultations that even with the identified buffer zones and mitigation techniques that an Incidental Harassment Authorization (IHA) is required, especially for the northern third of the proposed harbor.

Marine Acoustics, Inc. also completed a study of the expected ambient noise levels in Honokōhau Bay as a result of the increased vessel traffic from the expanded harbor. This report is included in this document as Appendix T-2. That report concluded that the average maximum daytime ambient noise levels would be expected to increase about 9.7 dB across the frequency spectrum from 100 Hz – 2 kHz, with the quadrupling of the vessels using the expanded harbor (i.e., the proposed action). Although significant, this increase would occur primarily during daylight hours, and the predicted median ambient noise would still be below 100 dB for all frequencies. The other significant factor is that there will be a quadrupling of the number of localized (i.e., small) individual sound fields in the area. These sound fields surround the individual boat that are contributing to the overall ambient noise. Noise levels in excess of 120 dB extend out to about 550 m (1804 ft) from these boats, with even high levels at closer ranges. Short of actual collisions with animals, Level A impacts are unlikely for noise levels typically generated by small boats. The Level B threshold nominally extends to approximately ten meters around each boat (depending on equipment such as size of motor, conditions of propeller and other equipment). Therefore potential Level B impacts to marine mammals and sea turtles would only occur within this range. Therefore, the chance for potential Level B impacts is small.

Completion of the harbor expansion project will increase the vessel traffic crossing the Hawaiian Islands Humpback Whale National Marine Sanctuary, the southern boundary of which is approximately four nautical miles north of Honokōhau Harbor. At a time when the whale population is growing, an increase of vessel traffic may increase the likelihood of vessel-whale collisions. Related to vessel traffic, an increase in whale watching activities is also likely. Vessels participating in these activities directly seek out higher whale population densities, increasing the likelihood of collisions, but also having the potential for disrupting whale behaviors such as resting, courting, mating or birthing.

As noted earlier, however, of the ~~27~~ 22 recorded whale strikes in the main Hawaiian Islands, only ~~two~~ three were recorded off the Kona coast. Sanctuary managers may need to implement additional regulations for private and/or commercial activities directly involving whale encounters. Mariner education programs, already in place as part of Sanctuary operations, will help to mitigate possible impacts due to increased boaters, and the proposed marine science center will complement Sanctuary educational programs.

~~Impacts to turtles may occur during construction of the marina. Since most of the marina will be excavated in a land-locked condition, turtles will not be subject to any potential harm from excavation. Experience during construction of the Ko Olina lagoons, and the expansion of the Barber's Point Harbor on O'ahu indicate that turtles abandoned their offshore (30-100 ft depth) resting habitats and concentrated in very near shore waters adjacent to the harbor and, at times, even within the active construction areas as soon as blasting and excavation began. Although no turtle injuries or mortalities were reported during either of those harbor construction activities, this should serve as a cautionary example for future coastal construction activities.~~

An increased level of impacts to turtles from increased boating and fishing activities may occur. ~~The level of impact documented by National Marine Fisheries Service is limited to only three turtle mortalities confirmed, since 1982, from a total of 3,861 strandings throughout the Main Hawaiian Islands~~. Of the 3,861 turtle strandings recorded from the Main Hawaiian Islands since 1982, 75% were mortalities, and of these about 4% (~est. 116, from Figure 3 of Chaloupka, et.al.) were from boat strikes and 3 of these occurred within 10 miles of Honokōhau Harbor. Data from NPS staff at the adjacent Kaloko-Honokōhau National Historical Park show a total of 20 strandings within the parking (19) and harbor (1) between 2000 and 2006 with one attributed to boat strike and 6 to fishing gear entanglement. Eleven additional gear entanglements and one additional boat strike were also recorded but not listed as strandings. Human caused impacts from fishing and boat strikes are anticipated to increase as turtle populations continue to increase and boating /fishing activities increase with the expanding harbor.

~~It would appear that anthropomorphic impact to turtles from boat strikes and fishing activities is very low along the Kona Coast adjacent to the existing harbor. It is likely that this is due in part to the relatively steep ocean bottom that limits the habitat of the turtles to the very nearshore areas away from the areas of heavy boat traffic~~. Recognition by the general public that sea turtles are protected ~~also~~ puts a heavy social pressure on fishermen who may inadvertently catch a sea turtle, and is likely a factor in the recovery of this species. Although no adverse impacts to turtles have been documented within the existing harbor, the close proximity of boats and turtles in this environment is cause for concern.

~~During land-based construction of the marina, no mitigation is necessary as previous experience has shown that turtles are not adversely impacted by these activities.~~ Once the land bridge is open, ~~however,~~ it is highly likely that turtles will be attracted into the new harbor and be subject to potential harm from in-water construction of piers or other facilities. During this period of time and until the harbor is operational, ~~it is recommended that a~~ mesh barrier will be ~~is~~ erected across the new harbor channel to exclude turtles from the inner basin. The mesh size needs to be selected in consultation with ~~regulatory~~ NMFS ~~agencies~~ to make sure it does not entangle turtles.

As the new harbor area will ~~likely~~possibly attract turtles to the basin (similar to the existing harbor) and an increase in boat traffic is expected in the harbor channel there will be an increased possibility of turtle strikes within the channel and new harbor area. To minimize this possibility it is ~~recommended~~ proposed that educational signs be erected around the harbor describing the turtles and warning boaters to be cautious while traversing harbor channels. The slow no-wake lane in the entrance channel should also be strictly enforced and the State should consider extending the slow no-wake zone further out to the first green buoy.

~~As all marine mammals have very sensitive hearing, any loud underwater sounds have the potential to disturb these creatures. Potential underwater acoustics may impact marine mammals and sea turtles during construction activities, such as blasting and pile driving. Appendix Q contains a study of underwater noise impacts during the construction and operation of the proposed project.~~

~~To mitigate impacts related to noise generated by construction activities, such as blasting and pile driving, a program to monitor sound levels and the presence of marine mammals and sea turtles will be implemented. Construction activities will be adjusted if whales, monk seals, dolphins or sea turtles are in the vicinity. Further, keeping the land bridge closed to the ocean until all major pile driving and blasting are completed will further avoid adverse impacts.~~

~~Increased boat traffic will result in increased low intensity sounds in the harbor area and along transit routes. The ecological role played by anthropomorphic sound in the marine environment has recently received heightened awareness. Evidence from declassified Department of Defense ocean recordings off of San Diego show that background sound levels off-shore of the harbor have increased approximately ten-fold in 30 years. Much of this increase in sound level has been ascribed to large ship traffic. While intense sound levels can adversely impact marine mammals and potentially other species, this level of sound pressure has not been shown to be produced by the small boats envisioned to occupy the new marina.~~

~~Adverse impacts of lower intensity noise, such as from small boat engines, have been very difficult to quantify. No definitive information is available to determine the level of impact produced by increase in small boat generated noise on fish, marine mammals and sea turtles. Given the sporting habit of spinners and other dolphins of bow-riding ships and small boat wakes, they are apparently not overtly impacted by vessel traffic noises.~~

~~However, boat-generated noises can be reduced by slowing boats to "slow-no-wake" in the main traffic lane of the entrance channel. The State could also consider extending the "slow-no-wake" lane out to the first green buoy. Appropriate signage to enforce these requirements is recommended.~~

~~3.9.6~~3.9.5 Ciguatera

ENVELOPE POSTMARKED FEB 13, 2007

Submitted by:
Eric von Platten Luder
75-5828 Kahakai Road
Kailua Kona HI 96740

Dayan Vithanage
Oceanit
828 Fort Street Mall, 6th Floor
Honolulu HI 96813

Subject: Draft Environmental Impact Statement for Kona Kai Ola

I am submitting public comments on the DEIS that are in agreement with the planned urban expansion land use for this area.

Jacoby Development's Kona Kai Ola plan includes an expanded marina that this community has been asking for for decades. This project will bring this community over $100 million dollars of badly needed public infrastructure paid for by the project, including a new major road, improvements to the regional waste water treatment plant, planned parks, access to the shoreline, more than 40% of the project left in open space and a setback from the shoreline of 400-feet. I applaud this.

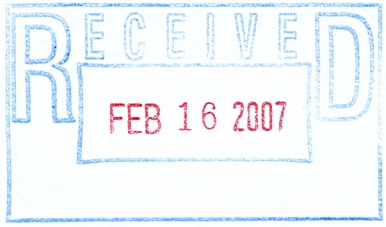
The developer has the ability and experience to deliver to this community environmental sustainability that will become a model for others to follow. They want to bring solutions that will clean up the antiquated regional waste water treatment plant, address the unlined land fill and provide energy solutions. That is what we are looking for in long-range planning.

Although I am in support of developing the parcel, I do have serious concerns with the density of the project and am not in favor of the amount of timeshare and hotel units which are currently being planned.

I understand the general financial economics of projects like this and perhaps reducing the size of the expanded marina will allow the project to proceed with less density that would equate to less hotel and time share units and more open space.

Mahalo,

Eric von Platen Luder



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oceanit
innovation through engineering & scientific excellence

July 23, 2007

Eric von Platten Luder
75-5828 Kahakai Road
Kailua-Kona, Hawai'i 96740

Dear Mr. Luder:

Subject: Kona Kai Ola Draft Environmental Impact Statement
Response to Your Comments Postmarked February 13, 2007

Thank you for your comments on the Kona Kai Ola Draft Environmental Impact Statement.

We agree that Kona Kai Ola's proposed marina is a response to a long-standing public need. We also appreciate your recognition that the project will privately fund needed public infrastructure. You are correct in noting that 40 percent of the project will be left in open space and that there is a 400-foot shoreline setback.

We also concur with your acknowledgement of the incorporation of environmentally sustainability practices, and EIS Section 1.5.2, Project Sustainable Design, provides sustainability goals in the areas of design, energy, water, waste and transportation. These goals are consistent with the principles of responsible long-range planning. The following text is incorporated in the EIS Section 1.5.2:

The US General Services Administration defines sustainable design as a process that "seeks to reduce negative impacts on the environment, human health and comfort of building occupants, thereby improving building performance" (GSA 2006). Sustainable design is a process that requires integration and communication between all parties involved in the design and construction of a development. In a typical development, an owner works with an architect and site planner to design the development. Following a site's design, engineers are hired to design the structure and systems of a building. Eventually a contractor is brought in to construct the development. In this version of development, the designers and contractors work in isolation. In contrast, sustainable design requires that team members work together to understand how all pieces to a development fit within the whole. This integration allows project members to offer unique solutions to common design and construction problems while also integrating environmental concerns into a project.

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JDI has made a corporate commitment to environmental sustainability in all its work. In Kona Kai Ola, JDI intends to incorporate the latest environmental design and technology to create an energy efficient, low environmental impact, sustainable development at Kona Kai Ola. The vision for the project is to develop a project that has minimal impact on the environment by striving to significantly reduce water consumption, waste disposal, energy use and carbon dioxide emissions.

One key to measuring the sustainability of the project's design and operation is to use the Leadership in Energy and Environmental Design (LEED) Green Building Rating System. The LEED Green Building Rating System is the nationally accepted benchmark for the design, construction, and operation of high performance green buildings. LEED gives building developers and operators the tools they need to have an immediate and measurable impact on their buildings' performance (LEED 2006). JDI has experience with the LEED certification process from its other projects both for individual buildings, and for large campus infrastructure as well. JDI intends to pursue, at a minimum, Silver LEED certification for its development of the Kona Kai Ola project.

At the project's onset, JDI developed goals related to design, energy, water, waste and transportation, and the following sections present goals in each of those areas.

Regarding your concern about the "amount of time-share and hotel units," JDI has been exploring project alternatives and one alternative reflects a decrease in such units.

As explained in the DEIS, the agreement between JDI and the State of Hawai'i established a required scope and scale of the project for which the impact analysis was provided. Several comments have addressed the fact that alternatives other than the No Project Alternative were not addressed in the DEIS Section 2, Alternatives Analysis.

Kona Kai Ola is of the position that alternative actions other than a No Project alternative are not currently feasible without an amendment to the agreement with the State. Agency and public comments in response to the DEIS, as well as additional information generated as a result of inquiry into issues raised by the comments, have been helpful in identifying alternative actions that will serve the State's goal of providing additional marina slips for the Kona area. These alternative actions also serve to reduce or mitigate anticipated effects of the proposed development.

Thus, agencies such as the Land Division of the Department of Land and Natural Resources, the U.S. Department of the Interior Fish and Wildlife Service, the Planning Department of the County of Hawai'i, and the Office of Environmental Quality Control (OEQC), as well as community organizations have commented that a reduced scale marina and related facilities should be considered. The OEQC has also asked that the alternative of a reduced scale project be evaluated under the assumption that DHHL may determine that a downsized project would be preferred.

In response to these comments on the DEIS and in consideration of measures to mitigate anticipated impacts, the EIS Section 2, Alternatives Analysis, has been

revised to describe the following alternatives, which are discussed in more detail in the EIS:

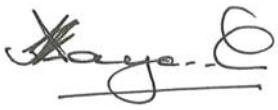
- Alternative 1 is a project involving a 400-slip marina, 400 hotel units, 1,100 time-share units, and commercial and support facilities. This alternative would enhance water quality and avoid the need to widen the existing harbor entrance channel, as well as reduce traffic and socioeconomic impacts.
- Alternative 2 is an alternative that had been previously discussed, but not included in the proposed project that includes an 800-slip harbor and a golf course.
- Alternative 3 is the no-action alternative.

A comparison between impacts related to the proposed project concept and impacts related to Alternative 1 indicates that a reduction in the acreage and number of slips in the marina, as well as the reduction in hotel and time-share units, would generate less environmental, traffic, social and economic impacts. Although positive economic impacts would be reduced, Alternative 1 can be considered as a preferable alternative because of reduced environmental impacts. However, while it can be concluded that the 25-acre marina in Alternative 1 would be the preferred size, the DLNR agreement establishes the size of the marina at 45 acres and 800 slips. An amendment to the DLNR agreement is required in order to allow Alternative 1 to proceed. Hence, selection of Alternative 1 is an unresolved issue at this time.

The additional EIS text that includes the added EIS Section 2, Alternative Analysis, is contained in Attachment 1 of this letter.

Your comment letter and this response are included in the Final Environmental Impact Statement. We appreciate your participation in the environmental review process. Please submit a request to our office if you would like to receive a printed or electronic copy of the Final Environmental Impact Statement, or portions thereof.

Sincerely,



Dayan Vithanage, P.E., PhD.
Director of Engineering

cc: Office of Environmental Quality Control
State Department of Hawaiian Home Lands
Jacoby Development, Inc.

Attachment 1

2 Alternatives Analysis

~~In typical land development projects, the initial planning process includes the exploration of alternatives to development objectives. In the EIS process, these alternatives are presented with a disclosure of reasons for the dismissal of non-preferred alternatives.~~

~~Kona Kai Ola does not follow this same pattern of alternatives evaluation.~~ As discussed in Section 1.4, the proposed Kona Kai Ola project is the result of agreements between JDI and the State DLNR and DHHL. The agreements and leases between the State and JDI stipulate the parameters of development for this site in terms of uses, quantities and size of many features, resulting in a limited range of land uses. Unlike a private property project, JDI is required to meet the criteria outlined in the agreements, thereby affording less flexibility in options and uses. From the developer's perspective, the agreements must also provide sufficient flexibility to allow for a development product that responds to market needs and provides a reasonable rate of return on the private investment.

The agreements between JDI and DLNR specify that the proposed harbor basin is to be 45 acres and accommodate 800 slips. This development proposal is the subject of this EIS. In response to DEIS comments, additional water quality studies and modeling were conducted. These studies determined that the water circulation in a 45-acre 800-slip marina would be insufficient to maintain the required standard of water quality. The models of water circulation suggest that a new 25-acre harbor basin could successfully maintain required water quality in the new harbor. Comments on the DEIS from DLNR, from other government agencies, the neighbors and the general community also called for the consideration of alternatives in the EIS, including a project with a smaller harbor basin and less density of hotel and time-share units.

In response to these comments on the DEIS, three alternatives are evaluated in this Final EIS and include Alternative 1, which is a plan with a 25-acre 400-slip harbor basin including a decrease in hotel and time-share units; Alternative 2, which is an alternative that had been previously discussed but not included in the proposed project, that includes an 800-slip harbor and a golf course; and Alternative 3, the no-project alternative. Each alternative is included in the EIS with an evaluation of their potential impacts. These project alternatives are presented to compare the levels of impacts and mitigation measures of the proposed project and alternative development schemes pursuant to requirements set forth in Chapter 343, HRS.

~~JDI is required to provide a new marina basin not less than 45 acres and a minimum of 800 new boat slips. Further, the agreements provide the following options for land uses at the project site:~~

- ~~Golf Course~~
- ~~Retail Commercial Facilities~~
- ~~Hotel Development Parcels~~
- ~~Marina Development Parcels~~
- ~~Community Benefit Development Parcels~~

~~JDI is not pursuing the golf course option and is proposing instead to create various water features throughout the project site. All other optional uses have been incorporated in Kona Kai Ola.~~

2.1 Project Alternatives

2.1.1 Alternative 1: 400-Slip Marina

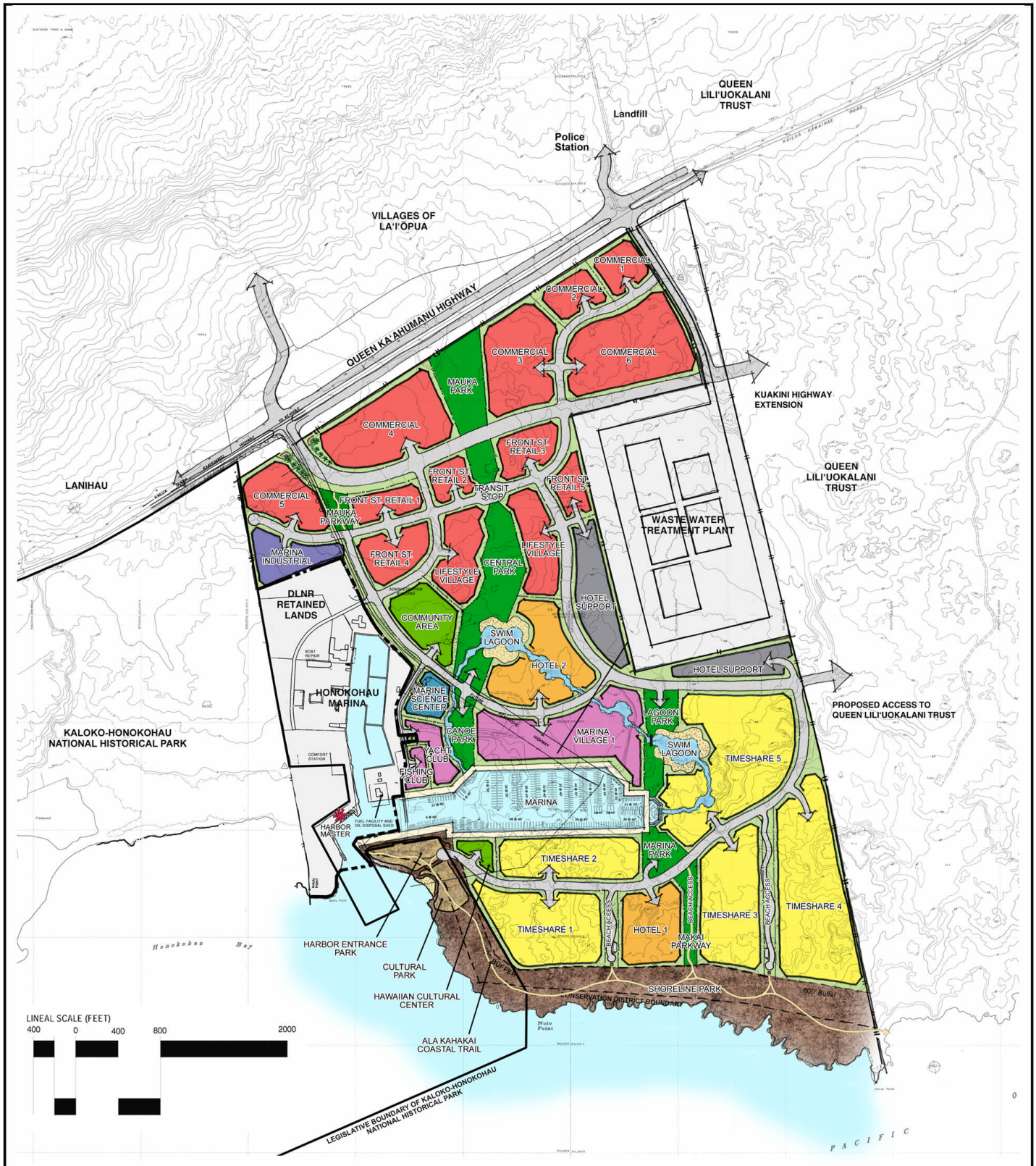
Studies conducted in response to DEIS comments found the construction and operation of an 800-slip marina may significantly impact the water quality within the marina and along the shoreline. Specifically, the Harbor Water Quality Modeling Study, as contained in Appendix U, found that the water circulation in a 45-acre 800-slip harbor was insufficient to maintain an acceptable level of water quality. Further, the existing harbor channel, which would serve both the existing and new harbors, could not adequately serve the increased boat traffic generated by an 800-slip marina during peak traffic. Mitigation measures to accommodate peak boat traffic included the widening of the existing channel, an action that would entail a complex process of Federal and State approvals and encounter significant environmental concern.

Concerns related to the proposed density of hotel and time-share units were also expressed in comments to the DEIS from members of the public, neighbors to the project site, especially the Kaniohale Community Association, and government agencies. Common themes in DEIS comments were related to impacts regarding traffic, project requirements of potable water and infrastructure systems, including sewer, drainage, utility and solid waste systems, and socioeconomic impacts.

In response to the water quality study results, and to the DEIS comments, an alternative plan was developed with a smaller marina with less boat slips, and a related decrease in hotel and time share units. Illustrated in Figure G, Alternative 1 reflects this lesser density project, and features a 400-slip marina encompassing 25 acres. For the purposes of the Alternative 1 analysis, JDI assumed 1,100 time-share units and 400 hotel rooms. Project components include:

- 400 hotel units on 34 acres
- 1,100 time-share units on 106 acres
- 143 acres of commercial uses
- 11 acres of marina support facilities
- 214 acres of parks, roads, open spaces, swim lagoons and community use areas

In addition, Alternative 1 would include the construction of a new intersection of Kealakehe Parkway with Queen Ka'ahumanu Highway, and the extension of Kealakehe Parkway to join Kuakini Highway to cross the lands of Queen Lili'uokalani Trust, and connecting with Kuakini Highway in Kailua-Kona. This is a significant off-site infrastructure improvement and is included in the agreements between the State and JDI.



Source: PBR HAWAII

Plan is conceptual only and subject to change

Figure G: Alternative 1: 400-Slip Marina

LEGEND

- TIME SHARE
- HOTEL
- RETAIL / COMMERCIAL
- MARINA RETAIL
- MARINA SUPPORT / COMMERCIAL
- MARINE SCIENCE CENTER
- COMMUNITY AREA / CULTURAL CENTER
- SWIM LAGOON
- MARINA
- UTILITIES
- PARKS & GREEN SPACE
- SHORELINE
- HARBOR ENTRANCE PARK / CULTURAL PARK

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Like the proposed project, Alternative 1 would have a strong ocean orientation, and project components that support this theme would include various water features including seawater lagoons and a marine science center. The new Alternative 1 harbor would include a yacht club, fishing club, a canoe park, and a cultural park with a focus on Hawaiian maritime cultural heritage of the voyaging canoe. The coastal area would be protected with a shoreline park with trails and public access parking for walking and shoreline fishing, and a cultural park surrounding the heiau, the cultural sites and 'Alula for community use. Additional Alternative 1 community areas would include facilities and space for community use, including programs of the Kona Kai Ola Community Foundation, which supports community programs in health care, culture, education, and employment training for the local community, especially to native Hawaiians. Like the original proposed plan, Alternative 1 includes 40 percent of the land in parks, roads, open spaces, swim lagoons and community use areas.

2.1.2 Alternative 2: Golf Course Feature

Alternative 2 was among the alternatives discussed at a community charrette in September 2003. It includes a golf course, which is a permitted use in the DLNR agreement and DHHL lease. As Figure H illustrates, an 18-hole championship golf course would occupy 222 acres on the southern portion of the project site. As with the proposed project, Alternative 2 includes an 800-slip marina on a minimum of 45 acres.

To support the economic viability of the project, other Alternative 2 uses include:

- Golf course clubhouse on three acres
- 1,570 visitor units on 88 acres fronting the marina
- 118 acres of commercial uses
- 23 acres of community uses

Community uses in Alternative 2 include an amphitheater, a canoe facilities park, a community health center, a Hawaiian cultural center and fishing village, a marine science center and employment training center. The sea water lagoon features contained in the proposed project and Alternative 1 are not included in this alternative.

2.1.3 Alternative 3: No Action

In Alternative 3, the project site would be left vacant, and the proposed marina, hotel and time-share facilities, commercial and marina industrial complexes, and community-oriented uses would not be realized.

~~The economic viability and sustainability of the project is determined by the density and uses proposed. Because JDI is obligated to develop an 800-slip marina for the State, complete road improvements, and provide various public enhancement features at its own expense, the density proposed for the income generating features of the development must be sufficient to provide an acceptable level of economic return for JDI. The market study, which is discussed in Section 4.6, reviewed various development schemes and determined that the currently proposed density and mix is the optimum to meet the anticipated financing and development cost obligations for the public features associated with the development.~~

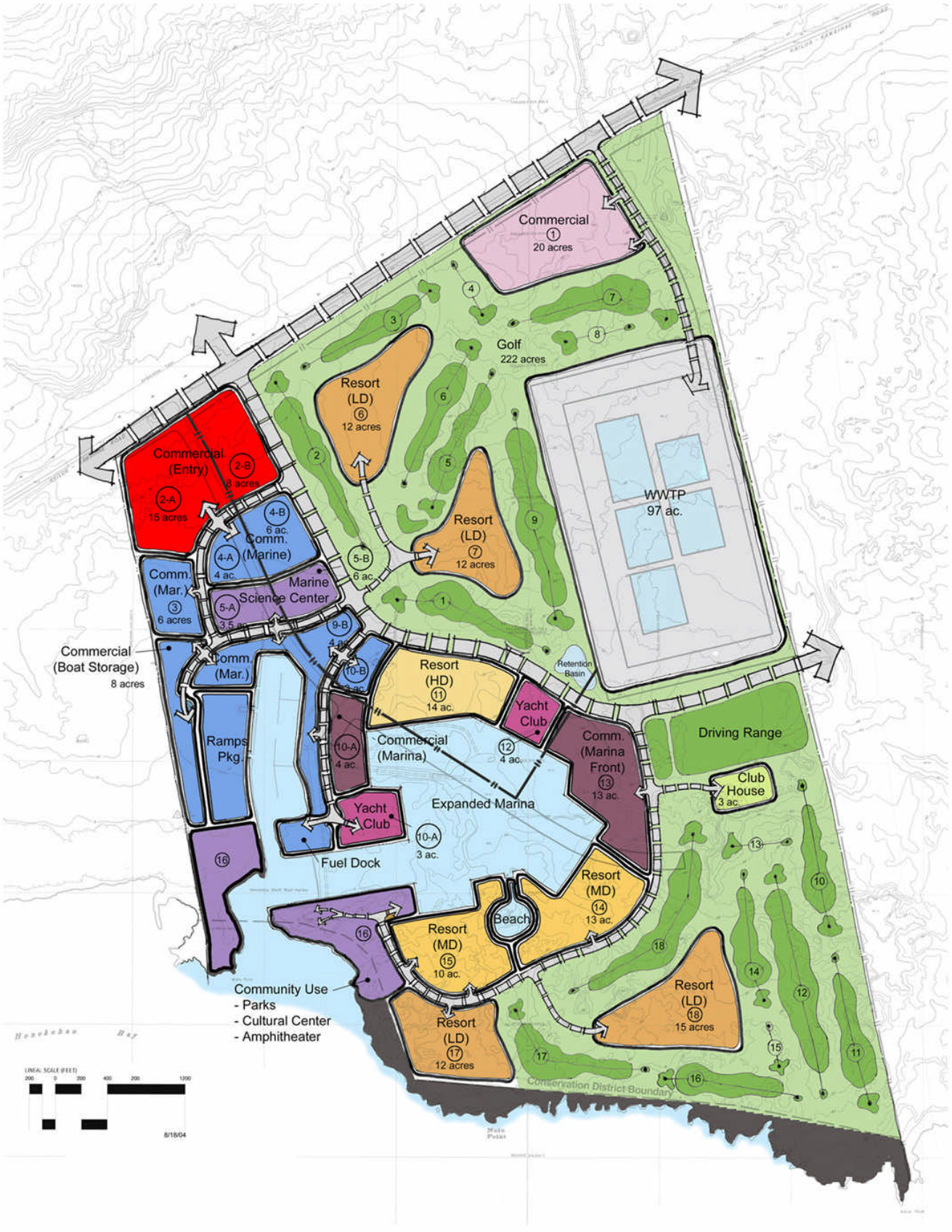

Figure H. Alternative 2: Golf Course Alternative

Legend

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2.2 Alternatives Analysis

As discussed in Section 2.1, the proposed Kona Kai Ola project (also referred to as "proposed project") is defined by development requirements related for a marina and the related uses that would be needed to generate a reasonable rate of return that covers development costs.

Beginning with Section 2.2.1, the alternative development concepts are comparatively assessed for potential impacts that may reasonably be expected to result from each alternative. Following is an overview of the primary observations of such assessment.

Alternative 1 includes half of the State-required boat slips and 60 percent of the proposed hotel and time-share units and, due to the decreased density, this alternative would generate significantly less environmental and socio-economic impacts. A harbor water quality model found the reduction of the volume of the new marina basin by about half (approximately 25 acres) significantly improved the water circulation and quality. Further, the reduced number of boat slips would generate less boat traffic, thereby reducing congestion and the need to mitigate impacts further by the widening of the existing harbor channel.

A project with fewer hotel and time-share units and increased commercial space with a longer (14 years) absorption period would change the mix of employment offered by the project, and slightly increase the overall employment count. The public costs/benefits associated with Alternative 1 would change, compared to the proposed project, with a general increase in tax collections, and a general decrease in per capita costs. Detailed discussion of Alternative 1 potential economic impacts are provided in Section 4.6.6. Comparisons of levels of impact are presented throughout this FEIS.

While this analysis might indicate that the 25-acre marina in Alternative 1 would be the more prudent choice, the DLNR agreement establishes the minimum size and slip capacity of the marina at 45 acres and 800 slips, respectively. Amendments to the DLNR agreement would be required in order to allow Alternative 1 to proceed as the preferred alternative. Hence, selection of the preferred alternative is an unresolved issue at the writing of this FEIS.

Alternative 2, the golf course alternative, was not previously considered to be the preferred alternative primarily because market conditions at the time of project development might not likely support another golf course. Further, DHHL has a strategy goal to have more revenue-generating activities on the commercial lease lands within the project area. In addition, concerns have been expressed as to environmental impacts of coastal golf courses, including the potential adverse impact on Kona's water supply if potable water is used for golf course irrigation.

While Alternative 3, the no-project alternative, would not generate adverse impacts related to development of these lands associated with the construction and long-term operations, it would also not allow for an expanded public marina that would meet public need and generate income for the public sector. Further, the no-project alternative would foreclose the opportunity to create a master-planned State-initiated development that would result in increased tax revenue, recreation options and community facilities. Crucial privately-funded improvements, such as the marina, regional roadway and circulation improvements, and improvements to the existing wastewater treatment plant, would not be implemented. Private funds toward the development of community-oriented facilities such as parks, other recreational facilities, and public access would not be contributed.

~~Hence, the only valid alternative to the proposed project is the no-action alternative. In this alternative, the project site would be left vacant, and the proposed marina, hotel and time-share facilities, commercial and marina industrial complexes, and community-oriented uses would not be realized.~~

~~The no-project alternative would therefore not generate adverse impacts associated with the construction and long-term operations would not occur.~~

~~Likewise, the creation of a master-planned state-initiated development, resulting in increased employment, tax revenue, recreation options and community facilities, would not be created. Privately-funded improvements, such as the marina, regional roadway and circulation improvements, and improvements to the existing wastewater treatment plant, would not be implemented. Private funds toward the development of community-oriented facilities such as parks, other recreational facilities and public access would not be contributed.~~

Further, the creation of revenue-producing businesses on the DHHL property to fund homestead programs would not occur, resulting in fewer potential benefits for Hawaiians.

Hence, the agreements and leases between the State and JDI indicate that the no-action alternative is not in the public interest~~has been rejected at this time~~.

2.2.1 Impact Comparison

Grading and Excavation

The proposed project requires grading and excavation. Both actions may impact groundwater due to rainfall runoff during construction. Alternative 1 would require a significantly smaller excavation for the marina basin and would therefore carry a lesser risk of potential adverse effects on water quality. Alternative 2 would require the same basin excavation as the proposed project, and would also include extensive grading and filling to build the golf course, the latter of which would generate additional impacts. Alternative 3 would result in no change to the geography, topography and geology.

Further discussion on grading and excavation is contained in Section 3.3.

Natural Drainage

Most precipitation infiltrates into the porous ground at the site, and no significant sheet flow is likely. Alternative 1 would generate similar levels of impacts on natural drainage as those of the proposed project and thus require similar mitigation measures. The golf course in Alternative 2 would not be as porous since the site would be graded, soil would be placed, and grass and other landscaping would be grown. Sheet flow and runoff can occur on a golf course, and drainage patterns might change. Alternative 3 would result in no change to the existing natural drainage pattern. Further discussion on natural drainage is contained in Section 3.4.

Air Quality

Air quality will be affected by construction activities, as well as pollutants from vehicular, industrial, natural, and agricultural sources. Alternative 1 would generate less construction air quality impacts than the proposed project due to the reduced amount of intensive groundwork associated with the smaller marina basin and fewer long-term impacts by reducing traffic 35 and 40 percent during, respectively, AM and PM peak traffic times. Construction of Alternative 2 would result in fugitive dust and exhaust from equipment and is expected to generate the same level of air quality impact as the proposed project. Alternative 3 would result in no change to existing air quality. Further discussion on air quality is contained in Section 3.5.

Terrestrial Environment

To provide additional habitat for shorebirds and some visiting seabirds, the project proposes to construct a brackishwater pond area suitable for avian fauna, including stilts, coots and ducks. While habitat expansion is beneficial, there is also a possibility that these species may be exposed to activity that may harm them. Alternative 1 would not include a brackish water pond, but will include 5 acres of seawater features, which is 74 percent less than the 19 acres of seawater features in the proposed project. While this would reduce beneficial impacts, it would also decrease exposure to potentially harmful activity. Alternative 2 does not include the brackish water pond features, but would include drainage retention basins that would attract avian fauna and expose them to chemicals used to maintain golf course landscaping. While Alternative 3 would result in no increase in potentially harmful activity, it would also not provide additional habitat for avian fauna. Further discussion on the terrestrial environment is contained in Section 3.7.

Groundwater

Groundwater at the project site occurs as a thin basal brackish water lens. It is influenced by tides and varies in flow direction and salt content. The existing Honokōhau Harbor acts as a drainage point for local groundwater. Any impact to groundwater flow from the proposed harbor is likely to be localized. The proposed marina basin will not result in any significant increase in groundwater flow to the coastline, but rather a concentration and redirection of the existing flows to the harbor entrance.

There will be differences in the flow to the marina entrance between the proposed project and Alternative 1. Alternative 1, being smaller in size, will have less impact on groundwater flow than the proposed marina. Alternative 2 will have a similar impact to groundwater quality as the proposed project. Alternative 2 may also impact water quality by contributing nutrients and biocides to the groundwater from the golf course. Alternative 3 would result in no change in existing groundwater conditions. Further discussion on groundwater is contained in Section 3.8.1.

Surface Water

There are no significant natural freshwater streams or ponds at the site, but there are brackish anchialine pools. Surface water at the project site will be influenced by rainfall. Runoff typically percolates rapidly through the permeable ground. The proposed project will include some impermeable surfaces, which together with building roofs, will change runoff and seepage patterns.

Alternative 1 is a lower density project that is expected to have proportionally less impact on surface water and runoff patterns and less potential impact on water quality than the proposed project. Alternative 2 would have more impact on surface water quality than the proposed project due to fertilizers and biocides carried by runoff from the golf course. Alternative 3 would result in no change to surface water conditions. Further discussion on surface water is contained in Section 3.8.2.

Nearshore Environment and Coastal Waters

The potential adverse impacts to the marine environment from the proposed project are due to the construction of an 800-slip marina and the resulting inflow of higher salinity seawater and inadequate water circulation, both of which are anticipated to impair water quality to the extent of falling below applicable standards. One possible mitigation measure is to significantly reduce the size of the marina expansion.

The reduced marina size (from 45 to 25 acres) and reduced lagoon acreage in Alternative 1 are expected to result in a proportionate reduction in seawater discharging into the new harbor and increased water circulation. Alternative 2 includes the same marina basin size and is therefore subject to the same factors that are expected to adversely affect water quality.

In the existing Honokōhau Harbor, water quality issues focus on the potential for pollutants, sediments, mixing and discharge into the nearshore marine waters. Before the harbor was constructed, any pollutants entrained within the groundwater were believed to have been diffused over a broad coastline.

The water quality in the proposed harbor depends on several components. These include salinity, nutrients, and sediments that come from the ocean, rainfall runoff, water features with marine animals, and dust. The smaller project offered as Alternative 1 is expected to produce a reduced amount of pollutants and reduce the risk of adverse impact upon water quality.

It is notable that the 45-acre marina basin planned in the proposed project and Alternative 2 only becomes viable from a water quality impact standpoint if the additional brackish groundwater inflow into the new marina exceeds 60 mgd. The resulting flushing from such inflow would be expected to better maintain water quality. However, it is unclear whether 60 mgd of brackish groundwater would be available. As proposed in Alternative 1, reduction of the volume of the new marina basin by 45 percent will significantly improve the flushing and water quality because the lower volume can be flushed by the available groundwater flow.

In addition, there could be higher rainfall runoff from the Alternative 2 golf course into the harbor, because the grassed golf course will be less porous than the natural surface. The golf course will also require relatively high levels of fertilizer, biocides, and irrigation, all of which could contribute to adverse water quality impacts.

Further discussion on nearshore environment and coastal waters is contained in Section 3.9.1.

Anchialine Pools

Anchialine pools are located north of Honokōhau Harbor, and south of the harbor on the project site. The marine life in these pools is sensitive to groundwater quality, and changes due to construction and operation of the project could degrade the viability of the pool ecosystem. In the southern complex, 3 anchialine pools with a combined surface area of $20m^2$ would be eliminated due to the harbor construction in the proposed project and Alternatives 1 and 2.

Predicting the extent of change in groundwater flow is difficult if not impossible even with numerous boreholes and intense sampling. The actual flow of groundwater towards the sea is minimal today, and tidal measurements show that tide fluctuations represent more than 90 percent in actual harbor tides. The fluctuations occur simultaneous with the ocean/harbor tide, which indicate a vertical and horizontal pressure regime between bore hole 6 and the ocean and harbor. Hence, the tides alone create a mixing system that increases salinity, as the flow approaches the point of discharge which will be either the channel or the shore. Another factor that could influence groundwater quality is the increased local recharge from irrigation between the channel and shore. This will add fresh water to the lens locally but is not quantified at this time.

Quantification of these impacts, including the flow of groundwater through each pond, is therefore extremely difficult. The shallow lavas are of the pahoehoe type and have a relatively high horizontal permeability. In surface depressions or undulations, the pahoehoe lavas have a tendency to lose vertical permeability from sedimentation thus restricting water exchange within the individual pools. This is normally reflected in both the salinity and temperature and this information has been adequately studied in the pools.

Changes in groundwater quality may or may not impact biological communities in the anchialine and estuarine environment. In either case, it is important to understand these relationships to effectively manage the resource. If there is significant deviation from the baseline especially in regard to nutrients, pathogens, and toxins, a mitigation plan to determine the cause and take decisive appropriate action will be implemented.

Due to the uncertainty of changes in groundwater flow and quality due to marina construction, the variability in impacts between the proposed project and Alternatives 1 and 2 is unknown at this time. Alternative 3 would result in no change in groundwater flow. While this would eliminate the potential for adverse impacts, Alternative 3 would also continue the pattern of existing degradation related to human activity and the introduction of alien species. Further discussion on anchialine pools is contained in Section 3.9.2.

Marine Fishing Impacts

The proposed marina will increase the number of boats in the area and it is reasonable to assume that a portion of these new boats will engage in fishing activities. The increase in boats in the area would be primarily related to the marlin and tuna / pelagic fishery, coral reefs due to extractive fisheries, and SCUBA activities. The pressure on fish and invertebrate stocks is expected to increase with or without the marina. Harbor expansion provides the opportunity to address existing conditions to consolidate, focus, and fund management and enforcement activities at one location.

Compared to the proposed project, Alternative 1 would result in a 21 percent decrease in boat traffic, thereby lessening the potential for marine fishing impacts. The level of impacts in Alternative 2 would be similar to that of the proposed project. Alternative 3 would result in no change in existing marine fishing conditions, and no opportunity to address already existing pressure on fish and invertebrate stocks. Further discussion on marine fishing impacts is contained in Section 3.9.3.

Cultural and Archaeological Resources

The proposed project will integrate cultural and archaeological resources in the overall development. Archaeological sites recommended for preservation will be preserved, and cultural practices will be encouraged. Kona Kai Ola includes a canoe park, and a cultural park with a focus on Hawaiian maritime cultural heritage of the voyaging canoe. Proposed is a 400-foot shoreline setback that would serve as a buffer between the ocean and developed areas. This coastal area would be protected with a shoreline park with trails and public access parking for walking and shoreline fishing, and a cultural park surrounding the heiau, the cultural sites and ʻAlula for community use.

Alternative 1 would contain all of the cultural archaeological features and the shoreline setback area would be 400 feet in the northern portion of the site and increase to 600 feet in the southern portion. Alternative 2 would preserve cultural and archaeological resources, but does not include a 400-foot shoreline setback. Alternative 3 would result in no change to existing cultural and archaeological resources and no addition of cultural and community facilities and activities. Further discussion on cultural and archaeological resources is contained in, respectively, Sections 4.1 and 4.2.

Noise

Project-generated noise is due to construction equipment and blasting, boats, marina activities, vehicle traffic, and the Kealakehe Wastewater Treatment Plant operations. Alternative 1 would generate less noise impacts due to reduced construction activities, fewer boats, less traffic and less on-site activity. Alternative 2 would also generate less noise due to reduced traffic and less on-site activity, but noise related to the excavation of the marina basin and an increase in the number of boats would be similar to that of the proposed project. Further discussion on noise impacts is presented in Section 4.4.

Socioeconomic Impacts

The proposed project will generate an increase in de facto population of an estimated 5,321 persons due to the increase in hotel and time-share units. The estimated de facto population increase in Alternative 1 is 37 percent less, at 3,363 persons, than the proposed project. The de facto population increase in Alternative 2 is similar to Alternative 1.

Employment in the commercial components will nearly double in Alternative 1, from a stabilized level of 1,429 full-time equivalent (FTE) positions in the proposed project to 2,740 in the Alternative 1.

Under Alternative 1, the total operating economic activity at Kona Kai Ola will increase due to the added commercial space more than off-setting the fewer visitor units, moving upward from $557.6 million per year to circa $814.3 million annually. The total base economic impact resulting from development and operation of Alternative 1 will similarly be higher by between 35 and 45 percent than that of the proposed project.

Alternative 1, which has a reduced marina size of 25 acres, and fewer hotel and time-share units, would have a meaningful market standing, create significant economic opportunities, and provide a net benefit to State and County revenues. From a market perspective, a smaller Kona Kai Ola would still be the only mixed use community in the Keahole to Kailua-Kona Corridor offering competitive hotel and time-share product.

The estimated absorption periods for marketable components of Alternative 1 are generally shorter than those for the same components in the proposed project. Marina slips under Alternative 1 are estimated to be absorbed within 2 years after groundbreaking, as compared with 9 years for absorption of slips in the proposed project. Hotel rooms under Alternative 1 are estimated to be absorbed within 4 years after groundbreaking, as compared with 7 years under the proposed project. Time-share units would be absorbed within 10 years under Alternative 1, while 15 years are projected under the proposed project. Due to the planned increase in commercial facilities under Alternative 1, the absorption period of commercial space is estimated at 14 years, as compared with 8 years for absorption of such facilities under the proposed project.

The State and County will still both receive a net benefit (tax receipts relative to public expenditures) annually on a stabilized basis under the Alternative 1. The County net benefits will be some $12.2 million per year under the Alternative 1 versus $14.9 million under the proposed project. The State net benefits will increase under the Alternative 1 to about $37.5 million annually, up substantially from the $11.4 million in the proposed project.

Due to the lower de facto population at build-out, the effective stabilized public costs for both the State and County will decline meaningfully under the Alternative 1, dropping from $7.7 million annually for the County and $36.5 million for the State, to $4.9 million and $23 million per year, respectively.

Alternative 3 would result in no increase in de facto population and improvement to economic conditions. Further discussion on social and economic impacts are contained in, respectively, Sections 4.5 and 4.6.

Vehicular Traffic

The proposed project will impact the nearby road network that currently is congested during peak traffic times. The proposed project includes roadway improvements that would reduce the impact and improve roadway conditions for the regional community.

Alternative 1 includes the same roadway system improvements as the proposed project, yet would reduce vehicular traffic by 35 percent when compared to the proposed project. Alternative 2 would have similar traffic conditions and roadway improvements as Alternative 1. Alternative 3 would result in no increase in traffic and no roadway improvements.

Marina Traffic Study

The increase in boat traffic due to the proposed 800-slip marina would cause entrance channel congestion during varying combinations of existing and new marina peak traffic flow. Worst case conditions of active sport fishing weekend and summer holiday recreational traffic result in traffic volumes exceeding capacity over a short afternoon period. Mitigation to address boat traffic in the proposed project include widening the entrance channel, traffic control, implementation of a permanent traffic control tower, or limiting vessel size.

Alternative 1 would result in a 21 percent reduction in boat traffic congestion under average existing conditions and ten percent reduction during peak existing conditions. The reduction to 400 slips also reduces the impacts of congestion at the entrance channel, thereby reducing the need for any modifications to the entrance channel.

Alternative 2 would have the same level of boat traffic as the proposed project. Alternative 3 would not meet the demand for additional boat slips and would not generate additional boat traffic. Further discussion on marina traffic is contained in Section 4.8.

Police, Fire and Medical Services

The proposed project will impact police, fire and medical services due to an increase in de facto population and increased on-site activity. Alternatives 1 and 2 would have similar levels of impact as the proposed project due to increased on-site activity. Further discussion on police, fire and medical services are contained, respectively, in Sections 4.10.1, 4.10.2 and 4.10.3.

Drainage and Storm Water Facilities

The proposed project will increase drainage flows, quantities, velocities, erosion, and sediment runoff.

Alternative 1 involves a reduction of the project density that would reduce storm runoff from the various land uses due to a reduction in impervious surfaces associated with hotel and time-share development and to the creation of more open space. However, roadway areas will increase by about 30 percent in Alternative 1. Storm runoff from proposed streets would therefore increase; thus requiring additional drainage facilities and possibly resulting in no net savings. The golf course in Alternative 2 may also change drainage characteristics from those of the proposed project and may not reduce impacts. Alternative 3 would result in no change in existing conditions and no improvements to drainage infrastructure. Further discussion on drainage and storm water facilities is contained in Section 4.10.5

Wastewater Facilities

The proposed development is located within the service area of the Kealakehe WWTP and a sewer system will be installed that connects to the WWTP. The sewer system will be comprised of a network of gravity sewers, force mains, and pumping stations which collect and convey wastewater to the existing Kealakehe WWTP. Project improvements will incorporate the usage of recycled / R1 water. Improvements implemented by the proposed project will also accommodate the needs of the regional service population.

Alternative 1 would generate approximately 10 percent less wastewater flow than the proposed project. Wastewater flow in Alternative 2 is undetermined. Alternative 3 would result in no additional flow, as well as no improvements that will benefit the regional community. Further discussion on wastewater facilities is contained in Section 4.10.6.

Potable Water Facilities

The proposed project average daily water demand is estimated at 1.76 million gallons per day. Existing County sources are not adequate to meet this demand and source development is required. The developer is working with DLNR and two wells have been identified that will produce a sustainable yield that will serve the project. These wells will also serve water needs beyond the project.

Alternative 1 would result in net decrease of about five percent of potable water demand. Alternative 2 may have a lower water demand than the proposed project as long as potable water is not used for irrigation. Alternative 3 would result in no additional flow, as well as no source development that will benefit the regional community. Further discussion on potable water facilities is contained in Section 4.10.8.

Energy and Communications

Regarding Alternative 1, preliminary estimates for electrical, telecommunications, and cable resulted in a net demand load that remains similar to the proposed project. Further discussion on energy and communications is contained in Section 4.10.9.1.

The proposed project will increase the demand for electrical energy and telecommunications. The demand would be reduced in Alternative 1 because the number of boat slips and units would decrease. Similarly, Alternative 2 would have fewer units than the proposed project and therefore reduce energy demands. Further reduction in energy demand for either alternative could be achieved by using seawater air conditioning (SWAC) and other energy reduction measures, as planned by the developer. Further discussion on energy and telecommunications is contained in Section 4.10.9.2.

Water Features and Lagoons

The proposed project includes a brackishwater pond, lagoons, and marine life exhibits supplied by clean seawater. The water features in Alternative 1 would significantly decrease by 74 percent from 19 acres in the proposed project to five acres in Alternative 1. This decrease in water features would result in a corresponding decrease in water source requirements and seawater discharge. Alternative 2 does not include the seawater features. Alternative 3 would result in no additional demand for water source requirements and seawater discharge.

2.2.2 Conformance with Public Plans and Policies

State of Hawai'i

Chapter 343, Hawai'i Revised Statutes

Compliance with this chapter is effected, as described in Section 5.1.1 in regard to the proposed project and the alternatives discussed.

- State Land Use Law, Chapter 205, Hawai'i Revised Statutes

  The discussion in Section 5.1.2 is directly applicable to Alternative 1, the proposed project. Alternative 1 will involve a setback of 400 feet that increases to 600 feet along the southern portion of the project site's shoreline area. Alternative 2 does not provide for such a setback, but may still require approvals from DLNR for cultural, recreational, and community uses and structures within the Conservation district.

- Coastal Zone Management Program, Chapter 205A, Hawai'i Revised Statutes

  Recreational Resources:

  In addition to the discussion of consistency with the associated objective and policies, as described in Section 5.1.3, the reduction from the proposed project's 800-slip marina to a 400-slip marina under Alternative 1 will still expand the region's boating opportunities and support facilities. The existing harbor entrance will still be utilized under this alternative; however, potential risks relating to boat traffic and congestion in the marina entrance area will be reduced significantly. The 400-600 foot shoreline setback, public parks, trails, cultural areas, community facilities, and marine science center remain important recreational components under Alternative 1.

Alternative 2 includes a golf course component, which would add a more passive recreation to the active and social components, such as boating, fishing, swimming, trails, walkways, parks, marine life, educational and interactive areas that are also part of the project. The golf course would enhance the range of leisure and recreational opportunities offered at Kona Kai Ola.

Alternative 2, like the proposed project, will expand the region's boating opportunities and support facilities through its 800-slip marina. However, the potential adverse impacts of increased boat traffic from the size of the marina are significant enough to offset the benefits of increased boating opportunities.

Coastal Ecosystems:

The discussion in Section 5.1.3 is directly applicable to Alternative 1.

Alternative 1 not only reduces the number of slips proposed by 50 percent, but it also reduces the size of the marina from 45 acres to 25 acres. The 25-acre marina will increase the body of water within the existing harbor, but to a significantly lesser extent than the proposed project's estimated increase, which is also applicable to the 45-acre size that is proposed for the marina under Alternative 2.

The findings of the Harbor Water Quality Modeling Study conclude that a reduction in the size of the harbor expansion is an alternative that will mitigate the risk of significant impacts upon water quality within the marina and existing harbor. Accordingly, the reduction in both the number of slips and the size of the marina basin under Alternative 1, in combination with proper facilities design, public education, and enforcement of harbor rules and regulations, would result in fewer long-term impacts to water quality and coastal ecosystems. Short-term (construction-related) impacts would likely remain the same although the reduction in the total acreage of excavation is expected to result in a shorter duration of such impacts.

In addition to its 800-slip marina and potential adverse impacts upon water quality and the marine environment, Alternative 2 includes a golf course component, which has the potential to impact coastal ecosystems by increasing the nutrient loading in surface runoff and groundwater and also by introducing pesticides, herbicides, and other chemicals common in golf course use and management into the nearshore waters surrounding the project site.

Economic Uses

Although reduced in the number of slips, the smaller marina under Alternative 1 will nevertheless serve public demand for more boating facilities in West Hawai'i and is consistent with the objective and policies and discussion set forth in Section 5.1.3. The economic impacts of Alternative 2, while comparable to those of the proposed project's marina development, are notably marginal as to the golf course component, based on the marketability analysis that indicates a condition of saturation within the region.

Coastal Hazards

The discussion and considerations set forth in Section 5.1.3 are also applicable to Alternatives 1 and 2 and indicate compliance with the objective and policies addressed. Tsunami risks mainly affect the large shoreline setback area that is proposed for the project and Alternative 1. Alternative 2 projects a transient accommodation site that is partially within the tsunami hazard zone and thus carries a higher hazard risk. However, the essential requirement for these alternatives, as well as the proposed project, is a well-prepared and properly implemented evacuation plan.

Beach Protection

Discussion and considerations set forth in Section 5.1.3 are also applicable to Alternatives 1 and 2 and indicate compliance with the objective and policies addressed. Alternative 1 and, to a lesser extent, Alternative 2, will retain the shoreline area in its natural condition.

Similar to the proposed project, Alternative 1 provides for a shoreline setback of considerable width within which no structure, except for possible culturally-related structures, would be allowed. Alternatives 1 and 2 will thus be designed to avoid erosion of structures and minimize interference with natural shoreline processes.

Marine Resources

The discussion in Section 5.1.3 is also applicable to Alternative 1 which is described to be an alternative that is specifically projected to mitigate anticipated adverse impacts on water quality and the marine environment that might otherwise result from the original harbor design and scale, which is also incorporated in Alternative 2 . The reduced marina size under Alternative 1 is projected to meet water quality standards and enable greater compliance with the objective and policies addressed in this section.

Alternative 2 includes a golf course component and thus the potential to adversely impact marine resources by increasing the nutrient loading in surface runoff and groundwater and also by introducing pesticides, herbicides, and other chemicals common in golf course use and management into the nearshore waters surrounding the project site.

Hawai'i State Plans, Chapter 226, Hawai'i Revised Statutes

Section 226-4 (State goals), 5 (Objectives and policies for population, and 6 (Objective and policies for economy in general):

The discussion in Section 5.1.4 is applicable to Alternatives 1 and 2, in addition to the proposed project. These development concepts generally conform to the goals, objectives, and policies set forth in these sections because they will provide some degree of economic viability, stability, and sustainability for future generations. Kona Kai Ola will convert essentially vacant land into a mixed-use development with a distinctive marina and boating element, providing a wide range of recreational, business, and employment opportunities to the community.

Section 226-8 Objective and policies for the economy – the visitor industry:

Alternatives 1 and 2 will be consistent with the State's economic objective and policies relating to the tourism industry for the same reasons that are discussed in regard to the proposed project in Section 5.1.4. They will incorporate JDI's commitment to sustainability principles in the planning and design of the development concepts in Alternatives 1 and 2. Although the total hotel and time-share unit count is reduced to approximately 1,500 in Alternatives 1 and 2, the transient accommodations component of these alternatives will still further the State's objective and policies for increased visitor industry employment opportunities and training, foster better visitor understanding of Hawai'i's cultural values, and contribute to the synergism of this mixed-use project concept that addresses the needs of the neighboring community, as well as the visitor industry.

Section 226-11 Objectives and policies for the physical environment: land-based, shoreline and marine resources:

Alternative 1 is expected to involve less potential adverse impacts upon these environmental resources than the proposed project. Likewise, and Alternative 2 would have less adverse impact because of its reduction in the size of the marina and in the total hotel and time-share unit count. Alternative 1 carries less potential risk to water quality and related impacts upon the marine environment and anchialine pool ecosystems. Although approximately three anchialine pools are expected to be destroyed, the great majority of pools will be preserved within and outside of the proposed 400-foot shoreline setback.

The golf course component in Alternative 2 has the potential to impact marine resources by increasing the nutrient loading in surface runoff and groundwater and also by introducing pesticides, herbicides, and other chemicals common in golf course use and management into the marina basin and nearshore waters surrounding the project site. It also has the potential to adversely affect the anchialine pools by introducing the chemicals into the pond systems.

Section 226-12 Objective and policies for the physical environment: scenic, natural beauty, and historic resources:

The discussion in Section 5.1.4 is directly applicable to Alternative 1 and describes the compliance with the objective and policies addressed.

The golf course component of Alternative 2 would create a park-like view that would potentially enhance the beauty of the project site and surrounding areas when considered in combination with the existing rugged natural beauty of the area.

Just as with the proposed project, Alternatives 1 and 2 would also be designed to blend with the natural terrain and to honor and protect the cultural history, resources, and practices of these lands.

Section 226-13 Objectives and policies for the physical environment: land, air and water quality:

As stated above, because of the reduction in both the number of slips and the size of the marina basin, with proper facilities design, public education and enforcement of harbor rules and regulations, Alternative 1 is anticipated to cause fewer long-term impacts to water quality than either the proposed project or Alternative 2. Based on the findings of the Harbor Water Quality Modeling Study, water quality resulting from a reduced marina basin size as proposed under Alternative 1 is expected to be similar to existing conditions.

As previously noted, Alternative 2 has the potential to adversely impact water quality by increasing the nutrient loading in surface runoff and groundwater by introducing pesticides, herbicides and other chemicals common in golf course development and maintenance into the marina basin and nearshore waters surrounding the project site.

Section 226-14 Objectives and policies for facility systems - general:

Alternatives 1 and 2 will conform to the objective and policies of this section on the grounds that are discussed in regard to the proposed project in Section 5.1.4. The master-planning and phasing of the project concepts under these alternatives will be coordinated with associated public and private infrastructural planning and related private and public infrastructural financing. The cost of the marina construction and project-related infrastructure is to be borne by the developer, resulting in considerable savings for the public. In addition, the projected lease revenue from these public lands will provide additional public benefits by establishing a revenue stream for capital improvements and maintenance of a range of State facilities.

Section 226-15 Objectives and policies for facility systems - solid and liquid wastes:

In addition to the developer's commitment to sustainable development design, the project will involve upgrades to the County of Hawai'i's Kealakehe Wastewater Treatment Plant to meet current needs, as well as the project's future needs. This commitment is applicable to Alternatives 1 and 2, as well as the proposed project that is discussed in Section 5.1.4.

Section 226-16 Objectives and policies for facility systems – water:

The discussion of water conservation methods and the need to secure additional potable water sources in Section 5.1.4 is also applicable to Alternative 1 and demonstrates conformity to the objective and policies for water facilities. Alternative 2 involves greater irrigation demands in regard to its golf course component and greater potable water demands for human consumption than those for Alternative 1. Alternative 2 is expected to face more serious challenges in securing adequate and reliable sources of water.

Section 229-17 Objectives and policies for facility systems – transportation:

Alternatives 1 and 2 will conform to this objective and policies because they will present water transportation opportunities, including the possible use of transit water shuttles to Kailua-Kona, as described in regard to the proposed project in Section 5.1.4.

Section 226-18 Objectives and policies for facility systems – energy:

Alternatives 1 and 2 conform to these objective and policies through the use of energy efficient design and technology and commitment to the use and production of renewable energy to serve the project's needs. Solar energy production, solar hot water heating, and the use of deep cold seawater for cooling systems are currently identified as means of saving substantial electrical energy costs for the community and the developer.

Section 226-23 Objectives and policies for socio-cultural advancement – leisure:

Alternative 1 conforms to this objective and related policies for the reasons offered in Section 5.1.4 in regard to the proposed project. Alternative 1 will be of greater conformity with the policy regarding access to significant natural and cultural resources in light of the 400-600 foot shoreline setback that has been designed for this alternative.

Although it does not propose the considerable shoreline setback that is planned for Alternative 1, Alternative 2 is consistent with this objective and related policies in incorporating opportunities for shoreline-oriented activities, such as the walking trails. In addition, the golf course component adds a more passive recreation alternative to the active and social components, such as boating, fishing, swimming, trails, walkways, parks, marine life educational and interactive areas that are also part of the project. The golf course would enhance the range of leisure and recreational opportunities offered at Kona Kai Ola.

Section 226-25 Objectives and policies for socio-cultural advancement-culture:

The discussion in Section 5.1.4 is relevant to Alternatives 1 and 2 and demonstrate their conformity the objective and policies of this section.

Both alternatives involve the preservation and protection of cultural features that have been identified by the Cultural Impact Assessment and archaeological studies for the project area. Both provide for public shoreline access, and both will continue the policy of close consultation with the local Hawaiian community and cultural and lineal descendants in the planning of cultural resource preservation and protection.

Section 226-103 Economic priority guidelines:

Alternatives 1 and 2 conform to these guidelines for the same reasons that are set forth in Section 5.1.4. They involve private investment in a public project that will create economic diversification through a mix of marina, industrial, commercial, visitor, and cultural facilities. This presents a wide range of entrepreneurial opportunities, long-term employment opportunities, and job training opportunities.

Section 226-104 Population growth and land resources priority guidelines:

As described in Section 5.1.4, the policy support for the proposed project also extends to the similar development concepts considered in Alternatives 1 and 2. Those alternatives conform to the guidelines of this section because they involve an urban development under parameters and within geographical bounds that are supported by the County's General Plan, a preliminary form of the Kona Community Development Plan, the County's Keahole to Kailua Regional Development Plan, and the reality of being located along the primary commercial/industrial corridor between Keahole Airport and Kailua-Kona. As with the proposed project, the development concepts of Alternatives 1 and 2 are essentially alternatives for the implementation and "in-filling" of the urban expansion area in North Kona.

DHHL Hawai'i Island Plan

This 2002 plan projects DHHL's Honokōhau makai lands for commercial use. As compared to the proposed project and Alternative 2, Alternative 1 presents an expanded commercial component that provides greater compliance with the plan, while addressing certain beneficiaries' concerns about the scale of the marina originally required in the Project. Alternative 2 also conforms to the recommended commercial uses in the makai lands but to a lesser degree than Alternative 1 because of its more limited commercial component. Like the proposed project, its marina size and number of slips raise environmental issues, as more specifically discussed in Part 3, and community concerns.

County of Hawai'i General Plan

HCGP Section 4 – Environmental Quality Goals, Policies and Courses of Action:

Alternative 1 is consistent with this section. It presents a reduction in both the number of slips and the size of the marina basin that, in combination with proper facilities design, public education and enforcement of harbor rules and regulations, would result in very few long term impacts to water quality. Based on the findings of the Harbor Water Quality Modeling Study, water quality would remain similar to existing conditions.

Alternative 2 is the least consistent with this section. In addition to the potential significant impacts of its 800 slip marina basin, its golf course component has the potential to adversely impact marine resources by increasing the nutrient loading in surface runoff and groundwater and also by introducing pesticides, herbicides and other chemicals common in golf course use and management into the nearshore waters surrounding the project site. It also has the potential to adversely affect the anchialine pools beyond their current conditions by introducing such substances into the pool systems.

HCGP Section 7 – Natural Beauty Goals and Policies:

Alternative 2 conforms to some degree with this section. Its golf course component would create a park-like view that would potentially enhance the beauty of the project site and surrounding areas when considered in combination with the existing rugged natural beauty of the area, as demonstrated in other makai golf courses within the region.

HCGP Section 8 – Natural Resources and Shoreline:

Alternative 1 is most consistent with the goals and policies of this section. It would require considerably less marina excavation than the proposed project and Alternative 2 and would reduce the potential risk of long-term adverse impacts to water quality. Based on the findings of the Harbor Water Quality Modeling Study, water quality would remain similar to existing conditions with the degree of reduction in marina basin size that is proposed under Alternative 1. This reduction is also expected to reduce potential impacts upon anchialine pools and their ecosytems, as well as shoreline and marine resources that are affected by water quality. Alternative 1 also retains the shoreline preservation and protection concepts that are proposed in and described for the Project.

HCGP Section 10 – Public Facilities Goals and Policies:

The discussion in Section 5.2.1. in relation to the proposed project is applicable to Alternatives 1 and 2. Improvements to public facilities are are integral to the Kona Kai Ola development. The provision of additional boat slips and numerous road improvements, including a makai extension of Kuakini Highway south to Kailua-Kona are incorporated into plans for the project's development. In light of these elements, Alternatives 1 and 2 are consistent with the goals and policies of this section.

HCGP Section 11 – Public Utility Goals, Policies:

As with the proposed project, Alternatives 1 and 2 are consistent with the goals and policies of this section, based on the relevant grounds set forth in Section 5.2.1. The developer is committed to design, fund, and develop environmentally sensitive and energy efficient utility systems to the extent possible, as described previously in Part 5. Its master planning provides for the coordinated development of such systems with the objective of achieving significant savings for the public. As previously-mentioned example, the project development involves the upgrading of the Kealakehe Wastewater Treatment Plant.

HCGP Section 12 – Recreation:

Alternative 1 is consistent with the goals, policies, and courses of action for North Kona in this section.

Although the number of slips is reduced under Alternative 1, the region's boating opportunities and support facilities will still be expanded. The existing marina entrance would still be utilized under this alternative. However, concerns relating to increased activity leading to increased congestion in the marina entrance area would be mitigated to a certain extent. The 400-600 foot shoreline setback, public parks, trails, cultural areas, community facilities and marine science center remain important components of Alternative 1.

The golf course component of Alternative 2 would add a more passive recreation to the active and social components, such as boating, fishing, swimming, trails, walkways, parks, marine life, educational and interactive areas that are also part of the project. The golf course would enhance the range of leisure and recreational opportunities offered at Kona Kai Ola. Alternative 2 is also considered to be consistent with this section.

HCGP Section 13 and 13.2 – Transportation:

The reduced marina component under Alternative 1 will still provide transportation opportunities and provide for possible use of transit water shuttles to Kailua-Kona, although to a lesser degree than under the proposed project and Alternative 2 . However, in each scenario, internal people-movers are planned, and numerous roadway improvements are planned for coordination with public agencies, including but not limited to the construction of the Kuakini Highway extension between Honokōhau and Kailua-Kona. Accordingly, both Alternatives 1 and 2 are consistent with the goals, policies, and courses of action for North Kona under these sections of the General Plan.

HCGP Section 14.3 – Commercial Development:

For the reasons presented in the discussion under Section 226-104 of the State Plan, the planned commercial component under Alternatives 1 and 2 are consistent with this section.

HCGP Section 14.8 – Open Space:

Alternatives 1 and 2 are consistent with the goals and policies of this section. Alternative 1 provides a considerable (400-600 foot) shoreline setback along the entire ocean frontage of the project site as a means of protecting the area's scenic and open space resources, as well as natural and cultural resources. Although it does not incorporate the shoreline setback planned in Alternative 1, Alternative 2 provides a golf course component would contribute to the amount of open space that is currently proposed and allow additional view corridors to be created.

Community Development Plans

Community development plans are being formulated for different regions in the County in order to supplement the County's General Plan. The Kona Kai Ola project is located in the Kona Community Development Plan (CDP) area. Maps associated with the preliminary work phases

of the Kona CDP include the Kona Kai Ola project site within the "Preferred Urban Growth" boundary of the North Kona district. The Kona CDP process is guided by a Steering Committee composed of a broad cross-section of the community. The Steering Committee will eventually complete its work and recommend the CDP's adoption.

After the DEIS was published, the Kona CDP has progressed to the development of plans for the major urban growth corridor north of Kailua-Kona. The Kona CDP has produced a draft plan showing a transit oriented development that includes a midlevel public transit corridor along the mauka residential elevation, and a makai transit corridor that runs along a proposed new frontage road just makai and parallel to Queen Kaahumanu Highway. The development plan for Alternative 1 includes the Kuakini Highway as part of this proposed frontage road and transit line from Kailua Kona to the Kealakehe area, along with a transit stop at Kona Kai Ola. The Alternative 1 plan also includes a road that could be extended to be part of the proposed frontage road should it be approved and implemented. In addition, the Kona CDP has continued to emphasize the principles of smart growth planning with mixed use urban areas where people can live, work, play and learn in the same region. Kona Kai Ola has been specifically designed to be consistent with this policy in order to provide a stable employment base close to where people live in the mauka residential areas already planned for DHHL and HHFDC lands.

It should be noted that currently and over the years, the 1990 Keāhole to Kailua Development Plan (K-to-K Plan) guides land use actions by the public and private sectors. It is intended to carry out the General Plan goals and policies related to the development of the portion of North Kona area, including the Kona Kai Ola site. The "Preferred Growth Plan" of the Keāhole to Kailua Development Plan identifies the project site as a new regional urban center to include commercial, civic, and financial business related uses, an expanded "Harbor Complex," a shoreline road, and a shoreline park. The proposed project and the development concepts in Alternatives 1 and 2 are therefore consistent with the recommendations in the Keāhole to Kailua Development Plan.

Hawai'i County Zoning

As shown on Figure AA, the project site is zoned "Open". Under Section 25-5-160 of the Hawai'i County Code, "The O (Open) district applies to areas that contribute to the general welfare, the full enjoyment, or the economic well-being of open land type use which has been established, or is proposed. The object of this district is to encourage development around it such as a golf course and park, and to protect investments which have been or shall be made in reliance upon the retention of such open type use, to buffer an otherwise incompatible land use or district, to preserve a valuable scenic vista or an area of special historical significance, or to protect and preserve submerged land, fishing ponds, and lakes (natural or artificial tide lands)".

Some of the proposed uses at Kona Kai Ola are permitted uses in the Open zone such as:

- Heiau, historical areas, structures, and monuments;
- Natural features, phenomena, and vistas as tourist attractions;
- Private recreational uses involving no aboveground structure except dressing rooms and comfort stations;

- Public parks;
- Public uses and structures, as permitted under Section 25-4-11.

In addition to those uses permitted outright, the following uses are permitted after issuance of a use permit:

- Yacht harbors and boating facilities; provided that the use, in its entirety, is compatible with the stated purpose of the O district.
- Uses considered directly accessory to the uses permitted in this section shall also be permitted in the O district.

The proposed time-share and hotel units and commercial uses would not be consistent with the zoning designation of "Open". Project implementation therefore requires rezoning of portions of the project to the appropriate zoning category or use permits for certain uses.

Special Management Area

As shown in Figure AB, the entire project area up to the highway is within the coastal zone management zone known as the Special Management Area ("SMA"). At the County level, implementation of the CZM Program is through the review and administering of the SMA permit regulations. Kona Kai Ola complies with and implements the objectives and policies of the Coastal Zone Management (CZM) Program, and a full discussion is provided in Section 5.1.3. The development concepts in the proposed project and Alternatives 1 and 2 will be subject to applicable SMA rules and regulations.

February 6, 2007

Oceanit, Oceanit Center
828 Fort Street Mall, 6th Floor
Honolulu, Hawaii 96813

Subject: Kona Kai Ola, DEIS

Dear Vayan Vithanage:

The proposed use of the 300 acres of Department of Land and Natural Resources Land principally for Marina Development is not justifiable use of Public Lands.

There is no compelling argument of public necessity or general public interest. The rationale for touting the splendid opportunity to enhance economic opportunity for public benefit is flimsy. The DEIS document should discuss viable alternatives justifying and satisfying public necessity with economic feasibility. Public benefits and destinations to the beneficiaries at best are circuitous and uncertain. The project plans, if and when implemented, would mean huge capital investments with anticipation of a high rate of return. There is no discussion of external public infrastructure investments that would be required at the taxpayer's expense. The DEIS should disclose the projected net benefits (or disbenefits) for the people's evaluation of project worthiness.

DLNR lands belong to the people with unconditional availability for them. Entrusting a private entity to balance public need and enjoyment with private desires would be tantamount to abrogation of the people's right and trust.

Private enrichment from public lands is simply not right. Unconditional availability of public lands for public use and benefit is right. The DEIS is inadequate in assuring the protection of natural resources and its beauty for the people.

Sincerely,

Harold Murata

Harold Murata
PO Box 1752
Kealakekua, Hawaii 96750

Harold Murata
PO Box 1752
Kealakekua, Hawaii 96750

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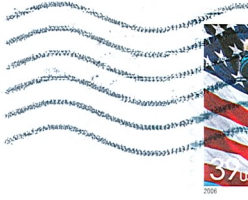

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FEB 07 2007

Oceanit, Oceanit Center
828 Fort Street Mall, 6th Floor
Honolulu, Hawaii 96813

oceanit
innovation through engineering & scientific excellence

July 23, 2007

Harold Murata
P.O. Box 1752
Kealakekua, Hawai'i 96750

Dear Mr. Murata:

Subject: Kona Kai Ola Draft Environmental Impact Statement
Response to Your Comments Dated February 6, 2007

Thank you for your comments on the Kona Kai Ola Draft Environmental Impact Statement.

We note your comment that the "Marina Development is not justifiable use of Public Lands." We disagree on two counts. First, Kona Kai Ola is not simply a marina development. The vision for Kona Kai Ola is an environmentally sustainable marina-focused development featuring a mix of uses including visitor and resident-serving commercial enterprises, hotels and time-share units, marina services, open space and community-benefiting facilities including public infrastructure improvements in a pedestrian friendly setting surrounding the marina and seawater lagoons.

Second, there is an existing demand for additional boat slips and marina facilities. This concern is often expressed in our community outreach program. DLNR specifically requested a private developer to build an expanded harbor to meet this public demand. By meeting this demand through the Kona Kai Ola project, the State is acting in the public interest.

Concerning your comment regarding viable alternatives, the EIS includes a full discussion of alternatives in EIS Section 2, Alternatives Analysis. As explained in the DEIS, the agreement between JDI and the State of Hawai'i established a required scope and scale of the project for which the impact analysis was provided. Several comments have addressed the fact that alternatives other than the No Project Alternative were not addressed in the DEIS Section 2, Alternatives Analysis.

Kona Kai Ola is of the position that alternative actions other than a No Project alternative are not currently feasible without an amendment to the agreement with the State. Agency and public comments in response to the DEIS, as well as additional information generated as a result of inquiry into issues raised by the

comments, have been helpful in identifying alternative actions that will serve the State's goal of providing additional marina slips for the Kona area. These alternative actions also serve to reduce or mitigate anticipated effects of the proposed development.

Thus, agencies such as the Land Division of the Department of Land and Natural Resources, the U.S. Department of the Interior Fish and Wildlife Service, the Planning Department of the County of Hawai'i, and the Office of Environmental Quality Control (OEQC), as well as community organizations have commented that a reduced scale marina and related facilities should be considered. The OEQC has also asked that the alternative of a reduced scale project be evaluated under the assumption that DHHL may determine that a downsized project would be preferred.

In response to these comments on the DEIS and in consideration of measures to mitigate anticipated impacts, the EIS Section 2, Alternatives Analysis, has been revised to describe the following alternatives, which are discussed in more detail in the EIS:

- Alternative 1 is a project involving a 400-slip marina, 400 hotel units, 1,100 time-share units, and commercial and support facilities. This alternative would enhance water quality and avoid the need to widen the existing harbor entrance channel, as well as reduce traffic and socioeconomic impacts.
- Alternative 2 is an alternative that had been previously discussed, but not included in the proposed project that includes an 800-slip harbor and a golf course.
- Alternative 3 is the no-action alternative.

A comparison between impacts related to the proposed project concept and impacts related to Alternative 1 indicates that a reduction in the acreage and number of slips in the marina, as well as the reduction in hotel and time-share units, would generate less environmental, traffic, social and economic impacts. Although positive economic impacts would be reduced, Alternative 1 can be considered as a preferable alternative because of reduced environmental impacts. However, while it can be concluded that the 25-acre marina in Alternative 1 would be the preferred size, the DLNR agreement establishes the size of the marina at 45 acres and 800 slips. An amendment to the DLNR agreement is required in order to allow Alternative 1 to proceed. Hence, selection of Alternative 1 is an unresolved issue at this time.

The additional EIS text that includes the added EIS Section 2, Alternative Analysis, is contained in Attachment 1 of this letter.

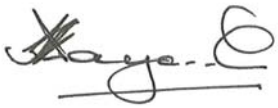
You mention that implementation of Kona Kai Ola "would mean huge capital investments with anticipation of a high rate of return." You further note that "there is no discussion of external public infrastructure investments that would be

required at taxpayer's expense." Both statements are inaccurate. The project is funded by private investment and will generate a reasonable rate of return. Further, the project includes crucial privately-funded improvements, such as the marina, regional roadway and circulation improvements, and improvements to the existing wastewater treatment plant. Private funds will also be used in the development of community-oriented facilities such as parks, other recreational facilities and public access.

Regarding the last two paragraphs of your letter, ownership of these lands will remain with the State. Further, several project features will enhance the public experience on these lands. These community-oriented features include various water features such as seawater lagoons with a marine wildlife park and a marine science center, a yacht club, fishing club, a canoe park, and a cultural park with a focus on the Hawaiian maritime cultural heritage of the voyaging canoe. The coastal area would be protected with a shoreline park with trails and public access parking for walking and shoreline fishing, and a cultural park surrounding the heiau, cultural sites and ʻAlula for community use. Additional project community areas would include facilities and space for community use, including programs of the Kona Kai Ola Community Foundation, which supports community programs in health care, culture, education, and employment training for the local community, especially to native Hawaiians. Hence, public interest will be served through the development of the Kona Kai Ola project.

Your comment letter and this response are included in the Final Environmental Impact Statement. We appreciate your participation in the environmental review process. Please submit a request to our office if you would like to receive a printed or electronic copy of the Final Environmental Impact Statement, or portions thereof.

Sincerely,



Dayan Vithanage, P.E., PhD.
Director of Engineering

cc: Office of Environmental Quality Control
State Department of Hawaiian Home Lands
Jacoby Development, Inc.

Attachment 1

2 Alternatives Analysis

~~In typical land development projects, the initial planning process includes the exploration of alternatives to development objectives. In the EIS process, these alternatives are presented with a disclosure of reasons for the dismissal of non-preferred alternatives.~~

~~Kona Kai Ola does not follow this same pattern of alternatives evaluation.~~ As discussed in Section 1.4, the proposed Kona Kai Ola project is the result of agreements between JDI and the State DLNR and DHHL. The agreements and leases between the State and JDI stipulate the parameters of development for this site in terms of uses, quantities and size of many features, resulting in a limited range of land uses. Unlike a private property project, JDI is required to meet the criteria outlined in the agreements, thereby affording less flexibility in options and uses. From the developer's perspective, the agreements must also provide sufficient flexibility to allow for a development product that responds to market needs and provides a reasonable rate of return on the private investment.

The agreements between JDI and DLNR specify that the proposed harbor basin is to be 45 acres and accommodate 800 slips. This development proposal is the subject of this EIS. In response to DEIS comments, additional water quality studies and modeling were conducted. These studies determined that the water circulation in a 45-acre 800-slip marina would be insufficient to maintain the required standard of water quality. The models of water circulation suggest that a new 25-acre harbor basin could successfully maintain required water quality in the new harbor. Comments on the DEIS from DLNR, from other government agencies, the neighbors and the general community also called for the consideration of alternatives in the EIS, including a project with a smaller harbor basin and less density of hotel and time-share units.

In response to these comments on the DEIS, three alternatives are evaluated in this Final EIS and include Alternative 1, which is a plan with a 25-acre 400-slip harbor basin including a decrease in hotel and time-share units; Alternative 2, which is an alternative that had been previously discussed but not included in the proposed project, that includes an 800-slip harbor and a golf course; and Alternative 3, the no-project alternative. Each alternative is included in the EIS with an evaluation of their potential impacts. These project alternatives are presented to compare the levels of impacts and mitigation measures of the proposed project and alternative development schemes pursuant to requirements set forth in Chapter 343, HRS.

~~JDI is required to provide a new marina basin not less than 45 acres and a minimum of 800 new boat slips. Further, the agreements provide the following options for land uses at the project site:~~

- ~~Golf Course~~
- ~~Retail Commercial Facilities~~
- ~~Hotel Development Parcels~~
- ~~Marina Development Parcels~~
- ~~Community Benefit Development Parcels~~

~~JDI is not pursuing the golf course option and is proposing instead to create various water features throughout the project site. All other optional uses have been incorporated in Kona Kai Ola.~~

2.1 Project Alternatives

2.1.1 Alternative 1: 400-Slip Marina

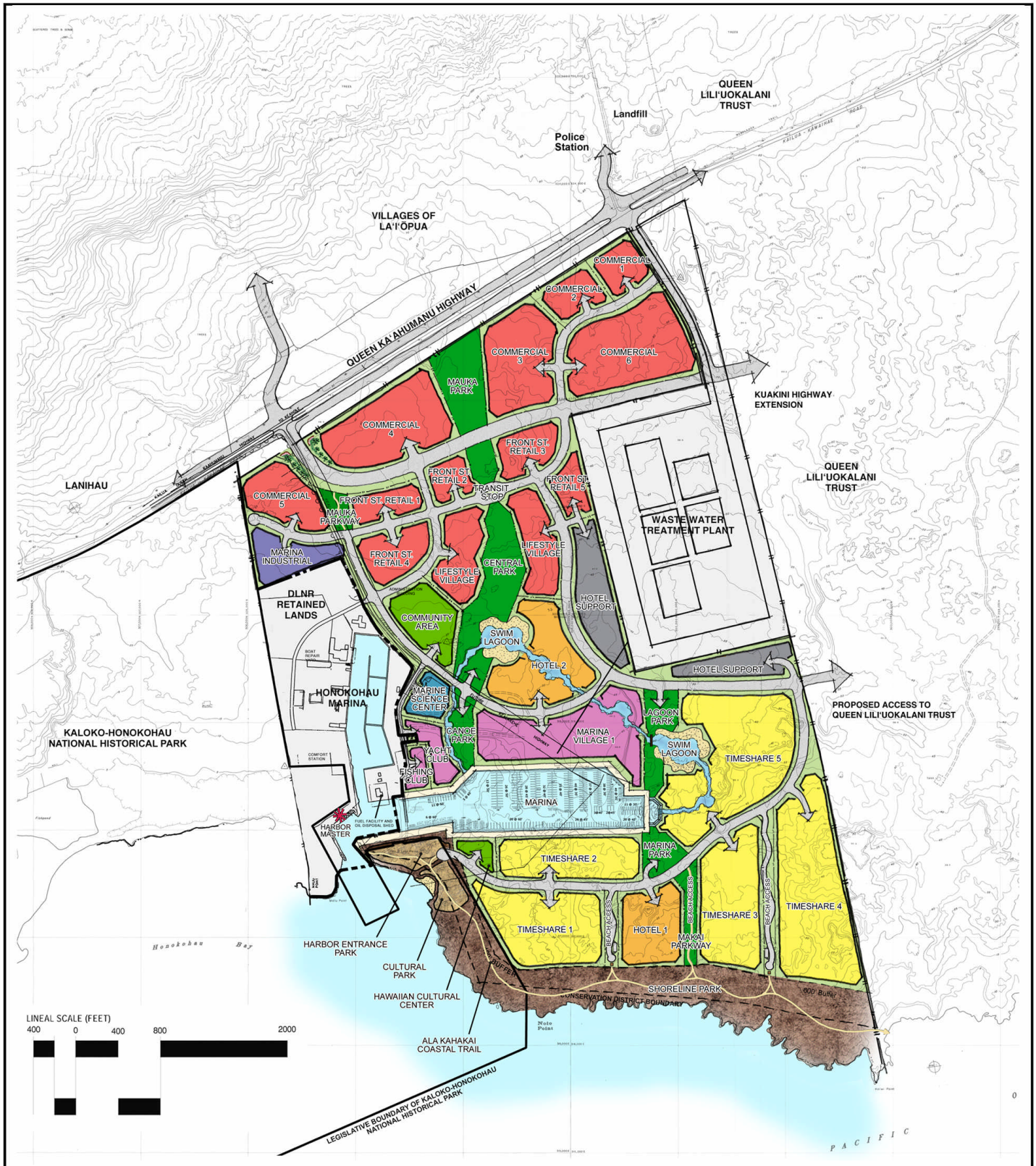
Studies conducted in response to DEIS comments found the construction and operation of an 800-slip marina may significantly impact the water quality within the marina and along the shoreline. Specifically, the Harbor Water Quality Modeling Study, as contained in Appendix U, found that the water circulation in a 45-acre 800-slip harbor was insufficient to maintain an acceptable level of water quality. Further, the existing harbor channel, which would serve both the existing and new harbors, could not adequately serve the increased boat traffic generated by an 800-slip marina during peak traffic. Mitigation measures to accommodate peak boat traffic included the widening of the existing channel, an action that would entail a complex process of Federal and State approvals and encounter significant environmental concern.

Concerns related to the proposed density of hotel and time-share units were also expressed in comments to the DEIS from members of the public, neighbors to the project site, especially the Kaniohale Community Association, and government agencies. Common themes in DEIS comments were related to impacts regarding traffic, project requirements of potable water and infrastructure systems, including sewer, drainage, utility and solid waste systems, and socioeconomic impacts.

In response to the water quality study results, and to the DEIS comments, an alternative plan was developed with a smaller marina with less boat slips, and a related decrease in hotel and time share units. Illustrated in Figure G, Alternative 1 reflects this lesser density project, and features a 400-slip marina encompassing 25 acres. For the purposes of the Alternative 1 analysis, JDI assumed 1,100 time-share units and 400 hotel rooms. Project components include:

- 400 hotel units on 34 acres
- 1,100 time-share units on 106 acres
- 143 acres of commercial uses
- 11 acres of marina support facilities
- 214 acres of parks, roads, open spaces, swim lagoons and community use areas

In addition, Alternative 1 would include the construction of a new intersection of Kealakehe Parkway with Queen Ka'ahumanu Highway, and the extension of Kealakehe Parkway to join Kuakini Highway to cross the lands of Queen Lili'uokalani Trust, and connecting with Kuakini Highway in Kailua-Kona. This is a significant off-site infrastructure improvement and is included in the agreements between the State and JDI.



Source: PBR HAWAII

Plan is conceptual only and subject to change

Figure G: Alternative 1: 400-Slip Marina

LEGEND

- TIME SHARE
- HOTEL
- RETAIL / COMMERCIAL
- MARINA RETAIL
- MARINA SUPPORT / COMMERCIAL
- MARINE SCIENCE CENTER
- COMMUNITY AREA / CULTURAL CENTER
- SWIM LAGOON
- MARINA
- UTILITIES
- PARKS & GREEN SPACE
- SHORELINE
- HARBOR ENTRANCE PARK / CULTURAL PARK

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JDI
JACOBY DEVELOPMENT, INC.

Like the proposed project, Alternative 1 would have a strong ocean orientation, and project components that support this theme would include various water features including seawater lagoons and a marine science center. The new Alternative 1 harbor would include a yacht club, fishing club, a canoe park, and a cultural park with a focus on Hawaiian maritime cultural heritage of the voyaging canoe. The coastal area would be protected with a shoreline park with trails and public access parking for walking and shoreline fishing, and a cultural park surrounding the heiau, the cultural sites and 'Alula for community use. Additional Alternative 1 community areas would include facilities and space for community use, including programs of the Kona Kai Ola Community Foundation, which supports community programs in health care, culture, education, and employment training for the local community, especially to native Hawaiians. Like the original proposed plan, Alternative 1 includes 40 percent of the land in parks, roads, open spaces, swim lagoons and community use areas.

2.1.2 Alternative 2: Golf Course Feature

Alternative 2 was among the alternatives discussed at a community charrette in September 2003. It includes a golf course, which is a permitted use in the DLNR agreement and DHHL lease. As Figure H illustrates, an 18-hole championship golf course would occupy 222 acres on the southern portion of the project site. As with the proposed project, Alternative 2 includes an 800-slip marina on a minimum of 45 acres.

To support the economic viability of the project, other Alternative 2 uses include:

- Golf course clubhouse on three acres
- 1,570 visitor units on 88 acres fronting the marina
- 118 acres of commercial uses
- 23 acres of community uses

Community uses in Alternative 2 include an amphitheater, a canoe facilities park, a community health center, a Hawaiian cultural center and fishing village, a marine science center and employment training center. The sea water lagoon features contained in the proposed project and Alternative 1 are not included in this alternative.

2.1.3 Alternative 3: No Action

In Alternative 3, the project site would be left vacant, and the proposed marina, hotel and time-share facilities, commercial and marina industrial complexes, and community-oriented uses would not be realized.

~~The economic viability and sustainability of the project is determined by the density and uses proposed. Because JDI is obligated to develop an 800-slip marina for the State, complete road improvements, and provide various public enhancement features at its own expense, the density proposed for the income generating features of the development must be sufficient to provide an acceptable level of economic return for JDI. The market study, which is discussed in Section 4.6, reviewed various development schemes and determined that the currently proposed density and mix is the optimum to meet the anticipated financing and development cost obligations for the public features associated with the development.~~

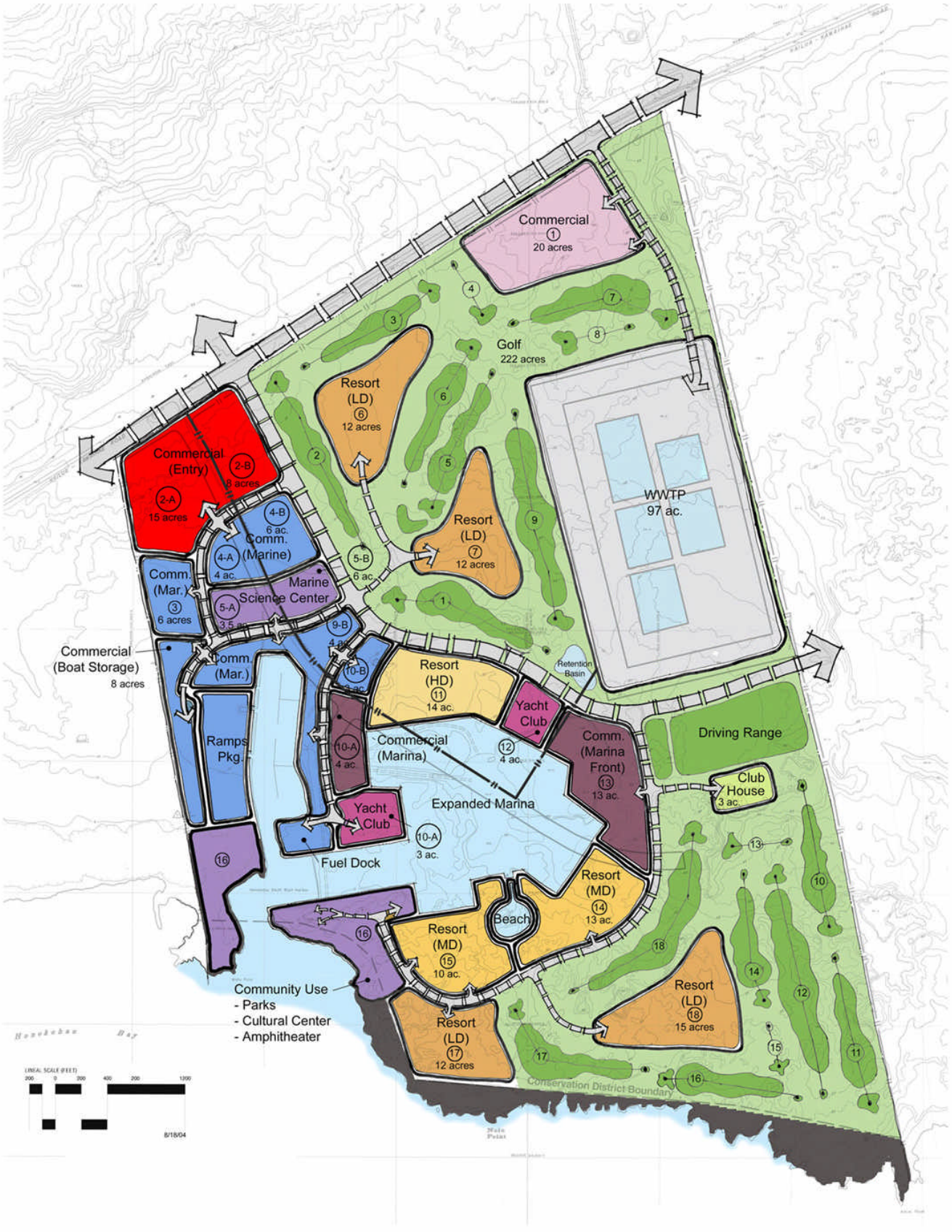

Figure H. Alternative 2: Golf Course Alternative

Legend

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JACOBY DEVELOPMENT, INC.

2.2 Alternatives Analysis

As discussed in Section 2.1, the proposed Kona Kai Ola project (also referred to as "proposed project") is defined by development requirements related for a marina and the related uses that would be needed to generate a reasonable rate of return that covers development costs.

Beginning with Section 2.2.1, the alternative development concepts are comparatively assessed for potential impacts that may reasonably be expected to result from each alternative. Following is an overview of the primary observations of such assessment.

Alternative 1 includes half of the State-required boat slips and 60 percent of the proposed hotel and time-share units and, due to the decreased density, this alternative would generate significantly less environmental and socio-economic impacts. A harbor water quality model found the reduction of the volume of the new marina basin by about half (approximately 25 acres) significantly improved the water circulation and quality. Further, the reduced number of boat slips would generate less boat traffic, thereby reducing congestion and the need to mitigate impacts further by the widening of the existing harbor channel.

A project with fewer hotel and time-share units and increased commercial space with a longer (14 years) absorption period would change the mix of employment offered by the project, and slightly increase the overall employment count. The public costs/benefits associated with Alternative 1 would change, compared to the proposed project, with a general increase in tax collections, and a general decrease in per capita costs. Detailed discussion of Alternative 1 potential economic impacts are provided in Section 4.6.6. Comparisons of levels of impact are presented throughout this FEIS.

While this analysis might indicate that the 25-acre marina in Alternative 1 would be the more prudent choice, the DLNR agreement establishes the minimum size and slip capacity of the marina at 45 acres and 800 slips, respectively. Amendments to the DLNR agreement would be required in order to allow Alternative 1 to proceed as the preferred alternative. Hence, selection of the preferred alternative is an unresolved issue at the writing of this FEIS.

Alternative 2, the golf course alternative, was not previously considered to be the preferred alternative primarily because market conditions at the time of project development might not likely support another golf course. Further, DHHL has a strategy goal to have more revenue-generating activities on the commercial lease lands within the project area. In addition, concerns have been expressed as to environmental impacts of coastal golf courses, including the potential adverse impact on Kona's water supply if potable water is used for golf course irrigation.

While Alternative 3, the no-project alternative, would not generate adverse impacts related to development of these lands associated with the construction and long-term operations, it would also not allow for an expanded public marina that would meet public need and generate income for the public sector. Further, the no-project alternative would foreclose the opportunity to create a master-planned State-initiated development that would result in increased tax revenue, recreation options and community facilities. Crucial privately-funded improvements, such as the marina, regional roadway and circulation improvements, and improvements to the existing wastewater treatment plant, would not be implemented. Private funds toward the development of community-oriented facilities such as parks, other recreational facilities, and public access would not be contributed.

~~Hence, the only valid alternative to the proposed project is the no-action alternative. In this alternative, the project site would be left vacant, and the proposed marina, hotel and time-share facilities, commercial and marina industrial complexes, and community-oriented uses would not be realized.~~

~~The no-project alternative would therefore not generate adverse impacts associated with the construction and long-term operations would not occur.~~

~~Likewise, the creation of a master-planned state-initiated development, resulting in increased employment, tax revenue, recreation options and community facilities, would not be created. Privately-funded improvements, such as the marina, regional roadway and circulation improvements, and improvements to the existing wastewater treatment plant, would not be implemented. Private funds toward the development of community-oriented facilities such as parks, other recreational facilities and public access would not be contributed.~~

Further, the creation of revenue-producing businesses on the DHHL property to fund homestead programs would not occur, resulting in fewer potential benefits for Hawaiians.

Hence, the agreements and leases between the State and JDI indicate that the no-action alternative is not in the public interest~~has been rejected at this time~~.

2.2.1 Impact Comparison

Grading and Excavation

The proposed project requires grading and excavation. Both actions may impact groundwater due to rainfall runoff during construction. Alternative 1 would require a significantly smaller excavation for the marina basin and would therefore carry a lesser risk of potential adverse effects on water quality. Alternative 2 would require the same basin excavation as the proposed project, and would also include extensive grading and filling to build the golf course, the latter of which would generate additional impacts. Alternative 3 would result in no change to the geography, topography and geology.

Further discussion on grading and excavation is contained in Section 3.3.

Natural Drainage

Most precipitation infiltrates into the porous ground at the site, and no significant sheet flow is likely. Alternative 1 would generate similar levels of impacts on natural drainage as those of the proposed project and thus require similar mitigation measures. The golf course in Alternative 2 would not be as porous since the site would be graded, soil would be placed, and grass and other landscaping would be grown. Sheet flow and runoff can occur on a golf course, and drainage patterns might change. Alternative 3 would result in no change to the existing natural drainage pattern. Further discussion on natural drainage is contained in Section 3.4.

Air Quality

Air quality will be affected by construction activities, as well as pollutants from vehicular, industrial, natural, and agricultural sources. Alternative 1 would generate less construction air quality impacts than the proposed project due to the reduced amount of intensive groundwork associated with the smaller marina basin and fewer long-term impacts by reducing traffic 35 and 40 percent during, respectively, AM and PM peak traffic times. Construction of Alternative 2 would result in fugitive dust and exhaust from equipment and is expected to generate the same level of air quality impact as the proposed project. Alternative 3 would result in no change to existing air quality. Further discussion on air quality is contained in Section 3.5.

Terrestrial Environment

To provide additional habitat for shorebirds and some visiting seabirds, the project proposes to construct a brackishwater pond area suitable for avian fauna, including stilts, coots and ducks. While habitat expansion is beneficial, there is also a possibility that these species may be exposed to activity that may harm them. Alternative 1 would not include a brackish water pond, but will include 5 acres of seawater features, which is 74 percent less than the 19 acres of seawater features in the proposed project. While this would reduce beneficial impacts, it would also decrease exposure to potentially harmful activity. Alternative 2 does not include the brackish water pond features, but would include drainage retention basins that would attract avian fauna and expose them to chemicals used to maintain golf course landscaping. While Alternative 3 would result in no increase in potentially harmful activity, it would also not provide additional habitat for avian fauna. Further discussion on the terrestrial environment is contained in Section 3.7.

Groundwater

Groundwater at the project site occurs as a thin basal brackish water lens. It is influenced by tides and varies in flow direction and salt content. The existing Honokōhau Harbor acts as a drainage point for local groundwater. Any impact to groundwater flow from the proposed harbor is likely to be localized. The proposed marina basin will not result in any significant increase in groundwater flow to the coastline, but rather a concentration and redirection of the existing flows to the harbor entrance.

There will be differences in the flow to the marina entrance between the proposed project and Alternative 1. Alternative 1, being smaller in size, will have less impact on groundwater flow than the proposed marina. Alternative 2 will have a similar impact to groundwater quality as the proposed project. Alternative 2 may also impact water quality by contributing nutrients and biocides to the groundwater from the golf course. Alternative 3 would result in no change in existing groundwater conditions. Further discussion on groundwater is contained in Section 3.8.1.

Surface Water

There are no significant natural freshwater streams or ponds at the site, but there are brackish anchialine pools. Surface water at the project site will be influenced by rainfall. Runoff typically percolates rapidly through the permeable ground. The proposed project will include some impermeable surfaces, which together with building roofs, will change runoff and seepage patterns.

Alternative 1 is a lower density project that is expected to have proportionally less impact on surface water and runoff patterns and less potential impact on water quality than the proposed project. Alternative 2 would have more impact on surface water quality than the proposed project due to fertilizers and biocides carried by runoff from the golf course. Alternative 3 would result in no change to surface water conditions. Further discussion on surface water is contained in Section 3.8.2.

Nearshore Environment and Coastal Waters

The potential adverse impacts to the marine environment from the proposed project are due to the construction of an 800-slip marina and the resulting inflow of higher salinity seawater and inadequate water circulation, both of which are anticipated to impair water quality to the extent of falling below applicable standards. One possible mitigation measure is to significantly reduce the size of the marina expansion.

The reduced marina size (from 45 to 25 acres) and reduced lagoon acreage in Alternative 1 are expected to result in a proportionate reduction in seawater discharging into the new harbor and increased water circulation. Alternative 2 includes the same marina basin size and is therefore subject to the same factors that are expected to adversely affect water quality.

In the existing Honokōhau Harbor, water quality issues focus on the potential for pollutants, sediments, mixing and discharge into the nearshore marine waters. Before the harbor was constructed, any pollutants entrained within the groundwater were believed to have been diffused over a broad coastline.

The water quality in the proposed harbor depends on several components. These include salinity, nutrients, and sediments that come from the ocean, rainfall runoff, water features with marine animals, and dust. The smaller project offered as Alternative 1 is expected to produce a reduced amount of pollutants and reduce the risk of adverse impact upon water quality.

It is notable that the 45-acre marina basin planned in the proposed project and Alternative 2 only becomes viable from a water quality impact standpoint if the additional brackish groundwater inflow into the new marina exceeds 60 mgd. The resulting flushing from such inflow would be expected to better maintain water quality. However, it is unclear whether 60 mgd of brackish groundwater would be available. As proposed in Alternative 1, reduction of the volume of the new marina basin by 45 percent will significantly improve the flushing and water quality because the lower volume can be flushed by the available groundwater flow.

In addition, there could be higher rainfall runoff from the Alternative 2 golf course into the harbor, because the grassed golf course will be less porous than the natural surface. The golf course will also require relatively high levels of fertilizer, biocides, and irrigation, all of which could contribute to adverse water quality impacts.

Further discussion on nearshore environment and coastal waters is contained in Section 3.9.1.

Anchialine Pools

Anchialine pools are located north of Honokōhau Harbor, and south of the harbor on the project site. The marine life in these pools is sensitive to groundwater quality, and changes due to construction and operation of the project could degrade the viability of the pool ecosystem. In the southern complex, 3 anchialine pools with a combined surface area of $20m^2$ would be eliminated due to the harbor construction in the proposed project and Alternatives 1 and 2.

Predicting the extent of change in groundwater flow is difficult if not impossible even with numerous boreholes and intense sampling. The actual flow of groundwater towards the sea is minimal today, and tidal measurements show that tide fluctuations represent more than 90 percent in actual harbor tides. The fluctuations occur simultaneous with the ocean/harbor tide, which indicate a vertical and horizontal pressure regime between bore hole 6 and the ocean and harbor. Hence, the tides alone create a mixing system that increases salinity, as the flow approaches the point of discharge which will be either the channel or the shore. Another factor that could influence groundwater quality is the increased local recharge from irrigation between the channel and shore. This will add fresh water to the lens locally but is not quantified at this time.

Quantification of these impacts, including the flow of groundwater through each pond, is therefore extremely difficult. The shallow lavas are of the pahoehoe type and have a relatively high horizontal permeability. In surface depressions or undulations, the pahoehoe lavas have a tendency to lose vertical permeability from sedimentation thus restricting water exchange within the individual pools. This is normally reflected in both the salinity and temperature and this information has been adequately studied in the pools.

Changes in groundwater quality may or may not impact biological communities in the anchialine and estuarine environment. In either case, it is important to understand these relationships to effectively manage the resource. If there is significant deviation from the baseline especially in regard to nutrients, pathogens, and toxins, a mitigation plan to determine the cause and take decisive appropriate action will be implemented.

Due to the uncertainty of changes in groundwater flow and quality due to marina construction, the variability in impacts between the proposed project and Alternatives 1 and 2 is unknown at this time. Alternative 3 would result in no change in groundwater flow. While this would eliminate the potential for adverse impacts, Alternative 3 would also continue the pattern of existing degradation related to human activity and the introduction of alien species. Further discussion on anchialine pools is contained in Section 3.9.2.

Marine Fishing Impacts

The proposed marina will increase the number of boats in the area and it is reasonable to assume that a portion of these new boats will engage in fishing activities. The increase in boats in the area would be primarily related to the marlin and tuna / pelagic fishery, coral reefs due to extractive fisheries, and SCUBA activities. The pressure on fish and invertebrate stocks is expected to increase with or without the marina. Harbor expansion provides the opportunity to address existing conditions to consolidate, focus, and fund management and enforcement activities at one location.

Compared to the proposed project, Alternative 1 would result in a 21 percent decrease in boat traffic, thereby lessening the potential for marine fishing impacts. The level of impacts in Alternative 2 would be similar to that of the proposed project. Alternative 3 would result in no change in existing marine fishing conditions, and no opportunity to address already existing pressure on fish and invertebrate stocks. Further discussion on marine fishing impacts is contained in Section 3.9.3.

Cultural and Archaeological Resources

The proposed project will integrate cultural and archaeological resources in the overall development. Archaeological sites recommended for preservation will be preserved, and cultural practices will be encouraged. Kona Kai Ola includes a canoe park, and a cultural park with a focus on Hawaiian maritime cultural heritage of the voyaging canoe. Proposed is a 400-foot shoreline setback that would serve as a buffer between the ocean and developed areas. This coastal area would be protected with a shoreline park with trails and public access parking for walking and shoreline fishing, and a cultural park surrounding the heiau, the cultural sites and ʻAlula for community use.

Alternative 1 would contain all of the cultural archaeological features and the shoreline setback area would be 400 feet in the northern portion of the site and increase to 600 feet in the southern portion. Alternative 2 would preserve cultural and archaeological resources, but does not include a 400-foot shoreline setback. Alternative 3 would result in no change to existing cultural and archaeological resources and no addition of cultural and community facilities and activities. Further discussion on cultural and archaeological resources is contained in, respectively, Sections 4.1 and 4.2.

Noise

Project-generated noise is due to construction equipment and blasting, boats, marina activities, vehicle traffic, and the Kealakehe Wastewater Treatment Plant operations. Alternative 1 would generate less noise impacts due to reduced construction activities, fewer boats, less traffic and less on-site activity. Alternative 2 would also generate less noise due to reduced traffic and less on-site activity, but noise related to the excavation of the marina basin and an increase in the number of boats would be similar to that of the proposed project. Further discussion on noise impacts is presented in Section 4.4.

Socioeconomic Impacts

The proposed project will generate an increase in de facto population of an estimated 5,321 persons due to the increase in hotel and time-share units. The estimated de facto population increase in Alternative 1 is 37 percent less, at 3,363 persons, than the proposed project. The de facto population increase in Alternative 2 is similar to Alternative 1.

Employment in the commercial components will nearly double in Alternative 1, from a stabilized level of 1,429 full-time equivalent (FTE) positions in the proposed project to 2,740 in the Alternative 1.

Under Alternative 1, the total operating economic activity at Kona Kai Ola will increase due to the added commercial space more than off-setting the fewer visitor units, moving upward from $557.6 million per year to circa $814.3 million annually. The total base economic impact resulting from development and operation of Alternative 1 will similarly be higher by between 35 and 45 percent than that of the proposed project.

Alternative 1, which has a reduced marina size of 25 acres, and fewer hotel and time-share units, would have a meaningful market standing, create significant economic opportunities, and provide a net benefit to State and County revenues. From a market perspective, a smaller Kona Kai Ola would still be the only mixed use community in the Keahole to Kailua-Kona Corridor offering competitive hotel and time-share product.

The estimated absorption periods for marketable components of Alternative 1 are generally shorter than those for the same components in the proposed project. Marina slips under Alternative 1 are estimated to be absorbed within 2 years after groundbreaking, as compared with 9 years for absorption of slips in the proposed project. Hotel rooms under Alternative 1 are estimated to be absorbed within 4 years after groundbreaking, as compared with 7 years under the proposed project. Time-share units would be absorbed within 10 years under Alternative 1, while 15 years are projected under the proposed project. Due to the planned increase in commercial facilities under Alternative 1, the absorption period of commercial space is estimated at 14 years, as compared with 8 years for absorption of such facilities under the proposed project.

The State and County will still both receive a net benefit (tax receipts relative to public expenditures) annually on a stabilized basis under the Alternative 1. The County net benefits will be some $12.2 million per year under the Alternative 1 versus $14.9 million under the proposed project. The State net benefits will increase under the Alternative 1 to about $37.5 million annually, up substantially from the $11.4 million in the proposed project.

Due to the lower de facto population at build-out, the effective stabilized public costs for both the State and County will decline meaningfully under the Alternative 1, dropping from $7.7 million annually for the County and $36.5 million for the State, to $4.9 million and $23 million per year, respectively.

Alternative 3 would result in no increase in de facto population and improvement to economic conditions. Further discussion on social and economic impacts are contained in, respectively, Sections 4.5 and 4.6.

Vehicular Traffic

The proposed project will impact the nearby road network that currently is congested during peak traffic times. The proposed project includes roadway improvements that would reduce the impact and improve roadway conditions for the regional community.

Alternative 1 includes the same roadway system improvements as the proposed project, yet would reduce vehicular traffic by 35 percent when compared to the proposed project. Alternative 2 would have similar traffic conditions and roadway improvements as Alternative 1. Alternative 3 would result in no increase in traffic and no roadway improvements.

Marina Traffic Study

The increase in boat traffic due to the proposed 800-slip marina would cause entrance channel congestion during varying combinations of existing and new marina peak traffic flow. Worst case conditions of active sport fishing weekend and summer holiday recreational traffic result in traffic volumes exceeding capacity over a short afternoon period. Mitigation to address boat traffic in the proposed project include widening the entrance channel, traffic control, implementation of a permanent traffic control tower, or limiting vessel size.

Alternative 1 would result in a 21 percent reduction in boat traffic congestion under average existing conditions and ten percent reduction during peak existing conditions. The reduction to 400 slips also reduces the impacts of congestion at the entrance channel, thereby reducing the need for any modifications to the entrance channel.

Alternative 2 would have the same level of boat traffic as the proposed project. Alternative 3 would not meet the demand for additional boat slips and would not generate additional boat traffic. Further discussion on marina traffic is contained in Section 4.8.

Police, Fire and Medical Services

The proposed project will impact police, fire and medical services due to an increase in de facto population and increased on-site activity. Alternatives 1 and 2 would have similar levels of impact as the proposed project due to increased on-site activity. Further discussion on police, fire and medical services are contained, respectively, in Sections 4.10.1, 4.10.2 and 4.10.3.

Drainage and Storm Water Facilities

The proposed project will increase drainage flows, quantities, velocities, erosion, and sediment runoff.

Alternative 1 involves a reduction of the project density that would reduce storm runoff from the various land uses due to a reduction in impervious surfaces associated with hotel and time-share development and to the creation of more open space. However, roadway areas will increase by about 30 percent in Alternative 1. Storm runoff from proposed streets would therefore increase; thus requiring additional drainage facilities and possibly resulting in no net savings. The golf course in Alternative 2 may also change drainage characteristics from those of the proposed project and may not reduce impacts. Alternative 3 would result in no change in existing conditions and no improvements to drainage infrastructure. Further discussion on drainage and storm water facilities is contained in Section 4.10.5

Wastewater Facilities

The proposed development is located within the service area of the Kealakehe WWTP and a sewer system will be installed that connects to the WWTP. The sewer system will be comprised of a network of gravity sewers, force mains, and pumping stations which collect and convey wastewater to the existing Kealakehe WWTP. Project improvements will incorporate the usage of recycled / R1 water. Improvements implemented by the proposed project will also accommodate the needs of the regional service population.

Alternative 1 would generate approximately 10 percent less wastewater flow than the proposed project. Wastewater flow in Alternative 2 is undetermined. Alternative 3 would result in no additional flow, as well as no improvements that will benefit the regional community. Further discussion on wastewater facilities is contained in Section 4.10.6.

Potable Water Facilities

The proposed project average daily water demand is estimated at 1.76 million gallons per day. Existing County sources are not adequate to meet this demand and source development is required. The developer is working with DLNR and two wells have been identified that will produce a sustainable yield that will serve the project. These wells will also serve water needs beyond the project.

Alternative 1 would result in net decrease of about five percent of potable water demand. Alternative 2 may have a lower water demand than the proposed project as long as potable water is not used for irrigation. Alternative 3 would result in no additional flow, as well as no source development that will benefit the regional community. Further discussion on potable water facilities is contained in Section 4.10.8.

Energy and Communications

Regarding Alternative 1, preliminary estimates for electrical, telecommunications, and cable resulted in a net demand load that remains similar to the proposed project. Further discussion on energy and communications is contained in Section 4.10.9.1.

The proposed project will increase the demand for electrical energy and telecommunications. The demand would be reduced in Alternative 1 because the number of boat slips and units would decrease. Similarly, Alternative 2 would have fewer units than the proposed project and therefore reduce energy demands. Further reduction in energy demand for either alternative could be achieved by using seawater air conditioning (SWAC) and other energy reduction measures, as planned by the developer. Further discussion on energy and telecommunications is contained in Section 4.10.9.2.

Water Features and Lagoons

The proposed project includes a brackishwater pond, lagoons, and marine life exhibits supplied by clean seawater. The water features in Alternative 1 would significantly decrease by 74 percent from 19 acres in the proposed project to five acres in Alternative 1. This decrease in water features would result in a corresponding decrease in water source requirements and seawater discharge. Alternative 2 does not include the seawater features. Alternative 3 would result in no additional demand for water source requirements and seawater discharge.

2.2.2 Conformance with Public Plans and Policies

State of Hawai'i

Chapter 343, Hawai'i Revised Statutes

Compliance with this chapter is effected, as described in Section 5.1.1 in regard to the proposed project and the alternatives discussed.

- State Land Use Law, Chapter 205, Hawai'i Revised Statutes

  The discussion in Section 5.1.2 is directly applicable to Alternative 1, the proposed project. Alternative 1 will involve a setback of 400 feet that increases to 600 feet along the southern portion of the project site's shoreline area. Alternative 2 does not provide for such a setback, but may still require approvals from DLNR for cultural, recreational, and community uses and structures within the Conservation district.

- Coastal Zone Management Program, Chapter 205A, Hawai'i Revised Statutes

  Recreational Resources:

  In addition to the discussion of consistency with the associated objective and policies, as described in Section 5.1.3, the reduction from the proposed project's 800-slip marina to a 400-slip marina under Alternative 1 will still expand the region's boating opportunities and support facilities. The existing harbor entrance will still be utilized under this alternative; however, potential risks relating to boat traffic and congestion in the marina entrance area will be reduced significantly. The 400-600 foot shoreline setback, public parks, trails, cultural areas, community facilities, and marine science center remain important recreational components under Alternative 1.

Alternative 2 includes a golf course component, which would add a more passive recreation to the active and social components, such as boating, fishing, swimming, trails, walkways, parks, marine life, educational and interactive areas that are also part of the project. The golf course would enhance the range of leisure and recreational opportunities offered at Kona Kai Ola.

Alternative 2, like the proposed project, will expand the region's boating opportunities and support facilities through its 800-slip marina. However, the potential adverse impacts of increased boat traffic from the size of the marina are significant enough to offset the benefits of increased boating opportunities.

Coastal Ecosystems:

The discussion in Section 5.1.3 is directly applicable to Alternative 1.

Alternative 1 not only reduces the number of slips proposed by 50 percent, but it also reduces the size of the marina from 45 acres to 25 acres. The 25-acre marina will increase the body of water within the existing harbor, but to a significantly lesser extent than the proposed project's estimated increase, which is also applicable to the 45-acre size that is proposed for the marina under Alternative 2.

The findings of the Harbor Water Quality Modeling Study conclude that a reduction in the size of the harbor expansion is an alternative that will mitigate the risk of significant impacts upon water quality within the marina and existing harbor. Accordingly, the reduction in both the number of slips and the size of the marina basin under Alternative 1, in combination with proper facilities design, public education, and enforcement of harbor rules and regulations, would result in fewer long-term impacts to water quality and coastal ecosystems. Short-term (construction-related) impacts would likely remain the same although the reduction in the total acreage of excavation is expected to result in a shorter duration of such impacts.

In addition to its 800-slip marina and potential adverse impacts upon water quality and the marine environment, Alternative 2 includes a golf course component, which has the potential to impact coastal ecosystems by increasing the nutrient loading in surface runoff and groundwater and also by introducing pesticides, herbicides, and other chemicals common in golf course use and management into the nearshore waters surrounding the project site.

Economic Uses

Although reduced in the number of slips, the smaller marina under Alternative 1 will nevertheless serve public demand for more boating facilities in West Hawai'i and is consistent with the objective and policies and discussion set forth in Section 5.1.3. The economic impacts of Alternative 2, while comparable to those of the proposed project's marina development, are notably marginal as to the golf course component, based on the marketability analysis that indicates a condition of saturation within the region.

Coastal Hazards

The discussion and considerations set forth in Section 5.1.3 are also applicable to Alternatives 1 and 2 and indicate compliance with the objective and policies addressed. Tsunami risks mainly affect the large shoreline setback area that is proposed for the project and Alternative 1. Alternative 2 projects a transient accommodation site that is partially within the tsunami hazard zone and thus carries a higher hazard risk. However, the essential requirement for these alternatives, as well as the proposed project, is a well-prepared and properly implemented evacuation plan.

Beach Protection

Discussion and considerations set forth in Section 5.1.3 are also applicable to Alternatives 1 and 2 and indicate compliance with the objective and policies addressed. Alternative 1 and, to a lesser extent, Alternative 2, will retain the shoreline area in its natural condition.

Similar to the proposed project, Alternative 1 provides for a shoreline setback of considerable width within which no structure, except for possible culturally-related structures, would be allowed. Alternatives 1 and 2 will thus be designed to avoid erosion of structures and minimize interference with natural shoreline processes.

Marine Resources

The discussion in Section 5.1.3 is also applicable to Alternative 1 which is described to be an alternative that is specifically projected to mitigate anticipated adverse impacts on water quality and the marine environment that might otherwise result from the original harbor design and scale, which is also incorporated in Alternative 2 . The reduced marina size under Alternative 1 is projected to meet water quality standards and enable greater compliance with the objective and policies addressed in this section.

Alternative 2 includes a golf course component and thus the potential to adversely impact marine resources by increasing the nutrient loading in surface runoff and groundwater and also by introducing pesticides, herbicides, and other chemicals common in golf course use and management into the nearshore waters surrounding the project site.

Hawai'i State Plans, Chapter 226, Hawai'i Revised Statutes

Section 226-4 (State goals), 5 (Objectives and policies for population, and 6 (Objective and policies for economy in general):

The discussion in Section 5.1.4 is applicable to Alternatives 1 and 2, in addition to the proposed project. These development concepts generally conform to the goals, objectives, and policies set forth in these sections because they will provide some degree of economic viability, stability, and sustainability for future generations. Kona Kai Ola will convert essentially vacant land into a mixed-use development with a distinctive marina and boating element, providing a wide range of recreational, business, and employment opportunities to the community.

Section 226-8 Objective and policies for the economy – the visitor industry:

Alternatives 1 and 2 will be consistent with the State's economic objective and policies relating to the tourism industry for the same reasons that are discussed in regard to the proposed project in Section 5.1.4. They will incorporate JDI's commitment to sustainability principles in the planning and design of the development concepts in Alternatives 1 and 2. Although the total hotel and time-share unit count is reduced to approximately 1,500 in Alternatives 1 and 2, the transient accommodations component of these alternatives will still further the State's objective and policies for increased visitor industry employment opportunities and training, foster better visitor understanding of Hawai'i's cultural values, and contribute to the synergism of this mixed-use project concept that addresses the needs of the neighboring community, as well as the visitor industry.

Section 226-11 Objectives and policies for the physical environment: land-based, shoreline and marine resources:

Alternative 1 is expected to involve less potential adverse impacts upon these environmental resources than the proposed project. Likewise, and Alternative 2 would have less adverse impact because of its reduction in the size of the marina and in the total hotel and time-share unit count. Alternative 1 carries less potential risk to water quality and related impacts upon the marine environment and anchialine pool ecosystems. Although approximately three anchialine pools are expected to be destroyed, the great majority of pools will be preserved within and outside of the proposed 400-foot shoreline setback.

The golf course component in Alternative 2 has the potential to impact marine resources by increasing the nutrient loading in surface runoff and groundwater and also by introducing pesticides, herbicides, and other chemicals common in golf course use and management into the marina basin and nearshore waters surrounding the project site. It also has the potential to adversely affect the anchialine pools by introducing the chemicals into the pond systems.

Section 226-12 Objective and policies for the physical environment: scenic, natural beauty, and historic resources:

The discussion in Section 5.1.4 is directly applicable to Alternative 1 and describes the compliance with the objective and policies addressed.

The golf course component of Alternative 2 would create a park-like view that would potentially enhance the beauty of the project site and surrounding areas when considered in combination with the existing rugged natural beauty of the area.

Just as with the proposed project, Alternatives 1 and 2 would also be designed to blend with the natural terrain and to honor and protect the cultural history, resources, and practices of these lands.

Section 226-13 Objectives and policies for the physical environment: land, air and water quality:

As stated above, because of the reduction in both the number of slips and the size of the marina basin, with proper facilities design, public education and enforcement of harbor rules and regulations, Alternative 1 is anticipated to cause fewer long-term impacts to water quality than either the proposed project or Alternative 2. Based on the findings of the Harbor Water Quality Modeling Study, water quality resulting from a reduced marina basin size as proposed under Alternative 1 is expected to be similar to existing conditions.

As previously noted, Alternative 2 has the potential to adversely impact water quality by increasing the nutrient loading in surface runoff and groundwater by introducing pesticides, herbicides and other chemicals common in golf course development and maintenance into the marina basin and nearshore waters surrounding the project site.

Section 226-14 Objectives and policies for facility systems - general:

Alternatives 1 and 2 will conform to the objective and policies of this section on the grounds that are discussed in regard to the proposed project in Section 5.1.4. The master-planning and phasing of the project concepts under these alternatives will be coordinated with associated public and private infrastructural planning and related private and public infrastructural financing. The cost of the marina construction and project-related infrastructure is to be borne by the developer, resulting in considerable savings for the public. In addition, the projected lease revenue from these public lands will provide additional public benefits by establishing a revenue stream for capital improvements and maintenance of a range of State facilities.

Section 226-15 Objectives and policies for facility systems - solid and liquid wastes:

In addition to the developer's commitment to sustainable development design, the project will involve upgrades to the County of Hawai'i's Kealakehe Wastewater Treatment Plant to meet current needs, as well as the project's future needs. This commitment is applicable to Alternatives 1 and 2, as well as the proposed project that is discussed in Section 5.1.4.

Section 226-16 Objectives and policies for facility systems – water:

The discussion of water conservation methods and the need to secure additional potable water sources in Section 5.1.4 is also applicable to Alternative 1 and demonstrates conformity to the objective and policies for water facilities. Alternative 2 involves greater irrigation demands in regard to its golf course component and greater potable water demands for human consumption than those for Alternative 1. Alternative 2 is expected to face more serious challenges in securing adequate and reliable sources of water.

Section 229-17 Objectives and policies for facility systems – transportation:

Alternatives 1 and 2 will conform to this objective and policies because they will present water transportation opportunities, including the possible use of transit water shuttles to Kailua-Kona, as described in regard to the proposed project in Section 5.1.4.

Section 226-18 Objectives and policies for facility systems – energy:

Alternatives 1 and 2 conform to these objective and policies through the use of energy efficient design and technology and commitment to the use and production of renewable energy to serve the project's needs. Solar energy production, solar hot water heating, and the use of deep cold seawater for cooling systems are currently identified as means of saving substantial electrical energy costs for the community and the developer.

Section 226-23 Objectives and policies for socio-cultural advancement – leisure:

Alternative 1 conforms to this objective and related policies for the reasons offered in Section 5.1.4 in regard to the proposed project. Alternative 1 will be of greater conformity with the policy regarding access to significant natural and cultural resources in light of the 400-600 foot shoreline setback that has been designed for this alternative.

Although it does not propose the considerable shoreline setback that is planned for Alternative 1, Alternative 2 is consistent with this objective and related policies in incorporating opportunities for shoreline-oriented activities, such as the walking trails. In addition, the golf course component adds a more passive recreation alternative to the active and social components, such as boating, fishing, swimming, trails, walkways, parks, marine life educational and interactive areas that are also part of the project. The golf course would enhance the range of leisure and recreational opportunities offered at Kona Kai Ola.

Section 226-25 Objectives and policies for socio-cultural advancement-culture:

The discussion in Section 5.1.4 is relevant to Alternatives 1 and 2 and demonstrate their conformity the objective and policies of this section.

Both alternatives involve the preservation and protection of cultural features that have been identified by the Cultural Impact Assessment and archaeological studies for the project area. Both provide for public shoreline access, and both will continue the policy of close consultation with the local Hawaiian community and cultural and lineal descendants in the planning of cultural resource preservation and protection.

Section 226-103 Economic priority guidelines:

Alternatives 1 and 2 conform to these guidelines for the same reasons that are set forth in Section 5.1.4. They involve private investment in a public project that will create economic diversification through a mix of marina, industrial, commercial, visitor, and cultural facilities. This presents a wide range of entrepreneurial opportunities, long-term employment opportunities, and job training opportunities.

Section 226-104 Population growth and land resources priority guidelines:

As described in Section 5.1.4, the policy support for the proposed project also extends to the similar development concepts considered in Alternatives 1 and 2. Those alternatives conform to the guidelines of this section because they involve an urban development under parameters and within geographical bounds that are supported by the County's General Plan, a preliminary form of the Kona Community Development Plan, the County's Keahole to Kailua Regional Development Plan, and the reality of being located along the primary commercial/industrial corridor between Keahole Airport and Kailua-Kona. As with the proposed project, the development concepts of Alternatives 1 and 2 are essentially alternatives for the implementation and "in-filling" of the urban expansion area in North Kona.

DHHL Hawai'i Island Plan

This 2002 plan projects DHHL's Honokōhau makai lands for commercial use. As compared to the proposed project and Alternative 2, Alternative 1 presents an expanded commercial component that provides greater compliance with the plan, while addressing certain beneficiaries' concerns about the scale of the marina originally required in the Project. Alternative 2 also conforms to the recommended commercial uses in the makai lands but to a lesser degree than Alternative 1 because of its more limited commercial component. Like the proposed project, its marina size and number of slips raise environmental issues, as more specifically discussed in Part 3, and community concerns.

County of Hawai'i General Plan

HCGP Section 4 – Environmental Quality Goals, Policies and Courses of Action:

Alternative 1 is consistent with this section. It presents a reduction in both the number of slips and the size of the marina basin that, in combination with proper facilities design, public education and enforcement of harbor rules and regulations, would result in very few long term impacts to water quality. Based on the findings of the Harbor Water Quality Modeling Study, water quality would remain similar to existing conditions.

Alternative 2 is the least consistent with this section. In addition to the potential significant impacts of its 800 slip marina basin, its golf course component has the potential to adversely impact marine resources by increasing the nutrient loading in surface runoff and groundwater and also by introducing pesticides, herbicides and other chemicals common in golf course use and management into the nearshore waters surrounding the project site. It also has the potential to adversely affect the anchialine pools beyond their current conditions by introducing such substances into the pool systems.

HCGP Section 7 – Natural Beauty Goals and Policies:

Alternative 2 conforms to some degree with this section. Its golf course component would create a park-like view that would potentially enhance the beauty of the project site and surrounding areas when considered in combination with the existing rugged natural beauty of the area, as demonstrated in other makai golf courses within the region.

HCGP Section 8 – Natural Resources and Shoreline:

Alternative 1 is most consistent with the goals and policies of this section. It would require considerably less marina excavation than the proposed project and Alternative 2 and would reduce the potential risk of long-term adverse impacts to water quality. Based on the findings of the Harbor Water Quality Modeling Study, water quality would remain similar to existing conditions with the degree of reduction in marina basin size that is proposed under Alternative 1. This reduction is also expected to reduce potential impacts upon anchialine pools and their ecosytems, as well as shoreline and marine resources that are affected by water quality. Alternative 1 also retains the shoreline preservation and protection concepts that are proposed in and described for the Project.

HCGP Section 10 – Public Facilities Goals and Policies:

The discussion in Section 5.2.1. in relation to the proposed project is applicable to Alternatives 1 and 2. Improvements to public facilities are are integral to the Kona Kai Ola development. The provision of additional boat slips and numerous road improvements, including a makai extension of Kuakini Highway south to Kailua-Kona are incorporated into plans for the project's development. In light of these elements, Alternatives 1 and 2 are consistent with the goals and policies of this section.

HCGP Section 11 – Public Utility Goals, Policies:

As with the proposed project, Alternatives 1 and 2 are consistent with the goals and policies of this section, based on the relevant grounds set forth in Section 5.2.1. The developer is committed to design, fund, and develop environmentally sensitive and energy efficient utility systems to the extent possible, as described previously in Part 5. Its master planning provides for the coordinated development of such systems with the objective of achieving significant savings for the public. As previously-mentioned example, the project development involves the upgrading of the Kealakehe Wastewater Treatment Plant.

HCGP Section 12 – Recreation:

Alternative 1 is consistent with the goals, policies, and courses of action for North Kona in this section.

Although the number of slips is reduced under Alternative 1, the region's boating opportunities and support facilities will still be expanded. The existing marina entrance would still be utilized under this alternative. However, concerns relating to increased activity leading to increased congestion in the marina entrance area would be mitigated to a certain extent. The 400-600 foot shoreline setback, public parks, trails, cultural areas, community facilities and marine science center remain important components of Alternative 1.

The golf course component of Alternative 2 would add a more passive recreation to the active and social components, such as boating, fishing, swimming, trails, walkways, parks, marine life, educational and interactive areas that are also part of the project. The golf course would enhance the range of leisure and recreational opportunities offered at Kona Kai Ola. Alternative 2 is also considered to be consistent with this section.

HCGP Section 13 and 13.2 – Transportation:

The reduced marina component under Alternative 1 will still provide transportation opportunities and provide for possible use of transit water shuttles to Kailua-Kona, although to a lesser degree than under the proposed project and Alternative 2 . However, in each scenario, internal people-movers are planned, and numerous roadway improvements are planned for coordination with public agencies, including but not limited to the construction of the Kuakini Highway extension between Honokōhau and Kailua-Kona. Accordingly, both Alternatives 1 and 2 are consistent with the goals, policies, and courses of action for North Kona under these sections of the General Plan.

HCGP Section 14.3 – Commercial Development:

For the reasons presented in the discussion under Section 226-104 of the State Plan, the planned commercial component under Alternatives 1 and 2 are consistent with this section.

HCGP Section 14.8 – Open Space:

Alternatives 1 and 2 are consistent with the goals and policies of this section. Alternative 1 provides a considerable (400-600 foot) shoreline setback along the entire ocean frontage of the project site as a means of protecting the area's scenic and open space resources, as well as natural and cultural resources. Although it does not incorporate the shoreline setback planned in Alternative 1, Alternative 2 provides a golf course component would contribute to the amount of open space that is currently proposed and allow additional view corridors to be created.

Community Development Plans

Community development plans are being formulated for different regions in the County in order to supplement the County's General Plan. The Kona Kai Ola project is located in the Kona Community Development Plan (CDP) area. Maps associated with the preliminary work phases

of the Kona CDP include the Kona Kai Ola project site within the "Preferred Urban Growth" boundary of the North Kona district. The Kona CDP process is guided by a Steering Committee composed of a broad cross-section of the community. The Steering Committee will eventually complete its work and recommend the CDP's adoption.

After the DEIS was published, the Kona CDP has progressed to the development of plans for the major urban growth corridor north of Kailua-Kona. The Kona CDP has produced a draft plan showing a transit oriented development that includes a midlevel public transit corridor along the mauka residential elevation, and a makai transit corridor that runs along a proposed new frontage road just makai and parallel to Queen Kaahumanu Highway. The development plan for Alternative 1 includes the Kuakini Highway as part of this proposed frontage road and transit line from Kailua Kona to the Kealakehe area, along with a transit stop at Kona Kai Ola. The Alternative 1 plan also includes a road that could be extended to be part of the proposed frontage road should it be approved and implemented. In addition, the Kona CDP has continued to emphasize the principles of smart growth planning with mixed use urban areas where people can live, work, play and learn in the same region. Kona Kai Ola has been specifically designed to be consistent with this policy in order to provide a stable employment base close to where people live in the mauka residential areas already planned for DHHL and HHFDC lands.

It should be noted that currently and over the years, the 1990 Keāhole to Kailua Development Plan (K-to-K Plan) guides land use actions by the public and private sectors. It is intended to carry out the General Plan goals and policies related to the development of the portion of North Kona area, including the Kona Kai Ola site. The "Preferred Growth Plan" of the Keāhole to Kailua Development Plan identifies the project site as a new regional urban center to include commercial, civic, and financial business related uses, an expanded "Harbor Complex," a shoreline road, and a shoreline park. The proposed project and the development concepts in Alternatives 1 and 2 are therefore consistent with the recommendations in the Keāhole to Kailua Development Plan.

Hawai'i County Zoning

As shown on Figure AA, the project site is zoned "Open". Under Section 25-5-160 of the Hawai'i County Code, "The O (Open) district applies to areas that contribute to the general welfare, the full enjoyment, or the economic well-being of open land type use which has been established, or is proposed. The object of this district is to encourage development around it such as a golf course and park, and to protect investments which have been or shall be made in reliance upon the retention of such open type use, to buffer an otherwise incompatible land use or district, to preserve a valuable scenic vista or an area of special historical significance, or to protect and preserve submerged land, fishing ponds, and lakes (natural or artificial tide lands)".

Some of the proposed uses at Kona Kai Ola are permitted uses in the Open zone such as:

- Heiau, historical areas, structures, and monuments;
- Natural features, phenomena, and vistas as tourist attractions;
- Private recreational uses involving no aboveground structure except dressing rooms and comfort stations;

- Public parks;
- Public uses and structures, as permitted under Section 25-4-11.

In addition to those uses permitted outright, the following uses are permitted after issuance of a use permit:

- Yacht harbors and boating facilities; provided that the use, in its entirety, is compatible with the stated purpose of the O district.
- Uses considered directly accessory to the uses permitted in this section shall also be permitted in the O district.

The proposed time-share and hotel units and commercial uses would not be consistent with the zoning designation of "Open". Project implementation therefore requires rezoning of portions of the project to the appropriate zoning category or use permits for certain uses.

Special Management Area

As shown in Figure AB, the entire project area up to the highway is within the coastal zone management zone known as the Special Management Area ("SMA"). At the County level, implementation of the CZM Program is through the review and administering of the SMA permit regulations. Kona Kai Ola complies with and implements the objectives and policies of the Coastal Zone Management (CZM) Program, and a full discussion is provided in Section 5.1.3. The development concepts in the proposed project and Alternatives 1 and 2 will be subject to applicable SMA rules and regulations.

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FEB 05 2007

February 2, 2007

Jacoby Development, Inc.
171 17th St., Ste 1550
Atlanta, GA 30363

CC: Department of Hawaiian Homelands
Office of Environmental Quality Control
Oceanit

Re: Comments on HRS 343 DEIS Kona Kai Ola Development

Dear Sirs:

I would like to make the following comments on the Kona Kai Ola Development draft EIS. I would like to note that I have been a resident of the Big Island for 12 years, and I hold M.S. and Ph.D. degrees in hydrology.

Impact of pumped seawater on nutrients: Pages 44, 45, and 108.
The EIS correctly notes that nutrient concentrations in the harbor and harbor outflow will decline, but it fails to address the total flux (grams per day) of nutrients to shallow coastal waters. (Flux equals concentration times discharge.) The proposed development will increase the flux of nutrients to the nearshore coastal waters,. This is because the deep ocean water being pumped into the lagoon will add nutrients that were not there originally. These additional nutrients will be discharged from the harbor to the ocean, and may have an impact on coastal nutrient dynamics. Using the nutrient concentrations listed on page 44, and taking the natural groundwater outflow as 3.5 mgd and the deep seawater outflow as 75 mgd, one can calculate the increase in nutrient fluxes from the harbor due to the outflow from the lagoon. This increase is 330% for total dissolved nitrogen and 45% for total dissolved phosphorus. On page 45, the second to last sentence of the first paragraph should be amended to read "low concentrations of nutrients" (not low amounts, which is incorrect). The last sentence should be amended to state that water quality will be improved from a concentration viewpoint, but not necessarily from a loading viewpoint.

Page 159, Anchialine Pools
Destruction or salinization of anchialine pools containing candidate endangered species is a notable environmental impact. Section nine needs to acknowledge that some of the ponds that will be destroyed or salinized contain a candidate endangered species (Metabetaeus lohena) and that some of the ponds to be destroyed contained an additional candidate endangered species (Megalagrion xanthomelas) as late as 2004.

Page 51, Mitigation of damage to Anchialine Pools

It is hard to believe that there is "no realistic mechanism" for re-injecting fresh water into the salinized anchialine pools in order to preserve their ecosystems. If 75 mgd of deep seawater can be pumped into a lagoon then small amounts of fresh water can be pumped into the affected ponds. Preserving the pools through freshwater injection would be consistent with the environmental goals of the proposed project, would be more effective than many of the proposed remediation actions, and would be an excellent educational opportunity. If the cost of freshwater injection is a barrier to attempting to preserve the ponds, then the EIS should acknowledge this.

Page 48: Impacts on anchialine pools north of the existing harbor.

One cannot state with complete assurance that the anchialine pools north of the existing harbor will be unaffected. The existing harbor, the new marina, and the new lagoon are all places where the water table is (or will be) effectively lowered to sea level. This changes the direction and magnitude of the hydraulic gradient that drives groundwater flow. This will cause groundwater flow to be deflected towards the new marina and lagoon. It is conceivable that groundwater in Kaloko-Honokohau Park or mauka of Kaloko-Honokohau Park would be deflected slightly towards the south. The rate of flow will also be affected by changes to the hydraulic gradient. While any impacts within Kaloko-Honokohau Park would be subtle, they would be of concern due to the extreme sensitivity of the anchialine pools. The bottom line is that one cannot rule out the possibility of subtle impacts to groundwater within the Park. This is due, fundamentally, to the fact that the alternations to the water table by the new harbor and lagoon will impact groundwater flow in all directions, not just the makai direction.

Mitigation of nutrient loading from yard and grounds maintenance

Use of organic fertilizers such as compost in place of chemical fertilizers does not mitigate the nutrient loading from yard and grounds maintenance. Organic fertilizer contains considerable amounts of nutrients, which is why it is used for fertilizer.

Sincerely,

Jene' Michaud

Jene Michaud
POB 279
Honomu, HI 96728

Michaud
POB 279
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innovation through engineering & scientific excellence

July 23, 2007

Jene Michaud
P.O. Box 279
Honomu, Hawai'i 96728

Dear Mr./Ms. Michaud:

Subject: Kona Kai Ola Draft Environmental Impact Statement
Response to Your Comments Dated February 2, 2007

Thank you for your comments on the Kona Kai Ola Draft Environmental Impact Statement. We are responding to your comment by topic.

Impact of pumped seawater on nutrients:

There seems to be some confusion on the water pumping and circulation proposed for the Kona Kai Ola Project. The proposed development will extend the existing Honokohau Harbor by an additional 45 acres to accommodate an additional 800 slips. In addition, a marine exhibit for sea animals is proposed above the proposed marina extension. Sea water for the marine exhibit will be pumped for 200 to 300 feet water depth. Measurements and existing data show that nutrient concentrations at this depth are very similar to average surface water. The water at this depth is free from variations caused by storms and other oceanographic conditions and has low turbidity due to low sun light. Approximately 52,000 gallons per day will be pumped to create fast turn over tome in the lagoons. Therefore there will be no additional nutrients introduced into the nearshore area from the water alone. However, there will be nutrients added to the lagoon water by the animals kept in it. Although this increases the total amount of nutrients that enter the nearshore area, the large amount of pumpage (75 mgd) will dilute this additional nutrients as well as high nutrient laden brackish groundwater (25 to 30 mgd) that discharges through the harbor.

A three dimensional water quality model was used to assess impacts to water quality in the harbor as well as in the nearshore area. A detailed report is included in the EIS as Appendix U. The model showed that a smaller marina (25-acre and 400-slip) with the same amount or more of groundwater discharge into the harbor will essentially maintain the two layer flow that exists. This smaller harbor alternative is discussed as Alternative 1. Results show that nutrient laden water will be less dense than the ocean water due to fresh water influence and will remain in the upper water layer and will not impact the coral reefs and benthic environment.

Oceanit Center 828 Fort Street Mall, Suite 600 Honolulu, Hawaii 96813 Phone: 808.531.3017 Fax: 808.531.3177
www.oceanit.com

Anchialine Pools:

In response to DEIS comments and to further study the pools south of the entrance channel of Honokohau Harbor, a second study was conducted by David Chai of Aquatic Research Management and Design in June 2007. The second survey focused on intensive diurnal and nocturnal biological surveys and limited water quality analysis of the southern group of anchialine pools exclusively. In addition, further comment on the groundwater hydrology effects on anchialine pools was prepared by Waimea Water Services and is contained in Appendix G-3 of the EIS. Attachment 1 contains the EIS Sections 3.9.2.1 and 3.9.2.2, and Attachment 2 contains the study prepared by Aquatic Research Management.

The DEIS presented information stating that harbor construction would cause an increase in salinity in the anchialine pools makai of the proposed marina basin to become equivalent to the ocean at 35 parts per thousand (ppt) and that the anchialine biology would then perish.

Additional studies conducted in response to DEIS comments found that there are 19 anchialine pools that would be affected. This is an adjustment based on further study that determined that three of the originally identified 22 pools are actually part of an estuary complex with direct connection to the ocean. Of the 19 anchialine pools, three pools with a combined surface area of $20m^2$ would be eliminated due to the harbor construction.

The additional studies also found that changes in groundwater quality may or may not impact biological communities in the anchialine and estuarine environment. In either case, the developer is committed to practicing good stewardship over the pools to be preserved and eliminating or reducing alien species to the extent practicable. The developer recognizes it is important to understand these relationships to effectively manage the resource. If there is significant deviation from the baseline especially in regard to nutrients, pathogens, and toxins, a mitigation plan to determine the cause and take decisive appropriate action will be implemented.

Mitigation measures to facilitate the long term health of the remaining anchialine pools will be based on environmental monitoring, which is vital as an early warning system to detect potential environmental degradation. A series of quantitative baseline analysis of the physio-chemical and biological components within the project site will provide a standard by which the effects of the development, anthropogenic activities, and natural phenomena on these environments can be measured.

The framework for the mitigation plan will include three measures intended to meet these objectives, including bioretention, salinity adjustment and possible new pools.

Bioretention, which is a Best Management Practice (BMP) is a feasible application for the proposed development. There is a probability that nutrients and other potential pollutants will runoff landscaping and impermeable surfaces such as roadways and parking lots during medium or high rainfall events. Some of these pollutants could enter the groundwater table and into anchialine pools and ultimately the ocean. As an alternative to directing runoff into the ground through drywells, storm water may be directed into bioretention areas such as constructed surface or subsurface wetlands, vegetated filter strips, grass swales, and planted buffer areas. Storm water held and

moved through these living filter systems are essentially stripped of most potential pollutants, and allowed to slowly infiltrate back to the groundwater table.

Another mitigation measure that would be included in the management plan is salinity adjustment. In the 2006 assessment regarding the impact to the southern pools from the proposed construction of the harbor, it was stated that this construction would cause the salinity in the anchialine pools to become equivalent to the ocean at 35ppt. It was then concluded that the anchialine biology would perish.

There is currently a level of uncertainty by professional hydrologists as to the exact movement of surface groundwater and final determination of anchialine salinity following the harbor construction. The assessment that all anchialine pools will be barren with the construction of the harbor may be premature. *Halocaridina rubra* (‘opae‘ula) are routinely drawn from high salinity wells at 30-32 ppt. If the pools do become full strength seawater at 35ppt, there exists uncertainty on the long-term effects to anchialine organisms, since there are no long-term studies or examples of native anchialine ecosystems at 35ppt. Native anchialine pool vegetation also has relatively high salinity tolerance.

If the salinity were expected to rise to 35 ppt, possible mitigation in the management plan will include methods to surcharge man-made anchialine pools created adjacent to or in the vicinity of natural pools with low salinity well water. If sufficient volume is used, it is theoretically possible to lower salinity in adjacent natural anchialine pools. This surcharge method has been successfully used to raise salinity in anchialine pools in West Hawai‘i and cause the salinity rise in adjacent pools of at least up to 10 meters away. Surcharging with low salinity should work as well or better since the lower density water will essentially float atop the higher salinity water at the surface layer, and move throughout the complex of natural pools. Surcharging may also be a viable mitigation to dilute and more rapidly disperse any pollutants that may be detected in the pools.

Another mitigation measure includes the creation of new anchialine pools. There is significant opportunity to create new anchialine pools and greatly expand the native habitat and resource. It has been demonstrated at several projects in West Hawai‘i that anchialine pools can be created and will be colonized with a full complement of anchialine species endemic to the area. Anchialine pools are considered focal points of higher productivity relative to the subterranean groundwater habitat around them. Their productivity promotes an increase in population levels of anchialine species within the pools themselves and throughout the subterranean habitat surrounding them.

Impact on Northern Pools:

Groundwater flow in this area is driven by the tides and the net flow occurs from east to west. The proposed marina is constructed to the south of the existing Honokohau Harbor and will be excavated to a depth of 6 to 10 feet. The existing harbor has the same depths. No groundwater extraction will be made at this site. We agree that there will be limited impacts to the groundwater flow pattern to the south of the harbor. However it is very unlikely that the construction of the relatively shallow harbor in the south of the existing harbor will have a significant impact on the groundwater or the anchialine pools north of the harbor.

Migration of Nutrient Loading from Yard and Grounds Maintenance:

The landscaping and grounds will use organic composed fertilizer. Organic fertilizers do not have free nitrates and phosphates that can leach into the ground readily. The nutrients are generally in complex form and have to be released by bacterial action for plant uptake. This is a slow process and the roots have ample time to absorb most of the freed nutrients. This is the process that nature follows, and is the process that causes the least amount of impacts to water resources.

Your comment letter and this response are included in the Final Environmental Impact Statement. We appreciate your participation in the environmental review process. Please submit a request to our office if you would like to receive a printed or electronic copy of the Final Environmental Impact Statement, or portions thereof.

Sincerely,

Dayan Vithanage, P.E., PhD.
Director of Engineering

cc: Office of Environmental Quality Control
State Department of Hawaiian Home Lands
Jacoby Development, Inc.

Attachment 1

The conditions with the project constructed were found to be phosphorous limited. Several simulations were performed including and excluding the inflow from the marine exhibits which provides an additional nitrogen load and also varying the location of this inflow. It was found that the inflow from the marine exhibits can have a beneficial effect on flushing, especially when positioned within the existing harbor basin. However, its effect is significantly less than the effect due to the brackish groundwater inflow. When the exhibit inflow is excluded or positioned at the east end of the new marina, its effect is small in terms of flushing due to its high salinity. From a water quality perspective, since the loads from the exhibit inflow consist primarily of nitrogen, it does not cause increased algae growth. However, this exhibit inflow does raise the concentrations of ammonia and nitrate in the system.

Simulation results indicate that under the conditions when the post-expansion system receives an additional brackish inflow into the new 25-acre marina on the order of 30 mgd or more, water quality within the harbor system and in the surrounding waters remained similar to existing conditions. These conditions are expected to occur based on the findings reported by Waimea Water Services (2007), which states that the proposed marina would exhibit the same or similar flushing action as the existing marina.

An additional mitigation measure proposed by Waimea Water Services (2007), if sufficient inflow is not intercepted, consists of drilling holes in the bottom of the new marina to enhance this inflow and facilitate flushing within the proposed system.

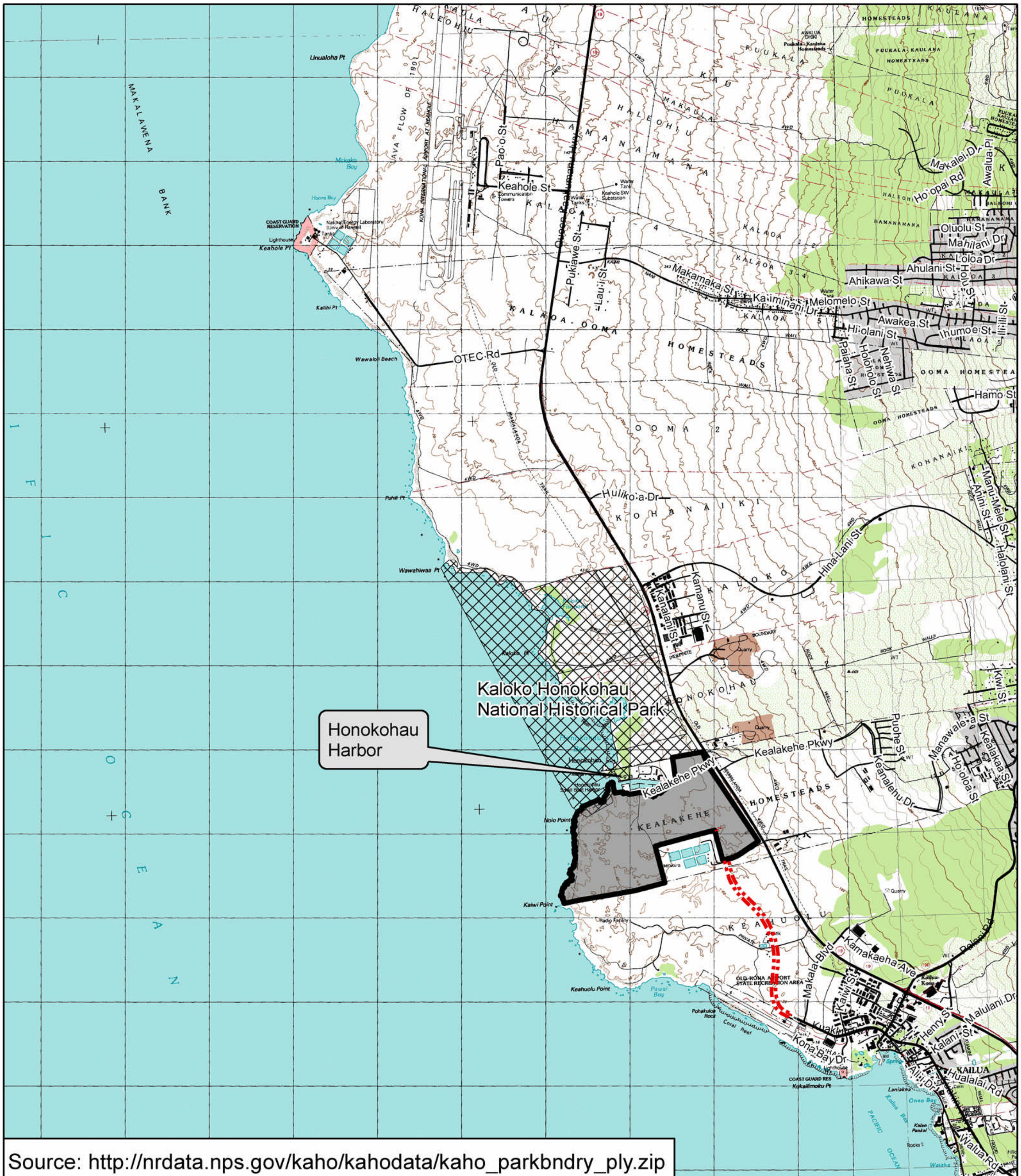
~~3.9.3~~3.9.2 Anchialine ~~Ponds~~ Pools

Two studies on anchialine pools were conducted in this EIS process. The anchialine ~~ponds~~ pools water quality studies and ~~biota surveys were conducted by David A. Ziemann, Ph.D. of the Oceanic Institute and is~~biota surveys were conducted by David A. Ziemann, Ph.D. of the Oceanic Institute in October 2006 and are included as Appendix ~~G~~H-1. That survey included pools located both north and south of Honokōhau Harbor. In response to DEIS comments and to further study the pools south of entrance channel of Honokōhau Harbor, a second study was conducted by David Chai of Aquatic Research Management and Design in June 2007. The second survey focused on intensive diurnal and nocturnal biological surveys and limited water quality analysis of the southern group of anchialine pools exclusively. The report is contained in Appendix H-2.

~~3.9.3.1~~3.9.2.1 Existing Conditions

Anchialine ~~ponds~~ pools exist in inland lava depressions near the ocean. Two anchialine ~~pond~~ pool complexes are located immediately to the north and south of the Honokōhau Harbor entrance channel. The complex to the north is located wholly within the designated boundaries of the Kaloko-Honokōhau National Historical Park as shown in Figure Q~~O~~. Many of the ~~ponds~~ pools in the southern complex are within the park administrative boundary as well. ~~Ponds~~ Pools in the northern complex show little evidence of anthropogenic impacts. Many contain typical vegetation and crustacean species in high abundance.

Figure R locates anchialine pools near the harbor entrance and pools~~Ponds~~ in the southern complex are depicted in Figure S.



Source: http://nrdata.nps.gov/kaho/kahodata/kaho_parkbndry_ply.zip

Figure Q: National Historical Park Service Legislative Boundary Map

Legend

- Project Site
- Proposed Parkway
- National Park Boundary

0 2,500 5,000 Feet

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Source: Oceanic Institute

Figure R: Anchialine Pool Locations

N
W E
S

0 2,000 4,000 Feet

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Source: Aquatic Resources Management And Design

Figure S: Anchialine Pool Locations in Southern Complex

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The 2006 study identified 22 pools in the southern complex. The 2007 study found that three of the 22 pools are part of an estuary complex with direct connection to the ocean. While there were several signs of direct human use and disturbance, such as trash receptacles and toilet facilities, the greatest degradation to the majority of the anchialine and estuarine resources was due to the presence of alien fish, including topminnows and tilapia, and introduced plants, predominantly pickleweed and mangrove. ~~are moderately to heavily impacted, with many containing exotic fish that exclude the anchialine crustaceans. The ponds also show evidence of human impact, including discarded bottles, cans, wrappers, diapers, toilet paper, etc. Water quality conditions within the ponds generally reflect the conditions of the underlying groundwater.~~

~~Figure P locates anchialine ponds near the harbor entrance. The study conducted as a part of this EIS show that the anchialine ponds south of the harbor entrance are moderately to heavily impacted by human activities and introduced fish populations. The study found that the nitrogen phosphorus concentrations in these ponds are significantly higher compared to the ponds north of the harbor entrance. The sources of these additional nutrients are not known. Continuous influx of nutrients will eventually degrade the water quality to levels that could alter the pond ecology.~~

Biota surveys in the two pond systems clearly indicate that counts of typical pond denizens show a remarkable difference between the northern and southern ~~ponds~~ pools. In the northern ~~ponds~~ pools the number of *Halocaridina rubra* ranged from a low of 20–25 to too numerous to count. The biota rich pond bottoms appeared red due to the *Halocaridina rubra* numbers. The only other species visible was the predatory shrimp *Metabetaeus lohena*. In contrast, only four out of the 22 ~~ponds~~ pools examined in the southern pond complex showed a decreased presence of *Halocaridina rubra* (6 to 200) individuals in the pond, and three ~~ponds~~ pools contained *Metabetaeus lohena*. Eight of the ~~ponds~~ pools contained numbers of introduced minnows which is an apparent predator of *Halocaridina rubra* and *Metabetaeus lohena*.

The 2007 study found three of the pools identified in the 2006 study were part of an estuary complex with direct connection to the ocean, and that the southern complex contained 19 anchialine pools. The study further found that a majority of the southern pools are degraded biologically and physically, primarily due to the effects of introduced fish and plant species. Six pools are currently devoid of alien fish, but they face a high level of threat due to the proximity of pools that have these species. Of the 19 anchialine pools, six were considered high tide pools (exposed only at medium or high tide), seven were considered pool complexes (individual pools at low tide and interconnected at high tide), and six were single isolated pools. Of the 19 anchialine pools, three pools with a combined surface area of $20m^2$ would be eliminated due to the harbor construction.

The DEIS presented information stating that harbor construction would cause an increase in salinity in the anchialine pools makai of the proposed marina basin to become equivalent to the ocean at 35 ppt. and that the anchialine biology would then perish. There is currently a level of uncertainty by professional hydrologists as to the exact movement of surface groundwater and final determination of anchialine salinity following the harbor construction. The assessment that all anchialine pools will be barren with the construction of the harbor may be premature. *Halocaridina rubra* (opae ula) are routinely drawn from high salinity wells at 30-32 ppt.

Within the 19 pools, native and non-native fauna included 14 species comprised of 5 fish, 2 mollusca, and 6 crustacea. Algae within the pools primarily consisted of a mixed assemblage of diatoms and cyanobacteria, with several pools dominated by matted filamentous *Cladophora*, sp. The darker cave/overhang pools and high tide pools had epilithic *Hildenbrandia* sp. covering the rock substrate. Riparian vegetation was dominated by introduced species consisting of Pickleweed (*Batis maritima*), Mangrove (*Rhyzophora mangle*), and Christmasberry (*Shinus terebenthifolius*). Only two species of native plants Akulikuli (*Sesuvium portulacastrum*) and Makaloa (*Cyperus laevigatus*) existed near the pools and comprised only few small patches and a single tuft (respectively).

Most of the hypogeal anchialine shrimp have adapted to the presence of minnows by foraging in the pools at night. During daylight hours, only the adult shrimp appear to coexist at low population levels with the smaller *P. reticulata*, but the larger *G. affinis* and *Oreochromis* prevent the daytime appearance of hypogeal shrimp due to predation.

The average salinity in Kealakehe pools is relatively high at 13.5 ppt compared to most other pools along the West Hawai'i coastline, having an average of approximately 7 ppt. This high salinity appears to be characteristic of this region, and is similar to the average of most pools within the adjacent ahupua'a of Honokōhau and Kaloko. The levels of nitrate-nitrogen levels are relatively high compared to other undeveloped areas, but fall in the range of some developed landscapes. Other water quality parameters, including pH and temperature, fall into normal ranges for anchialine pools.

This relatively high salinity is the likely reason aquatic insects were not found in any pools at Kealakehe. Though the rare damselfly *Megalagrion xanthomelas* has been observed and collected from Kaloko, a statewide assessment of its range has not found it to occur in water with salinity greater than 3ppt. However, there has been an unsubstantiated occurrence of the nymph in a pool of up to 8ppt (Polhemus, 1995).

Another species of concern is the hypogeal decapod shrimp *Metabetaeus lohena.* These shrimp are sometimes predatory on *H. rubra* but are more often opportunistic omnivores similar to *H. rubra.* Predusk and nocturnal sampling at high tide is clearly the optimal method to determine habitat range and population densities for this species. These shrimp were found in 13 of the 19 pools, 7 of which had *M. lohena* only at night. The occurrences of *H. rubra* were found in 16 of 19 sampled pools, 8 of which had 'Ōpae'ula observed only at night. Consequently, despite having numerous degraded anchialine resources at Kealakehe, there are opportunities for many of the pools to be restored and enhanced to a level where large populations of anchialine shrimp and other native species may return to inhabit the pools as they likely have in the past.

~~As mentioned earlier, the southern ponds also had elevated concentrations of nutrients indicating water quality degradation. These factors indicate that if no restoration or maintenance activities are instituted to reserve these ponds, these ecosystems will degrade beyond recovery.~~

~~3.9.3.2~~3.9.2.2 Anticipated Impacts and ~~Recommended~~ Proposed Mitigations

The anchialine ~~ponds~~ pools that are located north of the existing harbor are not likely to be impacted because no development activities are proposed north of the existing harbor. It is highly unlikely that existing groundwater flows to the Kaloko-Honokōhau pond system to the north of the existing harbor will be impacted by the proposed marina to the south.

Of the 19 pools in the southern complex, three would be eliminated due to harbor construction. Regarding the remaining pools, the DEIS noted that t~~T~~he change in the local groundwater flow pattern in the vicinity of the proposed marina ~~will~~ would impact the anchialine ~~ponds~~ pools that are located between the proposed marina and the shoreline south of the harbor entrance. The 2006 study (Appendix H-1) noted that t~~T~~he salinity of the anchialine ~~ponds~~ pools ~~will~~ would increase due to reduction of brackish groundwater, and that ~~. Some ponds will be excavated to make the new harbor basin. T~~those ~~ponds~~ pools that are not excavated will revert to full salinity, causing the loss of their habitat. ~~and associated aquatic flora and fauna. However, current investigations indicate that these ponds are already enriched by nutrients and the density of associated aquatic fauna is very low. In addition, trash from visitors, and introduction of minnows has already degraded the pond ecology.~~ Even without the potential impacts from the proposed marina construction, the pond ecology might change irreversibly from the nutrient input, human indifference and expansion of non native fauna species.

Further studies conducted in response to DEIS comments (Appendix H-2, and Appendix G-3) indicate that the remaining pools may not increase in salinity to levels unhealthy for *H. rubra* and *M. lohena* and other anchialine pool fauna. In addition, these studies determined that there are realistic mechanisms employed elsewhere that would mitigate changes due to groundwater changes. Waimea Water Services found that harbor construction would cut off some of the fresher ground-water flow. However, predicting the extent of change in flow is difficult if not impossible even with numerous boreholes and intense sampling. The actual flow of groundwater towards the sea is minimal today, and tidal measurements show that tide fluctuations represent more than 90 percent in actual harbor tides. The fluctuations occur simultaneous with the ocean/harbor tide, which indicate a vertical and horizontal pressure regime between bore hole 6 and the ocean and harbor. Hence, the tides alone create a mixing system that increases salinity, as the flow approaches the point of discharge which will be either the channel or the shore.

Another factor that could influence groundwater quality is the increased local recharge from irrigation between the channel and shore. This will add fresh water to the lens locally but is not quantified at this time.

Quantification of these impacts, including the flow of groundwater through each pond, is extremely difficult. The shallow lavas are of the pahoehoe type and have a relatively high horizontal permeability. In surface depressions or undulations, the pahoehoe lavas have a tendency to lose vertical permeability from sedimentation thus restricting water exchange within the individual pools. This is normally reflected in both the salinity and temperature and this information has been adequately studied in the pools.

Changes in groundwater quality may or may not impact biological communities in the anchialine and estuarine environment. In either case, it is important to understand these relationships to effectively manage the resource. If there is significant deviation from the baseline especially in regard to nutrients, pathogens, and toxins, a mitigation plan to determine the cause and take decisive appropriate action will be implemented. The mitigation plan will be based on the following objectives:

Objective 1 To preserve, maintain, and foster the long-term health and native ecological integrity of anchialine pools at Kealakehe.

Objective 2 To protect and promote cultural practices and traditions surrounding anchialine resources at Kealakehe.

Objective 3 To provide education, interpretation, and interactive opportunities for the community to learn about and appreciate the anchialine resources.

Objective 4 To acquire a pond manager to implement the program, conduct monitoring, research, and reporting, and provide education to the community about anchialine and estuarine resources.

Mitigation measures to facilitate the long-term health of the remaining anchialine pools will be based on environmental monitoring, which is vital as an early warning system to detect potential environmental degradation. A series of quantitative baseline analysis of the physio-chemical and biological components within the project site will provide a standard by which the effects of the development, anthropogenic activities, and natural phenomena on the environment can be measured. The framework for the mitigation plan will include three measures intended to meet these objectives, including bioretention, salinity adjustment and possible new pools.

As a mitigation measure, bioretention, which is a Best Management Practice (BMP) is a feasible application for the proposed development. There is a probability that nutrients and other potential pollutants will runoff landscaping and impermeable surfaces such as roadways and parking lots during medium or high rainfall events. Some of these pollutants could enter the groundwater table and into anchialine pools and ultimately the ocean. As an alternative to directing runoff into the ground through drywells, storm water should be directed into bioretention areas such as constructed surface or subsurface wetlands, vegetated filter strips, grass swales, and planted buffer areas. Storm water held and moved through these living filter systems are essentially stripped of most potential pollutants, and allowed to slowly infiltrate back to the groundwater table.

Bioretention is a Best Management Practice (BMP) that would be a highly appropriate application for the proposed development. Further, BMPs utilized in series may incorporate several storm water treatment mechanisms in a sequence to enhance the treatment of runoff. By combining structural and/or nonstructural treatment methods in series rather than singularly, raises the level and reliability of pollutant removal. Another means to reduce the potential for groundwater contamination is to increase soil depth above the standard in landscaped areas. This will allow chemicals to be held in the soils longer for more complete plant uptake and breakdown of these chemicals by soil microbes. A specific guide for chemical application by landscape maintenance personnel will be a beneficial tool to help avoid contamination of groundwater resources.

Another mitigation measure that may be included in the management plan is salinity adjustment. In the 2006 assessment regarding the impact to the southern pools from the proposed construction of the harbor, it was stated that this construction would cause the salinity in the anchialine pools to become equivalent to the ocean at 35ppt. It was then concluded that the anchialine biology would perish.

However, there is currently a level of uncertainty by professional hydrologists as to the exact movement of surface groundwater and a final determination of anchialine salinity following the harbor construction. The dynamics of groundwater movement through a porous lava medium both seaward and laterally along the coastline is an inexact science. This is compounded by the variations in water density, including stratification of salinity within the proposed harbor and capillary movement of low-density surface water through the substrata.

The assessment that all anchialine pools will be barren with the construction of the harbor may therefore be premature. *H. rubra* are routinely drawn from high salinity wells at 30 – 32 ppt and survive in this salinity for years. Further, high populations *H. rubra* and *M. lohena* have thrived and reproduced in pool salinities of 27ppt. If the pools do become full strength seawater at 35ppt, there exists uncertainty on the long-term effects to anchialine organisms, since there are no long-term studies or examples of native anchialine ecosystems at 35ppt. Native anchialine pool vegetation also has relatively high salinity tolerance.

If the salinity were expected to rise to 35 ppt, possible mitigation in the management plan will include methods to surcharge man-made anchialine pools created adjacent to or in the vicinity of natural pools with low salinity well water. If sufficient volume is used, it is theoretically possible to lower salinity in adjacent natural anchialine pools. This surcharge method has been successfully used to raise salinity in anchialine pools and cause the salinity rise in adjacent pools of at least up to 10 meters away. Surcharging with low salinity should work as well or better since the lower density water will essentially float atop the higher salinity water at the surface layer, and move throughout the complex of natural pools. Surcharging may also be a viable mitigation to dilute and more rapidly disperse any pollutants that may be detected in the pools.

Another mitigation measure includes the creation of new anchialine pools. There is significant opportunity to create new anchialine pools and greatly expand the native habitat and resource. It has been demonstrated at several projects in West Hawai'i that anchialine pools can be created and will be colonized with a full compliment of anchialine species endemic to the area. Anchialine pools are considered focal points of higher productivity relative to the subterranean groundwater habitat around them. Their productivity promotes an increase in population levels of anchialine species within the pools themselves and throughout the subterranean habitat surrounding them.

~~No realistic mechanisms are envisioned for re-injecting fresh water into these systems to maintain their ecological balance as an anchialine system. These ponds will be changed from a brackish water system to a marine system. But, those ponds in the area of the shoreline park and cultural park will be cleaned of vegetation and protected from other physical alteration. A buffer zone around these newly established marine ponds will be protected as well.~~

~~The anchialine pond shrimp (*Metabetaeus lohena)* and the orangeback damsel fly (*Megalagrion xanthomelas)* are listed as candidate endangered species in the Federal Register and were both recorded in surveys of these anchialine ponds done in 2004 by US Geological Survey Biological Resources Division and the NPS Inventory and Monitoring Program. Low numbers of *Metabetaeus lohena* were encountered in three of the 22 ponds surveyed in the southern pond complex. *Megalagrion xanthomelas* was not encountered in any of the southern pond complex ponds during the recent study. The low density of *Metabetaeus lohena* and the observed absence of *Megalagrion xanthomelas* may be due to the impacts from high nutrient input and general degradation of the ponds.~~

~~An attempt should be made to move as much of the existing population of *Metabetaeus lohena* from these anchialine ponds before they become too saline, to possible newly excavated ponds that may be developed off-site. These shrimp should not be introduced into existing populated ponds to avoid any potential pathogenic impacts to the healthy ponds.~~

~~Public education on the unique ecology of the anchialine ponds and the need for preserving their ecology will reduce future human impacts in other healthy ponds.~~

~~Further recommended mitigation includes restoration to degraded anchialine ponds off the project site, preferably those located at the adjacent Kaloko-Honokōhau National Historical Park.~~

Attachment 2

An Inventory And Assessment Of Anchialine Pools Including Management And Mitigation Recommendations For The Kona Kai Ola Project, Kealakehe, Hawaii

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June 14, 2007

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Introduction

Jacoby Development, Inc. is proposing to develop approximately 530 acres of land in lower Kealakehe, North Kona, on the Island of Hawaii. The development will consist of mixed urban, resort, and commercial facilities. Included in the plan will be an 800 slip marina and associated boating facilities, a seawater lagoon, and open space. One area planned for protected open space contains a number of anchialine pools, archaeological sites and an estuarine habitat.

1.0 Study Background and Purpose

In 1973 L.B. Holthuis originated the term anchialine pool which citation protocol dictates to be the proper term. Two anchialine pool surveys were conducted at Kealakehe to determine the existing water quality and biological conditions, probable impacts, and mitigation measures necessary to minimize potential adverse effects. The first survey was conducted in April of 2006, and included a biological survey and detailed nutrient analysis of anchialine waters. That survey, included pools located both north and south of Honokohau harbor. The second survey was conducted in May 2007, and focused on intensive diurnal and nocturnal biological surveys and limited water quality analysis of the southern group of anchialine pools exclusively. This southern group in the vicinity of Alula cove was selected for a second survey, as they are more likely to be impacted by the proposed Kona Kai Ola development project. The information and recommendations presented herein are drawn from both surveys as well as published literature on anchialine system and their management, consultation with others involved with anchialine pool research and management, and 17 years of applied anchialine pool and wetland management by this author.

This study was contracted by Oceanit Laboratories, Inc. to conduct intensive field surveys incorporating 2 diurnal and 2 nocturnal samplings during higher high tide periods. The survey will provide a current assessment of the contents and state of anchialine pools in the project area. Of particular concern is the potential for adverse ecological effects on anchialine resources due to the proposed harbor expansion and from construction activities and operations. Consequently, this paper will examine other anchialine systems that contain similar attributes, which have faced similar development situations. Based on an aggregate of existing data and information, this document will address possible management and mitigation measures.

2.0 Anchialine Pools as an Ecological Resource

2.1 Background

Anchialine pools are isolated coastal exposures of the groundwater table occupying depressions in historic or recent prehistoric lava flows and porous limestone depressions. These pools contain mixohaline water, and although lacking surface connection to the sea, their water levels exhibit damped tidal fluctuation indicating a subsurface connection to the ocean. Since these pools exist in low lying coastal depressions, in some cases shallow pools may disappear during low tide, which restricts the colonization of certain organisms. Conversely, some pools that were apparently isolated at low tide coalesce during high tide, forming larger singular pools, and are considered pool complexes with homogeneous biological and water chemistry characteristics. Many of the sampled pools at Kealakehe fall into these two categories. Anchialine pools are rare among aquatic ecosystems and geographically limited in the United States to Hawaii. It is estimated that nearly 700 pools exist in Hawaii, most of which occur along the west coast of Hawaii Island between Kawaihae and Kailua-Kona. The ecological significance of Hawaii's anchialine pools owes primarily to their role as habitat for a variety of unique flora and fauna. Their biota is distinctive in community structure and species endemism. Two classes of organisms are found in anchialine pools, epigeal and hypogeal species. The former require illuminated water and are often common to other coastal aquatic habitats, while hypogeal species spend a substantial portion of their life in the dark, which in anchialine systems corresponds to the subterranean interstices within the groundwater table.

2.2 Threats to Anchialine Resources

Anchialine pool ecosystems in West Hawaii are under increasing threat of degradation due to a number of factors. The single greatest threat is the introduction and spread of alien fish and plant species. A lesser threat is groundwater contamination. The effects of alien fish in anchialine pools is rapid senescence, both directly due to predation and competition, and indirectly through a change in the pools trophic ecology, predominantly due to the loss of primary consumers and detritivores. Combined, these changes accelerate eutrophication, sedimentation, infilling, and ultimately the demise of the pool. This altered condition is exacerbated when groundwater contamination in the form of chronic high nutrient levels is present and flushing rates are reduced, promoting rapid filamentous chrysophyte and chlorophyte production. In addition, elevated nutrients promote higher growth rates of terrestrial and riparian vegetation. Large or dense vegetation around pools add leaf litter and increase root mass within groundwater interstices around pools, which decrease water exchange, adding to the senescence process.

In anchialine systems that contain intact native biota, adequate flushing, and physically maintained riparian vegetation, elevated nutrient levels have little or no observable effect on the stability of the system. Anchialine systems are typically high in dissolved nutrients (relative to the ocean) from natural and anthropogenic sources, and inorganic nutrients in

anchialine pools vary among locations and may be as high or low in developed coastal areas as in pristine undeveloped areas. (Brock and Norris, 1988, Brock and Kam, 1997). Pools with native aquatic fauna dominated by *Halocaridina rubra*, a small red caridean shrimp most often associated with anchialine pools, usually have a compliment of lower order crustacea, mollusks, and microfauna. Most substrates in the sunlit pools are blanketed with cyanophytic crusts or epilithon, and interspersed with low-cropped filamentous chlorophytes. It is this complete diverse and rich ecology that prevents filamentous and matted algae from dominating and overwhelming a system. Consequently, healthy anchialine ecosystems in developed and undeveloped coastal areas remain intact even when faced with elevated dissolved nutrient concentrations from natural or anthropogenic sources (Brock & Kam, 1997, Chai, personal observation).

2.2.1 Salinity Levels and Effects in Anchialine Systems

In a 1974 study by Maciolek and Brock, 298 pools along the leeward coast of Hawaii Island were inventoried, and contained salinities of less than 15ppt for 93% of them. They ranged from 1ppt -30 ppt, with the average being 7ppt. Variations in salinity were seldom less than a few parts per thousand (Maciolek and Brock, 1974). However, salinity along the vertical gradient exhibits much more variation among locations along the West Hawaii coastline. For example, within the ahupua'a of Kawaihae, a salinity of 25ppt is reached at an average depth of approximately 18 meters below sea level within 100 meter of the shoreline. At Ka'upulehu, within the same distance of the shore a salinity of 25ppt is reached at approximately 6.8 meters, and Opaeula are drawn from wells over 18 meters below sea level with salinities averaging 31 ppt. Of the hundreds of anchialine pools observed and documented by this author and other anchialine pool researchers, *H. rubra* and *Metabetaeus lohena* are seldom observed in pools with salinities higher than 25 parts per thousand (ppt). These high salinity pools typically have a high level of connectivity to the ocean, and this connection often allows a variety of predatory and competitive marine and euryhaline fish and crustacea to access these anchialine pools and deplete or eliminate hypogeal shrimp.

At Hualalai Resort in Ka'upulehu, North Kona, Hawaii, moderate to high salinity fluctuation in anchialine pools has exhibited no apparent adverse changes to the anchialine ecology, even when facing salinity changes of up to 23 ppt. Two large man-made anchialine pools (1.4 million and 65,000 gallons) and a natural pool enlarged from 1,000 gallons to 40,000 gallons, were created in 1993 and all were surcharged in 1995 with high salinity well water to 27ppt in an attempt to stop the growth of a filamentous algae, *Melosira sp.* and *Cladophora sp.* These two types of algae are pioneer species in newly created or dramatically disturbed anchialine pools that lack the benefit of an adjacent healthy anchialine ecosystem to seed them. The strategy worked to eliminate filamentous algae, and during the first four years, the largest pond contained tens or hundreds of millions of *H. rubra* and millions of *M. lohena* that were especially abundant at night. The decline of these populations was gradual as marine fish were introduced to the pool, and eventually the hypogeal shrimp were observed only at night. The 65,000 gallon man-made anchialine pool located approximately 200 meters away was also surcharged to 27ppt for approximately 1 year until a stable anchialine ecosystem was

developed, allowing the surcharge system to be turned off. The pool reverted back to 6ppt and the ecosystem remained intact with dense populations of many anchialine organisms. In subsequent years, the pool was surcharged for a few weeks during the spring and fall to clarify the water during *Enteromorpha* sp. sporulation, with no apparent adverse effects. The enlarged natural pond (40,000 gal.) contained a salinity of 2-4ppt, and supported indigenous widgeon grass (*Ruppia maritime*) and an extremely dense population of *H. rubra* and *M. lohena*. It was surcharged on a periodic basis to 20ppt to eliminate alien Dragonfly larvae and Bufo tadpoles, the presence of which result in the decline and disappearance of hypogeal shrimp. This dense and stable community of native species in both pools existed for 11years until Minnows (*Poecilia sp.* and *Gambusia sp.)* were introduced to the pools in 2005, which devastated their ecology within 6 months. The anchialine pools that were untouched or enlarged, containing an intact native ecology, have remained intact since prior to the construction of the Resort.

2.2.2 Dissolved Nutrients in Anchialine Systems

Various scientists have measured groundwater nutrient concentrations from undeveloped sites in West Hawaii, over time. Brock has reported that nitrate nitrogen in these pools ranged from 280ug/l to 2800ug/l and orthophosphate ranged from 6.2ug/l to 201ug/l (Brock and Kam 1997). Kealakehe pools fall in the higher range in regard to dissolved nitrate nitrogen, having values between 1664ug/l to 2960ug/l with an average 2027ug/l. Orthophosphate ranged from 14ug/l to 32ug/l, averaging 21.6ug/l (Ziemann, 2006), which fell in the lower range compared to other undeveloped sites. Nutrient levels in man-made, modified, and natural pools at Ka'upulehu (a developed area) were recorded between 1989 prior to construction in 1994, and through to 2000. The pools contained nitrate nitrogen levels averaging 2106ug/l prior to construction and 2749ug/l during and after construction. Orthophosphate level prior to construction, averaged 154.4ug/l, while during and after construction orthophosphate levels averaged 149.7ug/l. The highest concentrations of nutrients in the pools occurred during the grow-in period of the landscape and following high rain events. Similar to the findings of Brock at Waikoloa, no apparent adverse effects were observed in healthy anchialine pools. However, disturbed or newly created pools began the process of eutrophication with heavy growths of *Cladophora sp.* until they were cleaned of all sediment and algae, surcharged with high salinity well water, and manually seeded from healthy pools and naturally recolonized with native biota.

There has been a great deal of research conducted since the 1980's by Brock on anchialine pools at Waikoloa and around the State. A good summary assessment on the effects of alien species, high nutrient concentrations, and other types of groundwater contamination on anchialine pools, can be found in Brock and Kams 1997 study entitled "Biological and Water Quality Characteristics of Anchialine Resources in Kaloko-Honokohau National Historical Park" (Brock and Kam, 1997). This study also examines a number of Management recommendations for the Parks pools that may apply to the anchialine resources at Kealakehe.

3.0 Anchialine Pools as Cultural Resource

In addition to their ecological value, anchialine pools are of significant cultural importance. Hawaiians of the past relied on anchialine resources for their livelihood and survival, and maintaining the health of these systems was of high importance. Hawaiian historians, who speak of the anchialine pools within the arid lands of West Hawaii, describe these pools as being a source for drinking and cooking water, bathing, irrigation, and aquaculture. Individual pools typically had a specific use and were well maintained.

Of particular importance were anchialine pools as habitat for Opaeula (*Halocaridina rubra*). Fishermen would gather hundreds of these shrimp into small balls which were sometimes mixed with fine red cinder to add bulk, and they would set out in their canoes to specific areas in the ocean where Opelu (Mackerel Scad, *Decapterus macarellus*) would gather in schools called a Ko'a Opelu. The balls of shrimp would then be released among the Opelu and nets would be set to harvest the fish as they fed upon the shrimp. During the Kapu seasons when Opelu fishing was not allowed, the Ko'a Opelu would continue to be fed and maintained as an early form of open-ocean farming or ranching. (H. Springer, L. Lightner, and C. Torres, pers. comm.) Some fishermen today practice the same fishing technique, and rely on a stable source of Opaeula to catch Opelu. The importance of this fishing tradition cannot be understated. Today, Opelu are not only a highly valued source of food, but they and the fishing methods surrounding them, continue to be a direct link to Hawaiian culture, values, and traditions of the past. The anchialine pools at Kealakehe offer a unique opportunity to help continue this tradition. Further study on the cultural use of anchialine pools of Kealakehe, Honokohau, and Kaloko by early Hawaiian inhabitants should be undertaken and incorporated into the final management plan.

4.0 Findings and Recommendations

The study site was comprised of 19 anchialine pools. Of the 19, six were considered high tide pools (exposed only at medium or high tide), seven were considered pool complexes (individual pools at low tide and interconnected at high tide), and six were single isolated pools. Three of the anchialine pools identified by Ziemann in the 2006 study were considered part of an estuary complex with direct connection to the ocean. Location, physical characteristics, aquatic macrofauna, and floral communities were recorded during higher high tide.

There were several signs of direct human use and disturbance in the pools such as trash receptacles and toilet facility. However, the greatest degradation to the majority of the anchialine and estuarine resources was due to the presence of alien fish, including topminnows and tilapia, and introduced plants, predominantly pickleweed and mangrove.

Figure 1. Location of Anchialine Pools and Estuary at Kealakehe

4.1 Survey Approach and Method

The field survey approach for anchialine pools at Kealakehe was based on recommendations made by John A. Maciolek, one of the pioneers in anchialine pool research (Maciolek, 1987). The survey was conducted on May 20th and 21st, 2007, and all pools were visually inspected each day and night at or near mean higher high tide periods. Since the inventory of aquatic fauna was of primary importance, intensive surveying was necessary during nocturnal high tides, a period conducive to anchialine faunal activity. Estuarine fauna were also recorded both days and nights as part of this study.

Temperature, salinity, oxygen and pH, were measured with an YSI model 556 multi-parameter meter, and were taken in all pools during higher high tide. These four parameters were selected because they are essential limiting factors governing populations of aquatic organisms in the anchialine biotope (Maciolek pers. comm.). All pools were less than 1 meter deep so all measurements were taken at or near the bottom of pools where water quality exhibits the most stability. Specific ions are also important factors to be considered in an aquatic ecosystem but were beyond the scope of this study. A water analysis and monitoring program is addressed later in this paper. Other physical parameters were recorded at higher high tide, and included surface water dimension, average pool depth, type of pond feature (i.e. crack, low lying depression, collapsed lava tube, etc.), and sediment depth and composition. All observed aquatic fauna was recorded and a relative abundance rating attributed to their numbers. Quadrat sampling was not used since both hypogeal shrimp species often occur in groups or clusters in a specific area of the pool. Consequently, a physical quadrant count may not be representative of the entire pool or pool complex for short-term analysis. However, long-term monitoring should involve more quantitative analysis using fixed sampling points. Riparian vegetation was a dominating feature of many Kealakehe pools and was noted in this study. Anchialine pool and estuary sites were recorded on a U.S. Geological Survey topographic map.

4.2 Survey Results

A taxonomic list of aquatic fauna observed is presented in Table 1, and includes their occurrence in each of the 19 pools and a relative abundance rating. Table 2 indicates the individual pools physical, water quality, substrate, and riparian vegetation characteristics.

Table 1. A list of aquatic fauna and their relative abundance in individual pools and pool complexes. A (n) suffix indicates organisms were observed only at night.

Abundance Rating:
1 = Less than 3 individual observed.
2 = several individuals observed or uncommon occurrence relative to other pools
3 = Common occurrence with many individuals observed relative to other pools
4 = Abundant throughout the pool or pool complex and/or numerous individuals occurring in groups.

Pool	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
Group/taxon																			
Mollusca																			
Theodoxus cariosus	4		2	2	2				1		2			2	3				4
Melania sp.											2			3	2			3	
Crustacea																			
Halocaridina rubra				3	2n	3	3	3	2n	3	2n	1n	2	3n	1n	2	2n	3	2n
Metabetaeus lohena				2	2n	2	2	3	2n	4			3n	2n	3n	3n		3	2n
Macrobrachium grandimanus	3	3			1				2		1			1n					
Metapograpsus thukuhar	3	1	2	3	2				2				1				1		2
Paryhale sp.				2															
Fish																			
Gambusia affinis	3		3		2						4	3		4	3		4		4
Poecilia reticulata	2		2		2						3	3	4	3	3	2	4	2	3
Oreochromis sp.														4	2				3
Gobidae sp.	1																		
Neomyxus sp.															1				

Table 2. Physical and water quality characteristics of anchialine pools at Kealakehe.

	Area	Depth	Sediment	Temp.		Salinity	D.O.	
Pool	m2	cm	Depth cm	ºC	pH	ppt	ppm	Description
1	16	50	<1	22.3	7.25	13	6.6	Collapsed lava tube rock-rubble substrate
2	20	74	<3	21.4	7.47	13.6	7.1	Collapsed lava tube rock-rubble substrate
3	40	53	<6	21.8	7.4	13.3	7.2	95% *Batis* filled depression complex, 3 open pools. Biogenic sediments
4	16	37	<1	22.3	7.38	13	7.4	80% *Batis* filled depression complex, 5 open pools
5	20	50	<1	22.6	7.39	14.2	7.3	90% *Batis* filled crack complex, 3 open pools
6	9	28	0	22.8	7.3	13.4	4.8	High tide crack pool, rock-rubble substrate
7	2	13	0	23	7.29	13.2	5.5	High tide pool, rock-rubble substrate
8	9	13	0	23.4	7.24	13.4	4.9	High tide pool, fissure depression, rock substrate
9	10	57	<6	22.1	7.46	14	6.9	Sunken depression two pool complex.
10	8	26	<2	22.3	7.45	13.8	4.8	Shaded cave pool, riparian *Sesuvium* northern edge
11	80	58	<15	22.3	7.56	13.2	7.4	97% *Batis* filled depression complex, 2 open pools, *Sesuvium* and *Cyperus*, biogenic sediments
12	15	78	<2	21.2	7.49	12.5	6.5	Collapsed lava tube pool
13	32	72	<4	22.3	7.58	13.6	7.5	Lava overhang, rocky depression, biogenic sediments
14	80	73	<6	23	7.5	14	6.2	70% *Batis* filled complex, 10 open pools, biogenic sediments
15	24	63	<4	22.4	7.52	14.1	7.9	90% *Batis* filled complex, 9 open pools, estuarine influence, biogenic/sand sediments
16	8	25	0	22.6	7.43	13.5	7.5	Dark fissure w/ *Hildenbrandia* epilithon
17	30	62	<10	23.6	7.27	13.7	7.8	Open cave pool, 40% *Cladophora* mat, Biogenic sediments
18	8	34	0	22.2	7.49	13.4	5.8	Rock fissure w/ no vegetation
19	64	75	<24	22.4	7.50	14.1	6.4	95% *Batis* filled depression with 5 open pools, biogenic sediments

4.2.1 Estuary Complex

The estuary at Kealakehe covers an area of approximately 1,120m^2. Its extent to the north includes the open water surrounding Makaopio heiau and the *Batis*-filled complex inland of the heiau. The eastern edge of the estuary is the inland extent of the mangroves. The southern extent runs along the mangrove and is bordered by thick *Batis* overlying rock and sand substrate. The estuary is a shallow water low-lying area with a series of open water pools and is surface connected to varying degrees during the higher high tide periods. Water chemistry and quality is influenced by direct connection to the ocean during medium and high tides mixed with the surface layer of fresher groundwater. Salinity ranged from 29.2 seaward to 14.7, the furthest inland open water exposure. Temperatures ranged from 27.5 to 22.5, and pH from 7.88 to 7.32.
The estuary is in an advanced stage of senescence, filled with *B. maritima* and *R. mangle*. The high density of this riparian and emergent vegetation, provide a barrier to more complete uniform mixing and movement of water and fauna. Sediments are comprised of sand and organic matter and vary in depth from 0cm-22cm. The estuary is distinguished from the anchialine pools not only by similar water characteristics, but similar biological components.

Many of the native species found in the estuary are common to tidepool and nearshore environments such as *Abudefduf abdominalis, Abudefduf sordidus, Sargocentron sp., Acanthurus triostegus,* and *Kuhlia sandvisensis*. Two fish species found at the furthest inland section were *Gymnothorax undulatus* and *Neomyxus leuciscus,* or possibly the introduced mullet *Chelon engeli*. There was an abundance of *T. cariosus* and Grapsid crabs. Unfortunately, throughout the estuary, minnows and tilapia were the dominant species with high population levels.

4.3 Conclusion and Evaluation

A majority of the anchialine pools at Kealakehe are degraded biologically and physically, primarily due the effects of introduced fish and plant species. The 7 pools that are currently devoid of alien fish face a high level of threat due to the proximity of pools that have these fish species. In addition, the pools with intact native biology have relatively low species abundance and diversity compared with other pools in the region and relatively small surface area and volume. They comprised only 10% of the total anchialine pool resource at Kealakehe, and approximately 40% of these were pools visible only at high tide. The high tide pools 6, 7, and 8 are the three to be eliminated by the proposed harbor.

Within the 19 pools, native and non-native fauna included 14 species comprised of 5 fish, 2 mollusca, and 6 crustacea. Algae within the pools primarily consisted of a mixed assemblage of diatoms and cyanobacteria, with several pools dominated by matted filamentous *Cladophora*, sp. The darker cave/overhang pools and high tide pools had epilithic *Hildenbrandia* sp. covering the rock substrate. Riparian vegetation was dominated by introduced species consisting of Pickleweed (*Batis maritima*), Mangrove

(*Rhyzophora mangle*), and Christmasberry (*Shinus terebenthifolius*). Only two species of native plants Akulikuli (*Sesuvium portulacastrum*) and Makaloa (*Cyperus laevigatus*) existed near the pools and comprised only few small patches and a single tuft (respectively).

Fortunately, most of the hypogeal anchialine shrimp have adapted to the presence of minnows by foraging in the pools at night. During daylight hours, only the adult shrimp appear to coexist at low population levels with the smaller *P. reticulata*, but the larger *G. affinis* and *Oreochromis* prevent the daytime appearance of hypogeal shrimp due to predation. The average salinity in Kealakehe pools is relatively high at 13.5 ppt compared to most other pools along the West Hawaii coastline, having an average of approximately 7 ppt. This high salinity appears to be characteristic of this region, and is similar to the average of most pools within the adjacent ahupua'a of Honokohau and Kaloko. This relatively high salinity is the likely reason aquatic insects were not found in any pools at Kealakehe. Though the rare damselfly *Megalagrion xanthomelas* has been observed and collected from Kaloko, a statewide assessment of its range has not found it to occur in water with salinity greater than 3ppt. However, there has been an unsubstantiated occurrence of the nymph in a pool of up to 8ppt (Polhemus, 1995). Another species of concern is the hypogeal decapod shrimp *Metabetaeus lohena*. These shrimp are sometimes predatory on *H. rubra* but are more often opportunistic omnivores similar to *H. rubra*. Predusk and nocturnal sampling at high tide is clearly the optimal method to determine habitat range and population densities for this species. These shrimp were found in 13 of the 19 pools, 7 of which had *M. lohena* only at night. The occurrences of H. *rubra* were found in 16 of 19 sampled pools, 8 of which had Opaeula observed only at night. Consequently, despite having numerous degraded anchialine resources at Kealakehe, there are opportunities for many of the pools to be restored and enhanced to a level where large populations of anchialine shrimp and other native species may return to inhabit the pools as they likely have in the past.

5.0 Framework for Management Program

In order to devise an anchialine pool management program, a set of objectives must be defined. In addition, a monitoring and evaluation program should be in place to detect changes in the physical, chemical, and biological components of the environment, and if necessary, modify the management program to achieve the stated objectives. The proposed list of management objectives and strategies for Kealakehe incorporates those suggested and actively in place by scientists and managers of anchialine systems in Hawaii, some of which include: recommendations by Maciolek in 1987 in an evaluation of anchialine pools at Awake'e, Kohanaiki, and Makalawena; recommendations by Chai, 1988 and 1990 for Ahihi-Kinau, Maui, and 3 National Parks with anchialine resources on Hawaii Island ; management of pools by Chai at Hualalai and Kona Village Resort, 1993-present; management plans developed by Brock for Waikoloa and implemented in 1987, and for Kukio Resort, implemented in 2000; and finally, those proposed by Brock and Kam in their 1997 CNPRSU technical report #112 for Kaloko-Honokohau National Historical Park. Additionally, these objectives and strategies should be taken as a preliminary framework or first step, not a static plan. Numerous valid interests toward the health and benefit of the anchialine pools and broader coastal ecosystem must be taken into account as the final objectives and strategies are formulated.

5.1 Management Objectives

Objective 1 To preserve, maintain, and foster the long-term health and native ecological integrity of anchialine pools at Kealakehe.

Objective 2 To protect and promote cultural practices and traditions surrounding anchialine resources at Kealakehe.

Objective 3 To provide education, interpretation, and interactive opportunities for the community to learn about and appreciate the anchialine resources.

Objective 4 To acquire a pond manager to implement the program, conduct monitoring, research, and reporting, and provide education to the community about anchialine and estuarine resources.

5.1.1 Objective 1 **To preserve, maintain, and foster the long-term health and native ecological integrity of anchialine pools at Kealakehe.**

To achieve this and allow all the other objectives a path toward success, the central component of the management program must involve the restoration and enhancement of the existing degraded pools. The existence of anchialine pools is ephemeral, and the senescence process that leads toward their ecological degradation and in filling, is dramatically accelerated due to the presence of alien species in and around the pools. The first stage of restoration will involve the removal of alien fish and plant species, and the removal of sediments from the pools and estuary. The consequence of this will be the natural return of native aquatic fauna to the pools very quickly. They are essentially "waiting in the wings" to reemerge from the subterranean habitat. The second stage will be the reintroduction of native plant species that formerly inhabited the pools and pool complexes. Again, as with the fauna, many native species will reemerge in the absence of

invasive plants, but some natives will need to be reintroduced to more quickly dominate the riparian and emergent habitat. Concurrent with the restoration should be a defined maintenance program to protect the ecological integrity of the system.

5.1.2 Objective 2 **To protect and promote cultural practices and traditions surrounding anchialine resources at Kealakehe.**

Concurrent with the ecological restoration should be the repair or reconstruction of the cultural features that were associated with the pools and estuary. Evidence suggests that early Hawaiian inhabitants used these pools. The pool management plan should incorporate some form of traditional use and management based on the testimony of lineal descendents of the ahupua'a if possible, or at least descendents from this region. The use of anchialine resources obtained from healthy native ecosystems can be accomplished on a sustainable basis without adverse impacts to the system. Hawaiians of the past considered anchialine pools a significant asset, a gift, and they were carefully maintained. This same respect and stewardship should be encouraged for pools at Kealakehe.

5.1.3 Objective 3 **To provide education, interpretation, and interactive opportunities for the community to learn about and appreciate the anchialine resources.**

Anchialine pools as an educational resource is important for many reasons. The pools are rare, accessible, and fascinating, allowing educators a unique opportunity to solidify concepts of science, math, and culture through their study. The pools allow people to learn about, experience, and appreciate a rare and unique habitat up-close. Understanding and appreciation of anchialine ecosystems lead to respect, and help foster the ideals and actions toward preservation and stewardship of the resource for many generations to come. Interpretive signs, tours and activities should be designed with this concept in mind.

5.1.4 Objective 4 **To acquire a pond manager to implement the program, conduct monitoring, research, and reporting, and provide education to the community about anchialine and estuarine resources.**

The designated anchialine pool manager should be well qualified and responsible for implementing the anchialine resource management program. This person will plan and oversee all the activities needed to fulfill the objectives. The manager will coordinate all aspects of the monitoring program and evaluate the results. As an ambassador to the public for the natural resources of Kealakehe, the manager must embrace the concepts and values of malama and pono in their management approach.

6.0 Water Quality and Aquatic Life Monitoring Plan

Environmental monitoring is vital as an early warning system to detect potential environmental degradation. A series of quantitative baseline analysis of the physio-chemical and biological components within the project site will provide a standard by which the effects of the development, anthropogenic activities, and natural phenomena on the environment can be measured. Changes in groundwater quality may or may not impact biological communities in the anchialine and estuarine environment. In either case, it is important to understand these relationships to effectively manage the resource. If there is significant deviation from the baseline especially in regard to nutrients, pathogens, and toxins, a mitigation plan to determine the cause and take decisive appropriate action should be implemented.

Water chemistry and sediment analysis should be undertaken in accordance with recommendations for groundwater and anchialine pool monitoring by the West Hawaii Coastal Monitoring Task Force, 1992. The monitoring protocol established in this document provides a complete and valuable management tool in helping to protect groundwater, anchialine, and marine resources. In conjunction with physio-chemical monitoring would be a quantitative analysis of biological communities. Determination of abundance, distribution, diversity, and physiological health of the populations should be key elements to the biological monitoring plan.

6.1 Monitoring Frequency

Using the 1992 monitoring protocol guidelines the monitoring program should be undertaken during 3 phases of the Kona Kai Ola project; 1) pre-construction to establish a comprehensive baseline analysis, 2) during construction as a continuation of monitoring protocol established during baseline analysis, and 3) post construction, or during the operations phase of the project. All monitoring should take place at least quarterly for water chemistry/quality and for biological communities as long as construction and pool restoration efforts are taking place. Thereafter, semi-annual monitoring should be adequate up to at least 5 years following construction activities. Extreme storm or other natural or anthropogenic events should also trigger a sampling analysis. Sediment sampling should be undertaken yearly if there is no indication of contamination by toxic pollutants. If contamination is discovered, monitoring should continue on a quarterly basis until there is no indication of contamination.

7.0 Mitigation Plan Recommendations

Based on the scale and scope of the proposed project, it is inevitable that there will be impacts to the anchialine pools, estuary, and marine environment. Managers of the proposed project have an opportunity to learn from, formulate plans, and make decisions based in some part on the mistakes and successes of other developments and resource management projects along the coast of West Hawaii. Much of the success in avoiding or mitigating detrimental environmental impacts will depend on the cooperation of the developer, landowners, and experts or persons knowledgeable in the field of environmental systems related to the project site. The following mitigation recommendations are a first step and a guideline for discussion and planning. The precise details of the plan and timeline will need to be determined at a later date.

7.1 Creation of New Anchialine Pools

A problem with the plan to restore existing degraded anchialine pools at Kealakehe is the proximity and high level of connectivity of some pools to the estuary. This connectivity will not permit the use of piscicides to eliminate alien fish, due to the possibility of harming marine organisms. Therefore, they cannot be restored to their former natural state dominated by native species. Additionally, the planned harbor is expected to eliminate three high tide anchialine pools that contain *H. rubra* and *M. lohena.* As a response to this loss of habitat there is significant opportunity to create new anchialine pools and greatly expand the native habitat and resource. It has been demonstrated at several projects in West Hawaii that anchialine pools can be created and will be colonized with a full compliment of anchialine species endemic to the area (Brock and Norris, 1988, Chai pers. observation). Anchialine pools are considered focal points of higher productivity relative to the subterranean groundwater habitat around them. Their productivity promotes an increase in population levels of anchialine species within the pools themselves and throughout the subterranean habitat surrounding them. In regard to decapod crustaceans, there exists a positive linear relationship between the size of the anchialine pool and the population of shrimp that inhabit them. A reconnaissance of the area indicates numerous potential sites within the project area to create anchialine pools wherever the land surface is within a few meters from the water table. In addition to increasing habitat productivity for native fauna, anchialine pools are functionally wetlands and have the ability to sequester and convert dissolved organic nutrients and other pollutants from the groundwater before they enter the marine environment (Brock and Kam, 1997, Ogden and Campbell, 1999).

7.2 Water Resources Protection and Mitigation

7.2.1 Bioretention

There is a high probability that nutrients and other potential pollutants will runoff landscaping and impermeable surfaces such as roadways and parking lots during medium or high rainfall events. Some of these pollutants will enter the groundwater table and into anchialine pools and ultimately the ocean. As an alternative to directing runoff into the ground through drywells, storm water should be directed into bioretention areas such as constructed surface or subsurface wetlands, vegetated filter strips, grass swales, and planted buffer areas. Storm water held and moved through these living filter systems are essentially stripped of most potential pollutants, and allowed to slowly infiltrate back to the groundwater table (Innovative Technologies for Storm water and Wastewater Workshop, 2005). Bioretention is a BMP (Best Management Practice) that would be a highly appropriate application for the proposed development. Furthermore, BMPs utilized in series may incorporate several storm water treatment mechanisms in a sequence to enhance the treatment of runoff. By combining structural and/or nonstructural treatment methods in series rather than singularly, raises the level and reliability of pollutant removal. Another means to reduce the potential for groundwater contamination is to increase soil depth above the standard in landscaped areas. This will allow chemicals to be held in the soils longer for more complete plant uptake and breakdown of these chemicals by soil microbes. A specific guide for chemical application by landscape maintenance personnel will be a beneficial tool to help avoid contamination of groundwater resources.

7.2.2 Salinity Adjustment

In the 2006 assessment by Ziemann regarding the impact to the southern pools from the proposed construction of the harbor, he stated that this construction would cause the salinity in the anchialine pools to become equivalent to the ocean at 35ppt. The anchialine biology would then soon perish. There is currently a level of uncertainty by professional hydrologists as to the exact movement of surface groundwater and a final determination of anchialine salinity following the harbor construction. The dynamics of groundwater movement through a porous lava medium both seaward and laterally along the coastline is an inexact science. This is compounded by the variations in water density, including stratification of salinity within the proposed harbor and capillary movement of low-density surface water through the substrata. The assessment that all anchialine pools will be barren with the construction of the harbor may be premature. *H. rubra* are routinely drawn from high salinity wells at 30 – 32 ppt and survive in this salinity for years. As mentioned early in this document, high populations of *H. rubra* and *M. lohena* have thrived and reproduced in pool salinities of 27ppt. If the pools do become full strength seawater at 35ppt, there exists uncertainty on the long-term effects to anchialine organisms, since there are no long-term studies or examples of native anchialine ecosystems at 35ppt. Native anchialine pool vegetation also has relatively high salinity tolerance. Akulikuli will grow as a riparian plant and *R. maritime* will thrive as an aquatic plant at a salinity of 27ppt. *Bacopa monieri* and Makaloa will grow in salinities of up to

20ppt. Other than Aki aki, (*Sporobolis virginicus*), and Ohelo kai (*Lycium sandwicense)* no other native aquatic or riparian flora will likely thrive among seawater pools.

If the salinity were expected to rise to 35 ppt, a possible mitigation would be to surcharge man-made anchialine pools created adjacent to or in the vicinity of natural pools with low salinity well water. If sufficient volume is used, it is theoretically possible to lower salinity in adjacent natural anchialine pools. This surcharge method has been successfully used to raise salinity in anchialine pools and cause the salinity rise in adjacent pools of at least up to 10 meters away. Surcharging with low salinity should work as well or better since the lower density water will essentially float atop the higher salinity water at the surface layer, and move throughout the complex of natural pools. Surcharging may also be a viable mitigation to dilute and more rapidly disperse any pollutants that may be detected in the pools.

If the harbor is to be a receptacle for the discharge of seawater from a man-made lagoon, it may help to maintain lower salinity in pools if the discharge of this seawater is place at the bottom of the harbor, thereby preserving the stratified layer of lower density surface water within the harbor. If the porosity of the lava near the surface of the groundwater table is sufficient, it may allow this low salinity surface water to move laterally through the area of anchialine pools.

7.2.3 Groundwater and Anchialine Pool Contamination Response

The response plan to contamination of the groundwater should be designed to prevent the negative impact to aquatic communities and human public who use the pools. Mitigation should focus on halting and reversing the source of contamination and its effects on living communities. Environmental problems that will trigger notification of the Developer and appropriate agencies, and require immediate mitigation and corrective action to halt the source of contamination, include: 1) the finding of pesticides or other toxic pollutants within the groundwater, anchialine pools or pool sediments; 2) a significant deviation in dissolved nutrients above normal baseline parameters; 3) a significant decline in population or a serious wide-spread health problem in the biological components that comprise the anchialine or estuarine habitat.

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To whom it may concern,

Aloha. My name is Jennifer Bach and I am writing in regards to oppose the proposed Kona Kai Ola Development which plans to dramatically impact 530 arcs in Kealakehe, North Kona, Hawaii Island. This development is subject to the destruction of the last of semi-pristine North Kona coastline. A number of significant factors are not properly addressed in your DEIS. Environmental impacts are briefly and inadequately described such as

1. **Potential impact to reefs by the pre and post expansion of an 800-slip marina:** The pre and post expansion of the planned marina will degrade nearby reefs and near shore habitats. Dive and other recreational business that heavily rely on the health of these reefs to generate income based incentive will be impacted. Increased boat and human traffic, pollution, and nutrient enhancement are expected to increase significantly with expansion of new planned marina
2. **Anchiline ponds will be destroyed and or impact significantly with little to no restoration:** Although alchiline ponds are described as "derogated" this is should be justified as a reason to destroy or discount them. Many derogated ponds have been successfully restored (i.e., Hualalai, David Chai). These ponds still offer habitat to native and indigenous species including endangered species which violates the Endangered Species Act.

Other misleading information reported in the Kona Kai Ola DEIS includes plans of employee housing which is not clarified or shown on Map keys. The details of exact number of housing rental/units will be offered permanent jobs estimates are left out. This also violates a lease that is designed to not allow permanent residential devilment. How do multi-timeshare and hotel units fit into this lease? Is this legally justified? Is the Department of Hawaiian Homes Land allowed to potentially "sell out" their land to provide so-called infrastructure (water, sewage) to Hawaiian homeland?

This devolvement infrastructure is clearly designated to generate income to development stakeholders with little monies to the community. Large profits will be dedicated to the main stakeholders involved with the Jacoby devolvement not the community.

On page 126 of the Kona Kai Ola DEIS states that section 226-104 a number of priority guidelines for regional growth distribution and land resource utilization (b). The Kona Kai Ola devolvement will violate these guidelines if allowed to proceed. Line 13 states that a priority is to "protect and enhance Hawaii's shorelines, open spaces, and scenic resources". This devolvement will urbanize one of Kona's last pristine shorelines and open space. It will alter and urbanize an area that should be designated for protection due to its unique environmental and cultural values. This devolvement, if allowed will also violate line (1) in the priority guidelines, in that it does not preserve the "Hawaiian lifestyle". The acceptance of this devolvement on Hawaiian homelands does not preserve the Hawaiian culture or enhance it. It is designed to urbanize the last of Hawaii's land and derogated important resources that is essential in the preservation of Hawaiian culture and lifestyles. Line (9) states that urban devolvement should be "away from critical environmental areas". How does a major hotels and timeshares fit into this guideline? In fact, they are planning to urbanize a critical environmental area.

If Kona Kai Ola is permitted this may be an example to other devolvement to try to use designated lands , such as DHHL and DLNR to break guidelines, zoning codes and state priorities and guidelines. Please take the time to reconsider this devolvement and not allow it to proceed for the well being and health of Hawaii's people, culture, and resources. Thank you very much

Sincerely,

Jennifer Aloha Bach

Jennifer Bach

B.A. Biological Conservation

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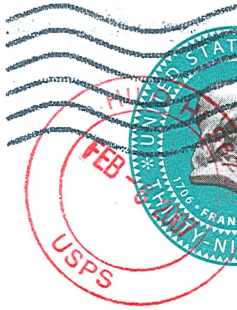

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July 23, 2007

Jennifer Bach
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Dear Ms. Bach:

Subject: Kona Kai Ola Draft Environmental Impact Statement
Response to Your Comments Dated February 6, 2007

Thank you for your comments on the Kona Kai Ola Draft Environmental Impact Statement. Our responses to your comments are based on the numerical sequence and paragraph sequence in your letter.

1. Potential impact to reefs by the pre and post expansion of an 800-slip marina.

We acknowledge your comments impacts to the nearby reefs and nearshore habitats may occur before and after the expansion of the harbor. However, the EIS finds that, while impacts are already occurring, the proposed project provides opportunities to address existing impacts and mitigate future impacts.

In EIS Section 3.9.3.2, Marine Fishing Impacts, Anticipated Impacts and Mitigation Measures, it is noted that private boats in Kona and around Hawai'i are used for a variety of activities that have historically proven difficult to regulate. Such activities include bottom fishing, trolling, spear fishing, tropical fish and invertebrate collecting, as well as non-extractive activities including sport diving, skiing, paragliding, racing, or shoreline transportation. Each of these activities has individual existing impacts upon marine resources and there will be increased pressure on these resources in the future, regardless of harbor development.

The EIS finds that an increase in the harbor size offers the opportunity to consolidate, focus, and fund management and enforcement activities at one centralized location. The pressure on fish and invertebrate stocks, as well as upon populations of marine mammals and turtles can be expected to increase as the Kona population increases, regardless of whether the harbor is improved. The following changes could be made by DLNR, paid for at least in part by the additional revenues to DLNR from the Kona Kai Ola project. These changes are in the management authority of the DLNR Division of Aquatic Resources and the DLNR Division of Boating and Ocean Recreation.

- Increase in the number of fisheries enforcement and management personnel in Kona at one centralized harbor location;
- Allocation of slip and office space for fisheries personnel and equipment;

- Increase numbers of submerged mooring buoys (presently approaching 100) at all dive sites;
- Increase education materials for recreational divers and fishermen;
- Initiate restrictions on the quantity and size of boats in each commercial sector;
- For inshore species, initiate catch restrictions in line with Division of Aquatic Resources guidelines that prioritize recreational fishing above commercial fishing, and subsistence fishing above recreational fishing.

In addition, the increased level of fisheries knowledge has spawned an atmosphere of stewardship in the general charter-boat fishing community. With catch and release programs returning upwards of 40 percent of the Kona catch back to the ocean, there is an obvious awareness that the value of catching the fish is often far greater than the value of selling it. The EIS recommends that facilities and programs foster continued stewardship, fisheries science, tracking of all fish catch, and educational programs be implemented in the design of the new marina facilities.

2. Anchialine ponds will be destroyed and or impact[ed] significantly with little or restoration.

The DEIS does not state that the existing anchialine pools are "derogated." Rather, the DEIS contained the statements about the existing conditions of anchialine pools located onsite and the possible project impacts related to the degradation of the anchialine pools. The DEIS presented information stating that harbor construction would cause an increase in salinity in the anchialine pools makai of the proposed marina basin to become equivalent to the ocean at 35 parts per thousand (ppt) and that the anchialine biology would then perish.

In response to DEIS comments and to further study the pools south of the entrance channel of Honokōhau Harbor, a second study was conducted by David Chai of Aquatic Research Management and Design in June 2007. The second survey focused on intensive diurnal and nocturnal biological surveys and limited water quality analysis of the southern group of anchialine pools exclusively. The report is contained in Appendix H-2 of the EIS and is summarized in EIS Sections 3.9.2.1 and 3.9.2.2. In addition, further comment on the groundwater hydrology effects on anchialine pools was prepared by Waimea Water Services and is contained in Appendix G-3 of the EIS. Attachment 1 contains the EIS Sections 3.9.2.1 and 3.9.2.2.

The DEIS identified 22 anchialine pools. Further studies determined that three of these pools are actually part of an estuary complex with direct connection to the ocean. Of the 19 anchialine pools, six were considered high tide pools (exposed only at medium or high tide), seven were considered pool complexes (individual pools at low tide and interconnected at high tide), and six were single isolated pools. Of the 19 anchialine pools, three pools with a combined surface area of 20m^2 would be eliminated due to the harbor construction.

While the second survey confirmed the presence of direct human use and disturbance, such as trash receptacles and toilet facilities, it found that the greatest degradation to the majority of the anchialine and estuarine resources was due to the presence of alien fish,

including topminnows and tilapia, and introduced plants, predominantly pickelweed and mangrove.

The additional studies indicate that the remaining pools may not increase in salinity to levels unhealthy for anchialine pool fauna. Waimea Water Services found that harbor construction would cut off some of the fresher ground-water flow. However, predicting the extent of change in flow is difficult, if not impossible, even with numerous boreholes and intense sampling. The tides alone create a mixing system that increases salinity, as the flow approaches the point of discharge which will be either the channel or the shore. Another factor that could influence groundwater quality is the increased local recharge from irrigation between the channel and shore. This will add fresh water to the lens locally but is not quantified at this time.

Hence, the additional studies found that changes in groundwater quality may or may not impact biological communities in the anchialine and estuarine environment. In either case, the developer is committed to practicing good stewardship over the pools to be preserved and eliminating or reducing alien species to the extent practicable. The developer recognizes it is important to understand these relationships to effectively manage the resource. If there is significant deviation from the baseline, especially in regard to nutrients, pathogens, and toxins, a mitigation plan to determine the cause and take decisive appropriate action will be implemented.

Mitigation measures to facilitate the long term health of the remaining anchialine pools will be based on environmental monitoring, which is vital as an early warning system to detect potential environmental degradation. A series of quantitative baseline analysis of the physio-chemical and biological components within the project site will provide a standard by which the effects of the development, anthropogenic activities, and natural phenomena on these environments can be measured.

The framework for the mitigation plan will include three measures intended to meet these objectives, including bioretention, salinity adjustment and possible new pools. These measures are described in detail in EIS Section 3.9.2, Anchialine Pools.

Page 1, 3rd Paragraph

This paragraph contains several statements that are incorrect. First, DEIS does not contain “plans of employee housing,” as you state. As EIS Section 1.4, Purpose and Need for Project, explains and as you state later in this paragraph, residential uses are prohibited.

Time-share and hotel units are allowed in the agreements between the State and the developer.

A study of workforce housing requirements was prepared to evaluate secondary impacts. As agreements between the State and JDI prohibit residential development at Kona Kai Ola, workforce housing would need to be located off-site. The most suitable location for workforce housing units is the Villages at La‘i‘Ōpua community, a DHHL project, or within the Hawai‘i Housing Finance and Development Corporation affordable housing development planned for Keahuolū. These are two State-owned undertakings

directly across the highway in the same or adjacent ahupua'a. Locating workforce affordable housing units in these communities would substantially lessen the traffic impacts associated with a community subject workforce. Alternatively, the State lands adjacent to Waikoloa Village would be appropriate for workforce housing.

JDI will comply with all affordable housing requirements of applicable Hawai'i County ordinances.

Page 1, 4th Paragraph

Your statement that "this development infrastructure is clearly designated to generate income to development stakeholders with little monies to the community" is incorrect, as is your following statement regarding large profits.

The project is funded by private investment and will generate a reasonable rate of return for the private developer and ongoing revenue for DLNR and DHHL. Further, the project includes crucial privately-funded improvements, such as the marina, regional roadway and circulation improvements, and improvements to the existing wastewater treatment plant. Private funds will also be used in the development of community-oriented facilities such as parks, other recreational facilities and public access. Hence, public interest will be served through the development of the Kona Kai Ola project.

Page 2, 1st Paragraph

You quote several priority guidelines from the Hawai'i State Plan, Chapter 226, Section 104 regarding population growth and land resources priority guidelines and provide your perspective that the project "violates" these guidelines. We disagree with your analysis.

The EIS discussion follows these guidelines with a discussion of Kona Kai Ola's consistency with these guidelines, and we include the EIS text as our response to your comment, as follows:

> *The site proposed for Kona Kai Ola is identified as part of the "Preferred Urban Growth Area" for Kona in the Kona Community Development Plan currently being developed by Hawai'i County. In the Keāhole to Kailua Regional Development Plan, the Kona Kai Ola site is the same location selected for the new regional urban center of Kona, as well as a "harbor expansion complex", connector road from the harbor to Kailua-Kona, and a shoreline park. This was to allow for the Kailua-Kona urban area to grow to meet the needs of Kona, while relieving the pressures of urbanization on the village of Kailua-Kona alone.*
>
> *The Kona Kai Ola site is identified in the 2005 Hawai'i County General Plan as "Urban Expansion Area" for the DHHL lands, and "Open" for the DLNR lands. On November 29, 2006, the Council approved an amendment request to change the DLNR lands to Urban Expansion Area. This land use designation is consistent with other regional "Urban Expansion" LUPAG areas, which are located mauka of Queen Ka'ahumanu Highway, and in areas contiguous to the project site, including Queen Lili'uokalani Trust lands to the south. For the most part, these sites are vacant, do not have an agricultural value, and are located proximate to an existing marina operation with associated support businesses.*

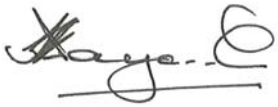
DHHL and HHFDC are planning over 3,000 homes in the ahupua'a mauka of the project site. As a proposed commercial development project, Kona Kai Ola can provide a stable employment base close to where people live.

From a regional perspective, the project site is located along a logical commercial and industrial corridor between the airport/NELHA and the urban area of Kailua-Kona. The infrastructure improvements associated with this project would not result in the expansion of the urban periphery but would instead be viewed as urban-infill and a response to existing infrastructure inadequacies (i.e. road network and existing harbor).

Finally, in response to your comments in the last paragraph of your letter, the project does not "break guidelines, zoning codes, and state priorities and guidelines," and we refer you to EIS Section 5, Conformance with Public Plans and Polices, for a full discussion of the project's consistency with State and County laws, regulations and policies.

Your comment letter and this response are included in the Final Environmental Impact Statement. We appreciate your participation in the environmental review process. Please submit a request to our office if you would like to receive a printed or electronic copy of the Final Environmental Impact Statement, or portions thereof.

Sincerely,



Dayan Vithanage, P.E., PhD.
Director of Engineering

cc: Office of Environmental Quality Control
State Department of Hawaiian Home Lands
Jacoby Development, Inc.

Attachment 1

The conditions with the project constructed were found to be phosphorous limited. Several simulations were performed including and excluding the inflow from the marine exhibits which provides an additional nitrogen load and also varying the location of this inflow. It was found that the inflow from the marine exhibits can have a beneficial effect on flushing, especially when positioned within the existing harbor basin. However, its effect is significantly less than the effect due to the brackish groundwater inflow. When the exhibit inflow is excluded or positioned at the east end of the new marina, its effect is small in terms of flushing due to its high salinity. From a water quality perspective, since the loads from the exhibit inflow consist primarily of nitrogen, it does not cause increased algae growth. However, this exhibit inflow does raise the concentrations of ammonia and nitrate in the system.

Simulation results indicate that under the conditions when the post-expansion system receives an additional brackish inflow into the new 25-acre marina on the order of 30 mgd or more, water quality within the harbor system and in the surrounding waters remained similar to existing conditions. These conditions are expected to occur based on the findings reported by Waimea Water Services (2007), which states that the proposed marina would exhibit the same or similar flushing action as the existing marina.

An additional mitigation measure proposed by Waimea Water Services (2007), if sufficient inflow is not intercepted, consists of drilling holes in the bottom of the new marina to enhance this inflow and facilitate flushing within the proposed system.

~~3.9.3~~3.9.2 Anchialine ~~Ponds~~ Pools

Two studies on anchialine pools were conducted in this EIS process. The anchialine ~~ponds~~ pools water quality studies and ~~biota surveys were conducted by David A. Ziemann, Ph.D. of the Oceanic Institute and is~~biota surveys were conducted by David A. Ziemann, Ph.D. of the Oceanic Institute in October 2006 and are included as Appendix ~~G~~H-1. That survey included pools located both north and south of Honokōhau Harbor. In response to DEIS comments and to further study the pools south of entrance channel of Honokōhau Harbor, a second study was conducted by David Chai of Aquatic Research Management and Design in June 2007. The second survey focused on intensive diurnal and nocturnal biological surveys and limited water quality analysis of the southern group of anchialine pools exclusively. The report is contained in Appendix H-2.

~~3.9.3.1~~3.9.2.1 Existing Conditions

Anchialine ~~ponds~~ pools exist in inland lava depressions near the ocean. Two anchialine ~~pond~~ pool complexes are located immediately to the north and south of the Honokōhau Harbor entrance channel. The complex to the north is located wholly within the designated boundaries of the Kaloko-Honokōhau National Historical Park as shown in Figure Q~~O~~. Many of the ~~ponds~~ pools in the southern complex are within the park administrative boundary as well. ~~Ponds~~ Pools in the northern complex show little evidence of anthropogenic impacts. Many contain typical vegetation and crustacean species in high abundance.

Figure R locates anchialine pools near the harbor entrance and pools~~Ponds~~ in the southern complex are depicted in Figure S.

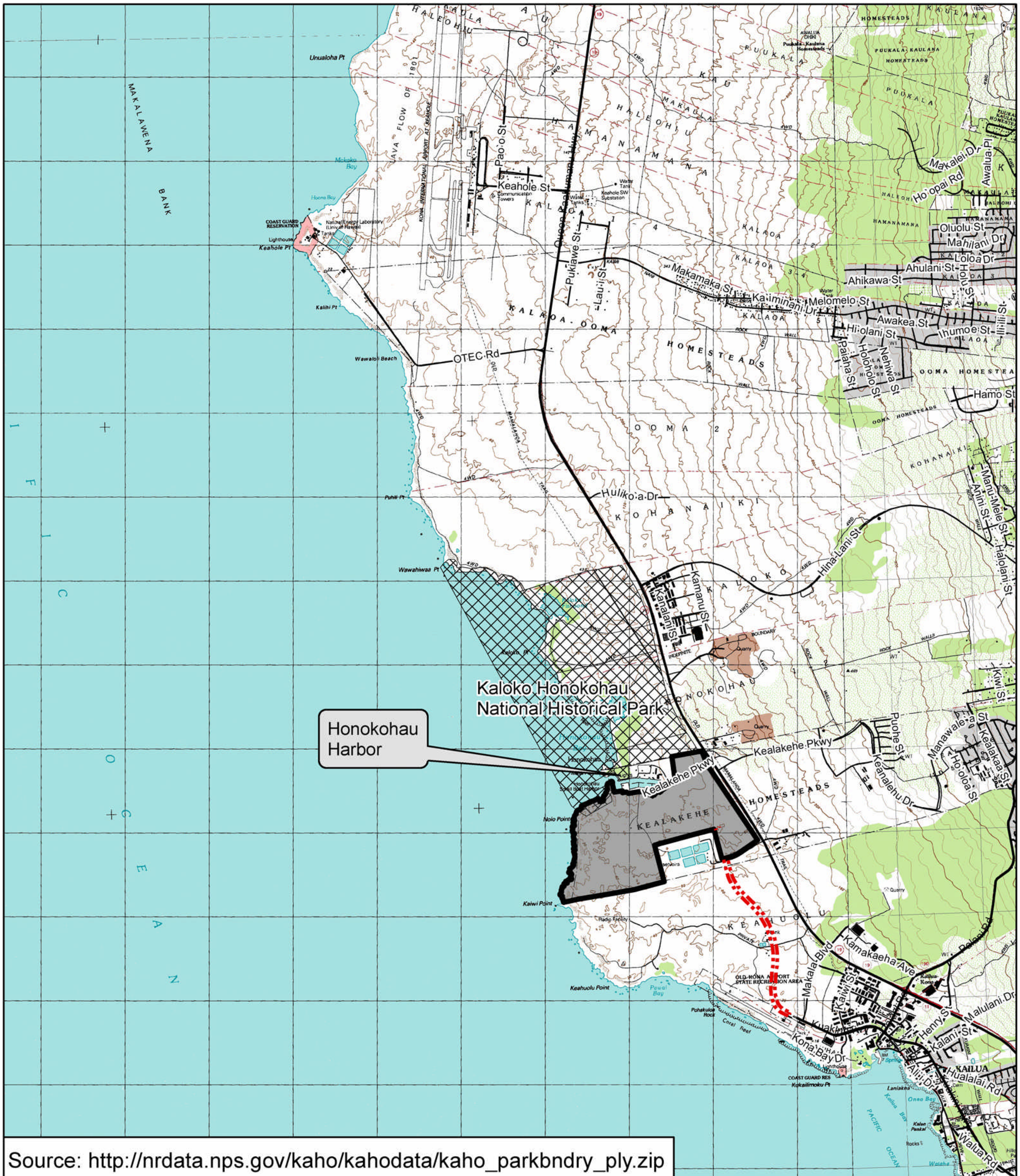


Figure Q: National Historical Park Service Legislative Boundary Map

Legend

- Project Site
- Proposed Parkway
- National Park Boundary

0 2,500 5,000 Feet

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Source: Oceanic Institute

Figure R: Anchialine Pool Locations

N
W E
S

0 2,000 4,000 Feet

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Source: Aquatic Resources Management And Design

Figure S: Anchialine Pool Locations in Southern Complex

N
W
E
S

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The 2006 study identified 22 pools in the southern complex. The 2007 study found that three of the 22 pools are part of an estuary complex with direct connection to the ocean. While there were several signs of direct human use and disturbance, such as trash receptacles and toilet facilities, the greatest degradation to the majority of the anchialine and estuarine resources was due to the presence of alien fish, including topminnows and tilapia, and introduced plants, predominantly pickleweed and mangrove. ~~are moderately to heavily impacted, with many containing exotic fish that exclude the anchialine crustaceans. The ponds also show evidence of human impact, including discarded bottles, cans, wrappers, diapers, toilet paper, etc. Water quality conditions within the ponds generally reflect the conditions of the underlying groundwater.~~

~~Figure P locates anchialine ponds near the harbor entrance. The study conducted as a part of this EIS show that the anchialine ponds south of the harbor entrance are moderately to heavily impacted by human activities and introduced fish populations. The study found that the nitrogen phosphorus concentrations in these ponds are significantly higher compared to the ponds north of the harbor entrance. The sources of these additional nutrients are not known. Continuous influx of nutrients will eventually degrade the water quality to levels that could alter the pond ecology.~~

Biota surveys in the two pond systems clearly indicate that counts of typical pond denizens show a remarkable difference between the northern and southern ~~ponds~~ pools. In the northern ~~ponds~~ pools the number of *Halocaridina rubra* ranged from a low of 20–25 to too numerous to count. The biota rich pond bottoms appeared red due to the *Halocaridina rubra* numbers. The only other species visible was the predatory shrimp *Metabetaeus lohena*. In contrast, only four out of the 22 ~~ponds~~ pools examined in the southern pond complex showed a decreased presence of *Halocaridina rubra* (6 to 200) individuals in the pond, and three ~~ponds~~ pools contained *Metabetaeus lohena*. Eight of the ~~ponds~~ pools contained numbers of introduced minnows which is an apparent predator of *Halocaridina rubra* and *Metabetaeus lohena*.

The 2007 study found three of the pools identified in the 2006 study were part of an estuary complex with direct connection to the ocean, and that the southern complex contained 19 anchialine pools. The study further found that a majority of the southern pools are degraded biologically and physically, primarily due to the effects of introduced fish and plant species. Six pools are currently devoid of alien fish, but they face a high level of threat due to the proximity of pools that have these species. Of the 19 anchialine pools, six were considered high tide pools (exposed only at medium or high tide), seven were considered pool complexes (individual pools at low tide and interconnected at high tide), and six were single isolated pools. Of the 19 anchialine pools, three pools with a combined surface area of $20m^2$ would be eliminated due to the harbor construction.

The DEIS presented information stating that harbor construction would cause an increase in salinity in the anchialine pools makai of the proposed marina basin to become equivalent to the ocean at 35 ppt. and that the anchialine biology would then perish. There is currently a level of uncertainty by professional hydrologists as to the exact movement of surface groundwater and final determination of anchialine salinity following the harbor construction. The assessment that all anchialine pools will be barren with the construction of the harbor may be premature. *Halocaridina rubra* (opae ula) are routinely drawn from high salinity wells at 30-32 ppt.

Within the 19 pools, native and non-native fauna included 14 species comprised of 5 fish, 2 mollusca, and 6 crustacea. Algae within the pools primarily consisted of a mixed assemblage of diatoms and cyanobacteria, with several pools dominated by matted filamentous *Cladophora*, sp. The darker cave/overhang pools and high tide pools had epilithic *Hildenbrandia* sp. covering the rock substrate. Riparian vegetation was dominated by introduced species consisting of Pickleweed (*Batis maritima*), Mangrove (*Rhyzophora mangle*), and Christmasberry (*Shinus terebenthifolius*). Only two species of native plants Akulikuli (*Sesuvium portulacastrum*) and Makaloa (*Cyperus laevigatus*) existed near the pools and comprised only few small patches and a single tuft (respectively).

Most of the hypogeal anchialine shrimp have adapted to the presence of minnows by foraging in the pools at night. During daylight hours, only the adult shrimp appear to coexist at low population levels with the smaller *P. reticulata*, but the larger *G. affinis* and *Oreochromis* prevent the daytime appearance of hypogeal shrimp due to predation.

The average salinity in Kealakehe pools is relatively high at 13.5 ppt compared to most other pools along the West Hawai'i coastline, having an average of approximately 7 ppt. This high salinity appears to be characteristic of this region, and is similar to the average of most pools within the adjacent ahupua'a of Honokōhau and Kaloko. The levels of nitrate-nitrogen levels are relatively high compared to other undeveloped areas, but fall in the range of some developed landscapes. Other water quality parameters, including pH and temperature, fall into normal ranges for anchialine pools.

This relatively high salinity is the likely reason aquatic insects were not found in any pools at Kealakehe. Though the rare damselfly *Megalagrion xanthomelas* has been observed and collected from Kaloko, a statewide assessment of its range has not found it to occur in water with salinity greater than 3ppt. However, there has been an unsubstantiated occurrence of the nymph in a pool of up to 8ppt (Polhemus, 1995).

Another species of concern is the hypogeal decapod shrimp *Metabetaeus lohena.* These shrimp are sometimes predatory on *H. rubra* but are more often opportunistic omnivores similar to *H. rubra.* Predusk and nocturnal sampling at high tide is clearly the optimal method to determine habitat range and population densities for this species. These shrimp were found in 13 of the 19 pools, 7 of which had *M. lohena* only at night. The occurrences of *H. rubra* were found in 16 of 19 sampled pools, 8 of which had 'Ōpae'ula observed only at night. Consequently, despite having numerous degraded anchialine resources at Kealakehe, there are opportunities for many of the pools to be restored and enhanced to a level where large populations of anchialine shrimp and other native species may return to inhabit the pools as they likely have in the past.

~~As mentioned earlier, the southern ponds also had elevated concentrations of nutrients indicating water quality degradation. These factors indicate that if no restoration or maintenance activities are instituted to reserve these ponds, these ecosystems will degrade beyond recovery.~~

~~3.9.3.2~~3.9.2.2 Anticipated Impacts and ~~Recommended~~ Proposed Mitigations

The anchialine ~~ponds~~ pools that are located north of the existing harbor are not likely to be impacted because no development activities are proposed north of the existing harbor. It is highly unlikely that existing groundwater flows to the Kaloko-Honokōhau pond system to the north of the existing harbor will be impacted by the proposed marina to the south.

Of the 19 pools in the southern complex, three would be eliminated due to harbor construction. Regarding the remaining pools, the DEIS noted that t~~T~~he change in the local groundwater flow pattern in the vicinity of the proposed marina ~~will~~ would impact the anchialine ~~ponds~~ pools that are located between the proposed marina and the shoreline south of the harbor entrance. The 2006 study (Appendix H-1) noted that t~~T~~he salinity of the anchialine ~~ponds~~ pools ~~will~~ would increase due to reduction of brackish groundwater, and that ~~. Some ponds will be excavated to make the new harbor basin. T~~those ~~ponds~~ pools that are not excavated will revert to full salinity, causing the loss of their habitat. ~~and associated aquatic flora and fauna. However, current investigations indicate that these ponds are already enriched by nutrients and the density of associated aquatic fauna is very low. In addition, trash from visitors, and introduction of minnows has already degraded the pond ecology.~~ Even without the potential impacts from the proposed marina construction, the pond ecology might change irreversibly from the nutrient input, human indifference and expansion of non native fauna species.

Further studies conducted in response to DEIS comments (Appendix H-2, and Appendix G-3) indicate that the remaining pools may not increase in salinity to levels unhealthy for *H. rubra* and *M. lohena* and other anchialine pool fauna. In addition, these studies determined that there are realistic mechanisms employed elsewhere that would mitigate changes due to groundwater changes. Waimea Water Services found that harbor construction would cut off some of the fresher ground-water flow. However, predicting the extent of change in flow is difficult if not impossible even with numerous boreholes and intense sampling. The actual flow of groundwater towards the sea is minimal today, and tidal measurements show that tide fluctuations represent more than 90 percent in actual harbor tides. The fluctuations occur simultaneous with the ocean/harbor tide, which indicate a vertical and horizontal pressure regime between bore hole 6 and the ocean and harbor. Hence, the tides alone create a mixing system that increases salinity, as the flow approaches the point of discharge which will be either the channel or the shore.

Another factor that could influence groundwater quality is the increased local recharge from irrigation between the channel and shore. This will add fresh water to the lens locally but is not quantified at this time.

Quantification of these impacts, including the flow of groundwater through each pond, is extremely difficult. The shallow lavas are of the pahoehoe type and have a relatively high horizontal permeability. In surface depressions or undulations, the pahoehoe lavas have a tendency to lose vertical permeability from sedimentation thus restricting water exchange within the individual pools. This is normally reflected in both the salinity and temperature and this information has been adequately studied in the pools.

Changes in groundwater quality may or may not impact biological communities in the anchialine and estuarine environment. In either case, it is important to understand these relationships to effectively manage the resource. If there is significant deviation from the baseline especially in regard to nutrients, pathogens, and toxins, a mitigation plan to determine the cause and take decisive appropriate action will be implemented. The mitigation plan will be based on the following objectives:

Objective 1 To preserve, maintain, and foster the long-term health and native ecological integrity of anchialine pools at Kealakehe.

Objective 2 To protect and promote cultural practices and traditions surrounding anchialine resources at Kealakehe.

Objective 3 To provide education, interpretation, and interactive opportunities for the community to learn about and appreciate the anchialine resources.

Objective 4 To acquire a pond manager to implement the program, conduct monitoring, research, and reporting, and provide education to the community about anchialine and estuarine resources.

Mitigation measures to facilitate the long-term health of the remaining anchialine pools will be based on environmental monitoring, which is vital as an early warning system to detect potential environmental degradation. A series of quantitative baseline analysis of the physio-chemical and biological components within the project site will provide a standard by which the effects of the development, anthropogenic activities, and natural phenomena on the environment can be measured. The framework for the mitigation plan will include three measures intended to meet these objectives, including bioretention, salinity adjustment and possible new pools.

As a mitigation measure, bioretention, which is a Best Management Practice (BMP) is a feasible application for the proposed development. There is a probability that nutrients and other potential pollutants will runoff landscaping and impermeable surfaces such as roadways and parking lots during medium or high rainfall events. Some of these pollutants could enter the groundwater table and into anchialine pools and ultimately the ocean. As an alternative to directing runoff into the ground through drywells, storm water should be directed into bioretention areas such as constructed surface or subsurface wetlands, vegetated filter strips, grass swales, and planted buffer areas. Storm water held and moved through these living filter systems are essentially stripped of most potential pollutants, and allowed to slowly infiltrate back to the groundwater table.

Bioretention is a Best Management Practice (BMP) that would be a highly appropriate application for the proposed development. Further, BMPs utilized in series may incorporate several storm water treatment mechanisms in a sequence to enhance the treatment of runoff. By combining structural and/or nonstructural treatment methods in series rather than singularly, raises the level and reliability of pollutant removal. Another means to reduce the potential for groundwater contamination is to increase soil depth above the standard in landscaped areas. This will allow chemicals to be held in the soils longer for more complete plant uptake and breakdown of these chemicals by soil microbes. A specific guide for chemical application by landscape maintenance personnel will be a beneficial tool to help avoid contamination of groundwater resources.

Another mitigation measure that may be included in the management plan is salinity adjustment. In the 2006 assessment regarding the impact to the southern pools from the proposed construction of the harbor, it was stated that this construction would cause the salinity in the anchialine pools to become equivalent to the ocean at 35ppt. It was then concluded that the anchialine biology would perish.

However, there is currently a level of uncertainty by professional hydrologists as to the exact movement of surface groundwater and a final determination of anchialine salinity following the harbor construction. The dynamics of groundwater movement through a porous lava medium both seaward and laterally along the coastline is an inexact science. This is compounded by the variations in water density, including stratification of salinity within the proposed harbor and capillary movement of low-density surface water through the substrata.

The assessment that all anchialine pools will be barren with the construction of the harbor may therefore be premature. *H. rubra* are routinely drawn from high salinity wells at 30 – 32 ppt and survive in this salinity for years. Further, high populations *H. rubra* and *M. lohena* have thrived and reproduced in pool salinities of 27ppt. If the pools do become full strength seawater at 35ppt, there exists uncertainty on the long-term effects to anchialine organisms, since there are no long-term studies or examples of native anchialine ecosystems at 35ppt. Native anchialine pool vegetation also has relatively high salinity tolerance.

If the salinity were expected to rise to 35 ppt, possible mitigation in the management plan will include methods to surcharge man-made anchialine pools created adjacent to or in the vicinity of natural pools with low salinity well water. If sufficient volume is used, it is theoretically possible to lower salinity in adjacent natural anchialine pools. This surcharge method has been successfully used to raise salinity in anchialine pools and cause the salinity rise in adjacent pools of at least up to 10 meters away. Surcharging with low salinity should work as well or better since the lower density water will essentially float atop the higher salinity water at the surface layer, and move throughout the complex of natural pools. Surcharging may also be a viable mitigation to dilute and more rapidly disperse any pollutants that may be detected in the pools.

Another mitigation measure includes the creation of new anchialine pools. There is significant opportunity to create new anchialine pools and greatly expand the native habitat and resource. It has been demonstrated at several projects in West Hawai'i that anchialine pools can be created and will be colonized with a full compliment of anchialine species endemic to the area. Anchialine pools are considered focal points of higher productivity relative to the subterranean groundwater habitat around them. Their productivity promotes an increase in population levels of anchialine species within the pools themselves and throughout the subterranean habitat surrounding them.

~~No realistic mechanisms are envisioned for re-injecting fresh water into these systems to maintain their ecological balance as an anchialine system. These ponds will be changed from a brackish water system to a marine system. But, those ponds in the area of the shoreline park and cultural park will be cleaned of vegetation and protected from other physical alteration. A buffer zone around these newly established marine ponds will be protected as well.~~

~~The anchialine pond shrimp (*Metabetaeus lohena)* and the orangeback damsel fly (*Megalagrion xanthomelas)* are listed as candidate endangered species in the Federal Register and were both recorded in surveys of these anchialine ponds done in 2004 by US Geological Survey Biological Resources Division and the NPS Inventory and Monitoring Program. Low numbers of *Metabetaeus lohena* were encountered in three of the 22 ponds surveyed in the southern pond complex. *Megalagrion xanthomelas* was not encountered in any of the southern pond complex ponds during the recent study. The low density of *Metabetaeus lohena* and the observed absence of *Megalagrion xanthomelas* may be due to the impacts from high nutrient input and general degradation of the ponds.~~

~~An attempt should be made to move as much of the existing population of *Metabetaeus lohena* from these anchialine ponds before they become too saline, to possible newly excavated ponds that may be developed off-site. These shrimp should not be introduced into existing populated ponds to avoid any potential pathogenic impacts to the healthy ponds.~~

~~Public education on the unique ecology of the anchialine ponds and the need for preserving their ecology will reduce future human impacts in other healthy ponds.~~

~~Further recommended mitigation includes restoration to degraded anchialine ponds off the project site, preferably those located at the adjacent Kaloko-Honokōhau National Historical Park.~~

Jill Wagner
73-1539 Hao St.
Kailua Kona, HI 96740

RECEIVED
FEB 2 2007

January 25, 2007

Mr. Scott Condra
Jacoby Development, Inc.
171 17th Street, NW Suite 1550
Atlanta, GA 30363

Subject: DEIS- Kona Kai Ola, Kealakehe, North Kona District, Island of Hawaii

Dear Mr. Condra,

I am a concerned citizen of Kailua Kona, Hawaii, and I am submitting comments on the above-referenced subject. I have worked in preservation and restoration of the Coastal dryland forest region of Kona for several years, and I am very concerned about the proposed development, Kona Kai Ola, which is South of the Kaloko-Honokohau National Park. I think the proposal is inappropriate for the site, and for Kona for many reasons.

The negative impacts to the proposed site of harbor expansion and land are numerous, and make it clear to me that expansion should not occur. As you must know, the site itself was designated as a National Historic Landmark in 1962. There are numerous archeological features including trail segments and heiau on the site. There are 22 anchiline pools, some of which are home to native candidate endangered species; *Megalagrion xanthomelas* orangeblack Hawaiian damselfly, and *Metabetaeus lohena*, red shrimp. The opai ula that live in the pools are ethnobotanically important, as they were used by Hawaiians for fishing. According to Sallie Beavers, NPS biologist, per. Comm.., some of the pools at the site are in good condition. Blasting the land to expand the harbor will cut off the fresh water supply to the pools, and to the native plants in the coastal areas. That should not happen. Offering to restore anchiline pools in the Kaloko-Honokohau National Park as a mitigation for destroying 22 pools is not an equitable nor acceptable idea.

There are many endangered species that live in the Kaloko-Honokohau area on land and in the ocean. This is a pristine site for breeding Humpback whales, *Megaptera novaeangliae,* threatened Green sea turtles, *Chelonia mydas,* Bottlenose dolphin, *Tursiops truncates,* spinner dolphin, *Stenella longirostris*,

endangered Hawaiian monk seal, *Monachus schauinslandi*, endandered Hawksbill turtles, endangered Hawaiian stilt, *Himantopus mexicanus knudseni* endangered Hawaiian coot, *Fulica alai,* Hawaiian hoary bat, *Lasiurus cinereus semotus,* and migratory shore birds and water fowl, marine invertebrates, and fishes to list. These animals would be negatively impacted by blasting, non-point source pollution from industrial parks, fertilizers, and noise. Noise alone would greatly disturb the turtles and other marine life on a daily basis. The sensitive hearing of these animals cannot withstand the increased noise that would go along with 800 new slips in the harbor. A mesh barrier does not make sense. If it is to catch silt then how will the hydrology work?

There are over 170 resident Green sea turtles at Kaloko-Honokohau National Park. That means that the turtles sleep at the National Park and are there daily. The turtles would be seriously threatened by the huge increase in boats entering and leaving the harbor. Furthermore, propellers are a serious danger to turtles. Turtle lungs are at the top of the carapace, and if a turtle is struck its lungs are in danger of being punctured. Turtle deaths and strandings are most probably under-reported in Hawaii because the Island does not have a dedicated patrol for stranded turtles. In addition, turtles that are struck and killed by propellers would most likely sink or be eaten, thus the true numbers of turtle deaths are unknown. The huge proposed increase in the harbor would certainly be grave for the turtles. There are two turtle cleaning stations at the mouth of the harbor entrance, "turtle pai" and "turtle heaven". It is also the place frequented by spinner dolphin. The spinner dolphin rest just outside of the harbor entrance.

The increase in boats crossing the Hawaiian Islands Humpback Whale National Marine Sanctuary is unacceptable. There are 4500 to 6500 whales migrating to Hawaii every year to give birth to their young. With whale hunting continuing in many parts of the world despite hunting moratoriums, it is critical that Hawaii remain a safe place for the whales to winter. There are many people in the community who do not want to see changes in Hawaii degrade the good health of its natural resources. The danger for whale strikes is too great with the intended increased number of boats. The over 300% expansion of the harbor is not only inappropriate, but unnecessary. According to the National Marine Manufacturers Association website, State Registrations of Boats from 1996-2004 shows that Hawaii has a -15% drop in boat sales during that period. What is the justification for such a huge increase in harbor slips? Furthermore, the intended cost of $11 per foot for slips is overpriced for the local community. People who are

currently towing their boats would have to continue to trailer them rather than dock them in the harbor. The high cost of slip fees clearly reflects an intention to focus on the wealthy part-timers in Kona and not the local community. Since the DEIS statement says that the decrease in blue marlin is dramatic, "as of 2005, the catch rate has dropped to about 1 blue marlin in every 10 trips (pg. 52)", the proposed development is not in line with environmental "red flags" that are happening at this time. As fisheries around the world are declining alarmingly, it would not be appropriate to endanger the Kona coast, especially due to the proximity of this proposed development to the Kaloko-Honokohau National Park. The coral reefs, whales, turtles, and all other marine life would undoubtedly suffer, as would the Kona community.

Kona is currently suffering due to workers shortages, traffic congestion, water limitations, and housing shortages. I have personally spoken to over 50 people about this proposed development. There is no interest from the local community for more hotels, which would greatly increase the total number of units in Kona at the expense of the city itself. The resorts and hotels in North Kona are placed far enough away from Kailua Kona's stores, houses, and activity center. This development would be right in the middle of the busiest place in Kona. That doesn't make sense and it would burden all aspects of Kona's infrastructure. People want to see Kona grow in a well thought out way. They want to see it grow while taking care of its natural resources. This proposed development obviously does not prioritize the natural resources of the Kona coast.

There are many misleading statements in the DEIS, and many errors. The document is too large for me to go through page by page. I saw much that was outright wrong. For example, there is a statement that green sea turtles are endangered by the EPA due to their resemblance to hawksbill turtles. The EPA has nothing to do with the endangered species act, furthermore, species are not listed due to the way they look.

I had a private meeting with representatives from Jacoby Development, yet how come no one sent me an email telling me that the comment period was been open? This whole process seems flawed. I had to actively seek out the website and continue to look weekly to make sure I wasn't missing the comment period. No wonder the public doesn't comment on many proposed developments that are not good for the community and/or the natural environment, although there are clear and strong reasons that the developments should not happen.

The overwhelming negative impacts on all of the biota in the environment, the fact that the site is designated as a National Historic Landmark centered in Kona town, and it's proximity to the Kaloko-Honokohau National Park make this proposed development unacceptable. An increase of 2300 units in one place(!) in the major traffic area of our town, that would overburden the already overburdened infrastructure, is not viable. Thus no action is the only viable solution.

Sincerely,

Jil Wagner

Jil Wagner

Cc: DLNR, Oceanit Center, OEQC

MS. JILL WAGNER
73 1539 Hao St
Kailua Kona, HI 96740

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July 23, 2007

Jill Wagner
73-1539 Hao St.
Kailua-Kona, Hawai'i 96749

Dear Ms. Wagner:

Subject: Kona Kai Ola Draft Environmental Impact Statement
Response to Your Comments Dated January 25, 2007

Thank you for your comments on the Kona Kai Ola Draft Environmental Impact Statement. We are responding to your comment by page and paragraph sequence.

Page 1, Paragraph 2

We acknowledge your concerns about anchialine ponds. The DEIS presented information stating that harbor construction would cause an increase in salinity in the anchialine pools makai of the proposed marina basin to become equivalent to the ocean at 35 parts per thousand (ppt) and that the anchialine biology would then perish.

In response to DEIS comments and to further study the pools south of the entrance channel of Honokōhau Harbor, a second study was conducted by David Chai of Aquatic Research Management and Design in June 2007. The second survey focused on intensive diurnal and nocturnal biological surveys and limited water quality analysis of the southern group of anchialine pools exclusively. In addition, further comment on the groundwater hydrology effects on anchialine pools was prepared by Waimea Water Services. Attachment 1 contains Section 3.9.2, Anchialine Pools; this section summarizes the two studies.

The DEIS identified 22 anchialine pools. Further studies determined that three of these pools are actually part of an estuary complex with direct connection to the ocean. Of the 19 anchialine pools, six were considered high tide pools (exposed only at medium or high tide), seven were considered pool complexes (individual pools at low tide and interconnected at high tide), and six were single isolated pools. Of the 19 anchialine pools, three pools with a combined surface area of 20m2 would be eliminated due to the harbor construction.

The additional studies indicate that the remaining pools may not increase in salinity to levels unhealthy for *H. rubra* and *M. lohena* and other anchialine pool fauna. Waimea Water Services found that harbor construction would cut off some of the fresher ground-water flow. However, predicting the extent of change in flow is difficult if not impossible even with numerous boreholes and intense sampling. The tides alone create a mixing system that increases salinity, as the flow approaches the point of discharge which will

be either the channel or the shore. Another factor that could influence groundwater quality is the increased local recharge from irrigation between the channel and shore. This will add fresh water to the lens locally but is not quantified at this time.

Quantification of these impacts, including the flow of groundwater through each pond, is extremely difficult. The shallow lavas are of the pāhoehoe type and have a relatively high horizontal permeability. In surface depressions or undulations, the pāhoehoe lavas have a tendency to lose vertical permeability from sedimentation thus restricting water exchange within the individual pools. This is normally reflected in both the salinity and temperature and this information has been adequately studied in the pools.

Hence, the additional studies found that changes in groundwater quality may or may not impact biological communities in the anchialine and estuarine environment. In either case, the developer is committed to practicing good stewardship over the pools to be preserved and eliminating or reducing alien species to the extent practicable. The developer recognizes it is important to understand these relationships to effectively manage the resource. If there is significant deviation from the baseline especially in regard to nutrients, pathogens, and toxins, a mitigation plan to determine the cause and take decisive appropriate action will be implemented.

Mitigation measures to facilitate the long term health of the remaining anchialine pools will be based on environmental monitoring, which is vital as an early warning system to detect potential environmental degradation. A series of quantitative baseline analysis of the physio-chemical and biological components within the project site will provide a standard by which the effects of the development, anthropogenic activities, and natural phenomena on these environments can be measured.

The framework for the mitigation plan will include three measures intended to meet these objectives, including bioretention, salinity adjustment and possible new pools.

Page 1, Paragraph 3 to Page 2, Paragraph 3 (1st half)

Three studies related to marine mammals and sea turtles were conducted in response to DEIS comments. Marine Acoustics, Inc., (MAI) prepared the following studies:

- Description of Marine Mammal and Sea Turtles
- Ambient Noise Measurements and Estimation Study
- Acoustic Analysis of Potential Impacts

These studies have significantly increased the EIS discussion on the affected marine environment and noise impacts that may be generated by the proposed project. Information sources are accurately represented, and modeling techniques provide a reliable indication of possible project-related impacts.

The EIS was revised to better understand the existing ocean environment, and discussions regarding humpback whales, sea turtles, dolphins, and Hawaiian monk seal were expanded and clarified. Further, impacts related acoustics noise generated by

construction activities to develop the marina base and ambient noise generated by boats were analyzed to understand sensitivity to noise.

We are including Section 3.9.4, Marine Mammals and Sea Turtles, as Attachment 2 in this letter.

Page 3, Paragraph 3 (2nd half)

The market study conducted as part of the EIS found that there is an existing demand for additional boat slips. This demand was verified in interviews conducted in the social impact assessment. One set of interviewees included marine and shore users. Most of the interviewees felt that current Honokohau marina facilities have deteriorated and that there is a significant need for boat slips. The cost of boat slips at Kona Kai Ola is undetermined at this time.

Page 3, Paragraph 1

You mentioned several infrastructure needs. The EIS contains information that indicates that project-related will be mitigated by proposed improvements to the roadway system, wastewater facilities, drainage and stormwater facilities and the potable water system. Improvements will be privately-funded, and, in some cases such as roadway improvements and the Kealakehe Waste Water Plant, these improvements will serve the regional community.

Page 3, Paragraph 2

As we stated earlier, EIS discussions on sea turtles have been clarified and expanded.

Page 3, Paragraph 3

We appreciate your interest in the project. In addition to public notification of the issuance of EIS documents by the State Office of Environmental Quality Control, there was media coverage when the DEIS was published. Nevertheless, we will make every effort to contact people on future notifications.

Page 4, Paragraph 1

We acknowledge your concerns about the density of the proposed project and note that additional alternatives analyses was conducted after the DEIS was published. As explained in the DEIS, the agreement between JDI and the State of Hawai‘i established a required scope and scale of the project for which the impact analysis was provided. Several comments have addressed the fact that alternatives other than the No Project Alternative were not addressed in the DEIS Section 2, Alternatives Analysis.

We are of the position that alternative actions other than a No Project alternative are not currently feasible without an amendment to the agreement with the State. Agency and public comments in response to the DEIS, as well as additional information generated as a result of inquiry into issues raised by the comments, have been helpful in identifying alternative actions that will serve the State’s goal of providing additional marina slips for the Kona area. These alternative actions also serve to reduce or mitigate anticipated effects of the proposed development.

Thus, agencies such as the Land Division of the Department of Land and Natural Resources, the U.S. Department of the Interior Fish and Wildlife Service, the Planning Department of the County of Hawai'i, and the Office of Environmental Quality Control (OEQC), as well as community organizations have commented that a reduced scale marina and related facilities should be considered. The OEQC has also asked that the alternative of a reduced scale project be evaluated under the assumption that DHHL may determine that a downsized project would be preferred.

In response to these comments on the DEIS and in consideration of measures to mitigate anticipated impacts, the EIS Section 2, Alternatives Analysis, has been revised to describe the following alternatives, which are discussed in more detail in the EIS:

- Alternative 1 is a project involving a 400-slip marina, 400 hotel units, 1,100 time-share units, and commercial and support facilities. This alternative would enhance water quality and avoid the need to widen the existing harbor entrance channel, as well as reduce traffic and socioeconomic impacts.

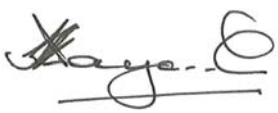
- Alternative 2 is an alternative that had been previously discussed, but not included in the proposed project that includes an 800-slip harbor and a golf course.

- Alternative 3 is the no-action alternative.

A comparison between impacts related to the proposed project concept and impacts related to Alternative 1 indicates that a reduction in the acreage and number of slips in the marina, as well as the reduction in hotel and time-share units, would generate less environmental, traffic, social and economic impacts. Although positive economic impacts would be reduced, Alternative 1 can be considered as a preferable alternative because of reduced environmental impacts. However, while it can be concluded that the 25-acre marina in Alternative 1 would be the preferred size, the DLNR agreement establishes the size of the marina at 45 acres and 800 slips. An amendment to the DLNR agreement is required in order to allow Alternative 1 to proceed. Hence, selection of Alternative 1 is an unresolved issue at this time. The additional EIS text that includes the added EIS Section 2, Alternative Analysis, is contained in Attachment 3 of this letter.

Your comment letter and this response are included in the Final Environmental Impact Statement. We appreciate your participation in the environmental review process. Please submit a request to our office if you would like to receive a printed or electronic copy of the Final Environmental Impact Statement, or portions thereof.

Sincerely,



Dayan Vithanage, P.E., PhD.
Director of Engineering

cc: Office of Environmental Quality Control
State Department of Hawaiian Home Lands
Jacoby Development, Inc.

Attachment 1

The conditions with the project constructed were found to be phosphorous limited. Several simulations were performed including and excluding the inflow from the marine exhibits which provides an additional nitrogen load and also varying the location of this inflow. It was found that the inflow from the marine exhibits can have a beneficial effect on flushing, especially when positioned within the existing harbor basin. However, its effect is significantly less than the effect due to the brackish groundwater inflow. When the exhibit inflow is excluded or positioned at the east end of the new marina, its effect is small in terms of flushing due to its high salinity. From a water quality perspective, since the loads from the exhibit inflow consist primarily of nitrogen, it does not cause increased algae growth. However, this exhibit inflow does raise the concentrations of ammonia and nitrate in the system.

Simulation results indicate that under the conditions when the post-expansion system receives an additional brackish inflow into the new 25-acre marina on the order of 30 mgd or more, water quality within the harbor system and in the surrounding waters remained similar to existing conditions. These conditions are expected to occur based on the findings reported by Waimea Water Services (2007), which states that the proposed marina would exhibit the same or similar flushing action as the existing marina.

An additional mitigation measure proposed by Waimea Water Services (2007), if sufficient inflow is not intercepted, consists of drilling holes in the bottom of the new marina to enhance this inflow and facilitate flushing within the proposed system.

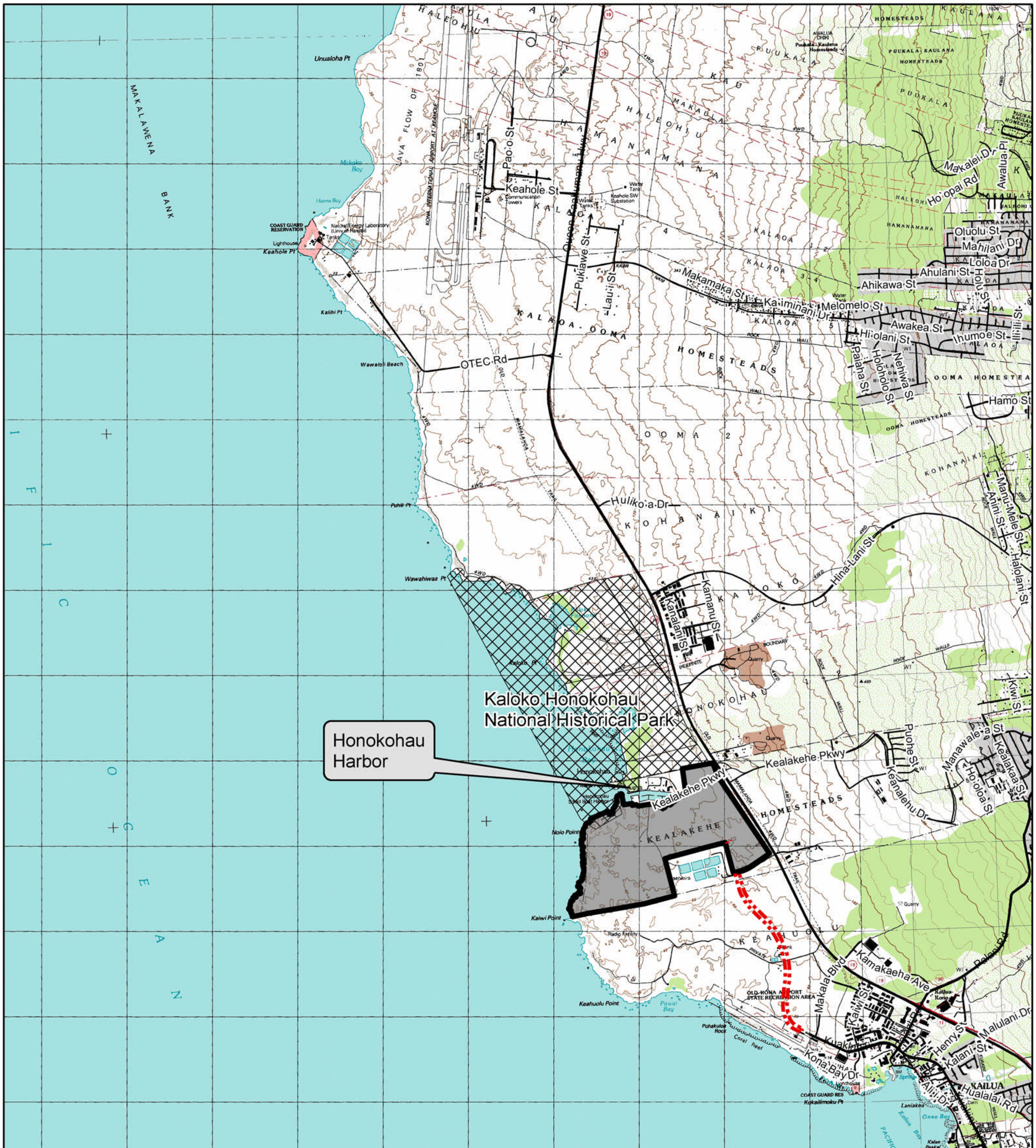
~~3.9.3~~3.9.2 Anchialine ~~Ponds~~ Pools

Two studies on anchialine pools were conducted in this EIS process. The anchialine ~~ponds~~ pools water quality studies and ~~biota surveys were conducted by David A. Ziemann, Ph.D. of the Oceanic Institute and is~~biota surveys were conducted by David A. Ziemann, Ph.D. of the Oceanic Institute in October 2006 and are included as Appendix ~~G~~H-1. That survey included pools located both north and south of Honokōhau Harbor. In response to DEIS comments and to further study the pools south of entrance channel of Honokōhau Harbor, a second study was conducted by David Chai of Aquatic Research Management and Design in June 2007. The second survey focused on intensive diurnal and nocturnal biological surveys and limited water quality analysis of the southern group of anchialine pools exclusively. The report is contained in Appendix H-2.

~~3.9.3.1~~3.9.2.1 Existing Conditions

Anchialine ~~ponds~~ pools exist in inland lava depressions near the ocean. Two anchialine ~~pond~~ pool complexes are located immediately to the north and south of the Honokōhau Harbor entrance channel. The complex to the north is located wholly within the designated boundaries of the Kaloko-Honokōhau National Historical Park as shown in Figure Q~~O~~. Many of the ~~ponds~~ pools in the southern complex are within the park administrative boundary as well. ~~Ponds~~ Pools in the northern complex show little evidence of anthropogenic impacts. Many contain typical vegetation and crustacean species in high abundance.

Figure R locates anchialine pools near the harbor entrance and pools~~Ponds~~ in the southern complex are depicted in Figure S.



Source: http://nrdata.nps.gov/kaho/kahodata/kaho_parkbndry_ply.zip

Figure Q: National Historical Park Service Legislative Boundary Map

Legend

- Project Site
- Proposed Parkway
- National Park Boundary

N W E S

0 2,500 5,000 Feet

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Source: Oceanic Institute

Figure R: Anchialine Pool Locations

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Source: Aquatic Resources Management And Design

Figure S: Anchialine Pool Locations in Southern Complex

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The 2006 study identified 22 pools in the southern complex. The 2007 study found that three of the 22 pools are part of an estuary complex with direct connection to the ocean. While there were several signs of direct human use and disturbance, such as trash receptacles and toilet facilities, the greatest degradation to the majority of the anchialine and estuarine resources was due to the presence of alien fish, including topminnows and tilapia, and introduced plants, predominantly pickleweed and mangrove. ~~are moderately to heavily impacted, with many containing exotic fish that exclude the anchialine crustaceans. The ponds also show evidence of human impact, including discarded bottles, cans, wrappers, diapers, toilet paper, etc. Water quality conditions within the ponds generally reflect the conditions of the underlying groundwater.~~

~~Figure P locates anchialine ponds near the harbor entrance. The study conducted as a part of this EIS show that the anchialine ponds south of the harbor entrance are moderately to heavily impacted by human activities and introduced fish populations. The study found that the nitrogen phosphorus concentrations in these ponds are significantly higher compared to the ponds north of the harbor entrance. The sources of these additional nutrients are not known. Continuous influx of nutrients will eventually degrade the water quality to levels that could alter the pond ecology.~~

Biota surveys in the two pond systems clearly indicate that counts of typical pond denizens show a remarkable difference between the northern and southern ~~ponds~~ pools. In the northern ~~ponds~~ pools the number of *Halocaridina rubra* ranged from a low of 20–25 to too numerous to count. The biota rich pond bottoms appeared red due to the *Halocaridina rubra* numbers. The only other species visible was the predatory shrimp *Metabetaeus lohena*. In contrast, only four out of the 22 ~~ponds~~ pools examined in the southern pond complex showed a decreased presence of *Halocaridina rubra* (6 to 200) individuals in the pond, and three ~~ponds~~ pools contained *Metabetaeus lohena*. Eight of the ~~ponds~~ pools contained numbers of introduced minnows which is an apparent predator of *Halocaridina rubra* and *Metabetaeus lohena*.

The 2007 study found three of the pools identified in the 2006 study were part of an estuary complex with direct connection to the ocean, and that the southern complex contained 19 anchialine pools. The study further found that a majority of the southern pools are degraded biologically and physically, primarily due to the effects of introduced fish and plant species. Six pools are currently devoid of alien fish, but they face a high level of threat due to the proximity of pools that have these species. Of the 19 anchialine pools, six were considered high tide pools (exposed only at medium or high tide), seven were considered pool complexes (individual pools at low tide and interconnected at high tide), and six were single isolated pools. Of the 19 anchialine pools, three pools with a combined surface area of $20m^2$ would be eliminated due to the harbor construction.

The DEIS presented information stating that harbor construction would cause an increase in salinity in the anchialine pools makai of the proposed marina basin to become equivalent to the ocean at 35 ppt. and that the anchialine biology would then perish. There is currently a level of uncertainty by professional hydrologists as to the exact movement of surface groundwater and final determination of anchialine salinity following the harbor construction. The assessment that all anchialine pools will be barren with the construction of the harbor may be premature. *Halocaridina rubra* (opae ula) are routinely drawn from high salinity wells at 30-32 ppt.

Within the 19 pools, native and non-native fauna included 14 species comprised of 5 fish, 2 mollusca, and 6 crustacea. Algae within the pools primarily consisted of a mixed assemblage of diatoms and cyanobacteria, with several pools dominated by matted filamentous *Cladophora*, sp. The darker cave/overhang pools and high tide pools had epilithic *Hildenbrandia* sp. covering the rock substrate. Riparian vegetation was dominated by introduced species consisting of Pickleweed (*Batis maritima*), Mangrove (*Rhyzophora mangle*), and Christmasberry (*Shinus terebenthifolius*). Only two species of native plants Akulikuli (*Sesuvium portulacastrum*) and Makaloa (*Cyperus laevigatus*) existed near the pools and comprised only few small patches and a single tuft (respectively).

Most of the hypogeal anchialine shrimp have adapted to the presence of minnows by foraging in the pools at night. During daylight hours, only the adult shrimp appear to coexist at low population levels with the smaller *P. reticulata*, but the larger *G. affinis* and *Oreochromis* prevent the daytime appearance of hypogeal shrimp due to predation.

The average salinity in Kealakehe pools is relatively high at 13.5 ppt compared to most other pools along the West Hawai'i coastline, having an average of approximately 7 ppt. This high salinity appears to be characteristic of this region, and is similar to the average of most pools within the adjacent ahupua'a of Honokōhau and Kaloko. The levels of nitrate-nitrogen levels are relatively high compared to other undeveloped areas, but fall in the range of some developed landscapes. Other water quality parameters, including pH and temperature, fall into normal ranges for anchialine pools.

This relatively high salinity is the likely reason aquatic insects were not found in any pools at Kealakehe. Though the rare damselfly *Megalagrion xanthomelas* has been observed and collected from Kaloko, a statewide assessment of its range has not found it to occur in water with salinity greater than 3ppt. However, there has been an unsubstantiated occurrence of the nymph in a pool of up to 8ppt (Polhemus, 1995).

Another species of concern is the hypogeal decapod shrimp *Metabetaeus lohena.* These shrimp are sometimes predatory on *H. rubra* but are more often opportunistic omnivores similar to *H. rubra.* Predusk and nocturnal sampling at high tide is clearly the optimal method to determine habitat range and population densities for this species. These shrimp were found in 13 of the 19 pools, 7 of which had *M. lohena* only at night. The occurrences of *H. rubra* were found in 16 of 19 sampled pools, 8 of which had 'Ōpae'ula observed only at night. Consequently, despite having numerous degraded anchialine resources at Kealakehe, there are opportunities for many of the pools to be restored and enhanced to a level where large populations of anchialine shrimp and other native species may return to inhabit the pools as they likely have in the past.

~~As mentioned earlier, the southern ponds also had elevated concentrations of nutrients indicating water quality degradation. These factors indicate that if no restoration or maintenance activities are instituted to reserve these ponds, these ecosystems will degrade beyond recovery.~~

~~3.9.3.2~~3.9.2.2 Anticipated Impacts and ~~Recommended~~ Proposed Mitigations

The anchialine ~~ponds~~ pools that are located north of the existing harbor are not likely to be impacted because no development activities are proposed north of the existing harbor. It is highly unlikely that existing groundwater flows to the Kaloko-Honokōhau pond system to the north of the existing harbor will be impacted by the proposed marina to the south.

Of the 19 pools in the southern complex, three would be eliminated due to harbor construction. Regarding the remaining pools, the DEIS noted that t~~T~~he change in the local groundwater flow pattern in the vicinity of the proposed marina ~~will~~ would impact the anchialine ~~ponds~~ pools that are located between the proposed marina and the shoreline south of the harbor entrance. The 2006 study (Appendix H-1) noted that t~~T~~he salinity of the anchialine ~~ponds~~ pools ~~will~~ would increase due to reduction of brackish groundwater, and that ~~. Some ponds will be excavated to make the new harbor basin. T~~those ~~ponds~~ pools that are not excavated will revert to full salinity, causing the loss of their habitat. ~~and associated aquatic flora and fauna. However, current investigations indicate that these ponds are already enriched by nutrients and the density of associated aquatic fauna is very low. In addition, trash from visitors, and introduction of minnows has already degraded the pond ecology.~~ Even without the potential impacts from the proposed marina construction, the pond ecology might change irreversibly from the nutrient input, human indifference and expansion of non native fauna species.

Further studies conducted in response to DEIS comments (Appendix H-2, and Appendix G-3) indicate that the remaining pools may not increase in salinity to levels unhealthy for *H. rubra* and *M. lohena* and other anchialine pool fauna. In addition, these studies determined that there are realistic mechanisms employed elsewhere that would mitigate changes due to groundwater changes. Waimea Water Services found that harbor construction would cut off some of the fresher ground-water flow. However, predicting the extent of change in flow is difficult if not impossible even with numerous boreholes and intense sampling. The actual flow of groundwater towards the sea is minimal today, and tidal measurements show that tide fluctuations represent more than 90 percent in actual harbor tides. The fluctuations occur simultaneous with the ocean/harbor tide, which indicate a vertical and horizontal pressure regime between bore hole 6 and the ocean and harbor. Hence, the tides alone create a mixing system that increases salinity, as the flow approaches the point of discharge which will be either the channel or the shore.

Another factor that could influence groundwater quality is the increased local recharge from irrigation between the channel and shore. This will add fresh water to the lens locally but is not quantified at this time.

Quantification of these impacts, including the flow of groundwater through each pond, is extremely difficult. The shallow lavas are of the pahoehoe type and have a relatively high horizontal permeability. In surface depressions or undulations, the pahoehoe lavas have a tendency to lose vertical permeability from sedimentation thus restricting water exchange within the individual pools. This is normally reflected in both the salinity and temperature and this information has been adequately studied in the pools.

Changes in groundwater quality may or may not impact biological communities in the anchialine and estuarine environment. In either case, it is important to understand these relationships to effectively manage the resource. If there is significant deviation from the baseline especially in regard to nutrients, pathogens, and toxins, a mitigation plan to determine the cause and take decisive appropriate action will be implemented. The mitigation plan will be based on the following objectives:

Objective 1 To preserve, maintain, and foster the long-term health and native ecological integrity of anchialine pools at Kealakehe.

Objective 2 To protect and promote cultural practices and traditions surrounding anchialine resources at Kealakehe.

Objective 3 To provide education, interpretation, and interactive opportunities for the community to learn about and appreciate the anchialine resources.

Objective 4 To acquire a pond manager to implement the program, conduct monitoring, research, and reporting, and provide education to the community about anchialine and estuarine resources.

Mitigation measures to facilitate the long-term health of the remaining anchialine pools will be based on environmental monitoring, which is vital as an early warning system to detect potential environmental degradation. A series of quantitative baseline analysis of the physio-chemical and biological components within the project site will provide a standard by which the effects of the development, anthropogenic activities, and natural phenomena on the environment can be measured. The framework for the mitigation plan will include three measures intended to meet these objectives, including bioretention, salinity adjustment and possible new pools.

As a mitigation measure, bioretention, which is a Best Management Practice (BMP) is a feasible application for the proposed development. There is a probability that nutrients and other potential pollutants will runoff landscaping and impermeable surfaces such as roadways and parking lots during medium or high rainfall events. Some of these pollutants could enter the groundwater table and into anchialine pools and ultimately the ocean. As an alternative to directing runoff into the ground through drywells, storm water should be directed into bioretention areas such as constructed surface or subsurface wetlands, vegetated filter strips, grass swales, and planted buffer areas. Storm water held and moved through these living filter systems are essentially stripped of most potential pollutants, and allowed to slowly infiltrate back to the groundwater table.

Bioretention is a Best Management Practice (BMP) that would be a highly appropriate application for the proposed development. Further, BMPs utilized in series may incorporate several storm water treatment mechanisms in a sequence to enhance the treatment of runoff. By combining structural and/or nonstructural treatment methods in series rather than singularly, raises the level and reliability of pollutant removal. Another means to reduce the potential for groundwater contamination is to increase soil depth above the standard in landscaped areas. This will allow chemicals to be held in the soils longer for more complete plant uptake and breakdown of these chemicals by soil microbes. A specific guide for chemical application by landscape maintenance personnel will be a beneficial tool to help avoid contamination of groundwater resources.

Another mitigation measure that may be included in the management plan is salinity adjustment. In the 2006 assessment regarding the impact to the southern pools from the proposed construction of the harbor, it was stated that this construction would cause the salinity in the anchialine pools to become equivalent to the ocean at 35ppt. It was then concluded that the anchialine biology would perish.

However, there is currently a level of uncertainty by professional hydrologists as to the exact movement of surface groundwater and a final determination of anchialine salinity following the harbor construction. The dynamics of groundwater movement through a porous lava medium both seaward and laterally along the coastline is an inexact science. This is compounded by the variations in water density, including stratification of salinity within the proposed harbor and capillary movement of low-density surface water through the substrata.

The assessment that all anchialine pools will be barren with the construction of the harbor may therefore be premature. *H. rubra* are routinely drawn from high salinity wells at 30 – 32 ppt and survive in this salinity for years. Further, high populations *H. rubra* and *M. lohena* have thrived and reproduced in pool salinities of 27ppt. If the pools do become full strength seawater at 35ppt, there exists uncertainty on the long-term effects to anchialine organisms, since there are no long-term studies or examples of native anchialine ecosystems at 35ppt. Native anchialine pool vegetation also has relatively high salinity tolerance.

If the salinity were expected to rise to 35 ppt, possible mitigation in the management plan will include methods to surcharge man-made anchialine pools created adjacent to or in the vicinity of natural pools with low salinity well water. If sufficient volume is used, it is theoretically possible to lower salinity in adjacent natural anchialine pools. This surcharge method has been successfully used to raise salinity in anchialine pools and cause the salinity rise in adjacent pools of at least up to 10 meters away. Surcharging with low salinity should work as well or better since the lower density water will essentially float atop the higher salinity water at the surface layer, and move throughout the complex of natural pools. Surcharging may also be a viable mitigation to dilute and more rapidly disperse any pollutants that may be detected in the pools.

Another mitigation measure includes the creation of new anchialine pools. There is significant opportunity to create new anchialine pools and greatly expand the native habitat and resource. It has been demonstrated at several projects in West Hawai'i that anchialine pools can be created and will be colonized with a full compliment of anchialine species endemic to the area. Anchialine pools are considered focal points of higher productivity relative to the subterranean groundwater habitat around them. Their productivity promotes an increase in population levels of anchialine species within the pools themselves and throughout the subterranean habitat surrounding them.

~~No realistic mechanisms are envisioned for re-injecting fresh water into these systems to maintain their ecological balance as an anchialine system. These ponds will be changed from a brackish water system to a marine system. But, those ponds in the area of the shoreline park and cultural park will be cleaned of vegetation and protected from other physical alteration. A buffer zone around these newly established marine ponds will be protected as well.~~

~~The anchialine pond shrimp (*Metabetaeus lohena)* and the orangeback damsel fly (*Megalagrion xanthomelas)* are listed as candidate endangered species in the Federal Register and were both recorded in surveys of these anchialine ponds done in 2004 by US Geological Survey Biological Resources Division and the NPS Inventory and Monitoring Program. Low numbers of *Metabetaeus lohena* were encountered in three of the 22 ponds surveyed in the southern pond complex. *Megalagrion xanthomelas* was not encountered in any of the southern pond complex ponds during the recent study. The low density of *Metabetaeus lohena* and the observed absence of *Megalagrion xanthomelas* may be due to the impacts from high nutrient input and general degradation of the ponds.~~

~~An attempt should be made to move as much of the existing population of *Metabetaeus lohena* from these anchialine ponds before they become too saline, to possible newly excavated ponds that may be developed off-site. These shrimp should not be introduced into existing populated ponds to avoid any potential pathogenic impacts to the healthy ponds.~~

~~Public education on the unique ecology of the anchialine ponds and the need for preserving their ecology will reduce future human impacts in other healthy ponds.~~

~~Further recommended mitigation includes restoration to degraded anchialine ponds off the project site, preferably those located at the adjacent Kaloko-Honokōhau National Historical Park.~~

Attachment 2

The increased level of fisheries knowledge has spawned an atmosphere of stewardship in the general charter-boat fishing community. With catch and release programs returning upwards of 40 percent of the Kona catch back to the ocean there is an obvious awareness that the value of catching the fish is often far greater than the value of selling it. It is ~~recommended~~ proposed that facilities and programs to foster continued stewardship, fisheries science, tracking of all fish catch, and educational programs be implemented in the design of the new marina facilities.

The proposed marina, marina support facilities, public marina promenade, fishing club, and marine science center will provide a venue for implementing the following efforts:

- Efforts to promote tag and release will be fostered through public education and the implementation of more "Catch and Release – Only" tournaments.
- Promote management through catch limits to possibly include slot weight catch limits, ~~ie.~~i.e. must tag & release animals between 250–950 pounds
- Promote various other stewardship measures relating to fisheries conservation.

~~3.9.5~~3.9.4 Marine Mammals and Sea Turtles

In addition to water quality, which is discussed in Section 3.9.1.3, other environmental impacts that may affect marine mammals and sea turtles include noise and vessel collisions. The following sections describe existing conditions, potential impacts and suggested mitigations to prevent negative impacts to marine mammals and sea turtles from noise and vessel collisions.

~~3.9.5.1~~3.9.4.1 ~~Existing Conditions~~Affected Environment

A number of marine mammal and turtle species are found in Hawaiian waters near the Kona Kai Ola project site. Detailed information on the abundance, behavior, threats to the species, hearing ability and vocalization data is provided for all species in Appendix S. Data on the most prevalent endangered species and species of particular interest are summarized here.

Humpback Whales: The population of h~~H~~umpback whales (*Megaptera novaeangliae*) around Hawai'i was estimated to be between ~~are mammals and belong to the baleen whale suborder, *mysticeti*. An estimated~~ 4,500-6,500 in 2000 ~~whales migrate between subpolar Alaska and Hawai'i each year~~ (Mobley et al 2001). The population growth rate between 1993 and 2000 is estimated to be seven percent indicating that the population is recovering from its dramatic reduction due to commercial whaling. It is worth noting that this is considered a high rate of increase for a mammalian species.

The highest densities of animals are found within the 100 fathom isobath. ~~and seek refuge in shallow waters close to shore.~~ Most humpbacks off Hawai'i are found north of Honokōhau in the waters of the Hawaiian Islands Humpback Whale National Marine Sanctuary. Nevertheless, they are commonly seen off Honokōhau in winter months. Humpbacks are not deep diving animals. Whales in Hawai'i typically dive to less than 100 feet, although occasional deeper dives are possible (Hamilton et al. 1997)The whales breed and give birth while in Hawai'i during the winter months, and migrate north to feed each spring.

~~Humpback whales found in Hawai'i's waters are part of a global population of Humpback whales that was reduced by over 250,000 individuals, or 90 percent, due to hunting (Johnson et al 1984). In 1966, the International Whaling Commission instituted a moratorium on all hunting of whales globally, and populations have begun to rebound. The North Pacific population of humpback whales, with a population of approximately 15,000 prior to hunting, is recovering from an estimated low of 1,000 individuals (Rice 1978, Johnson et al 1984). Humpback whales are also protected under the Federal Endangered Species Act. It is estimated that Hawai'i's population of Humpback whales is growing by 7% annually (Mobley et al 2001).~~

Congress designated the Hawaiian Islands Humpback Whale National Marine Sanctuary (HINMS) on November 4, 1992, and was followed by the Governor of Hawai'i's formal approval in 1997. The Sanctuary's purpose includes protecting humpback whales and their habitat within the Sanctuary, educating the public about the relationship of humpback whales to the Hawaiian Islands marine environment, managing the human uses of the Sanctuary, and providing for the identification of marine resources and ecosystems of national significance for possible inclusion in the Sanctuary. The sanctuary is approximately four nautical miles north of Honokōhau Harbor.

~~While waters surrounding the main Hawaiian islands constitute one of the world's most important North Pacific humpback whale habitats (Calambokidis et al. 1997), the Sanctuary actually encompasses five noncontiguous marine protected areas across the Main Hawaiian Islands, totaling 1370 square miles. Almost half of this area surrounds the islands of Maui, Lāna'i and Moloka'i. Smaller areas are designated on the North shore of Kaua'i, North and Southeast shores of O'ahu, and Hawai'i's Kona Coast. On Hawai'i's Kona Coast, the Sanctuary encompasses the entire northwest-facing coast, consisting of submerged lands and waters seaward of the shoreline to the 100-fathom (183 meter) isobath from 'Upolu Point southward to Keāhole Point, which is approximately four nautical miles north of Honokōhau Harbor.~~

Whales have very sensitive hearing, so any loud underwater sound has ~~may have~~ the potential to disturb these animals. ~~Vessel collisions are also a concern with whales.~~ Playback experiments have estimated that humpback whales will respond to biologically meaningful sound at levels as low as 102 dB re 1 µPa, a level that is similar to background ambient noise (Frankel et al. 1995). Increases in vessel numbers will lead to an increase in noise from operating boats. However, even at its greatest predicted increase, the median sound level from active boats is not expected to raise sound levels to an intensity that would be considered an impact (Level B take) to marine mammal population (See Appendices T-2 and T-3). Humpback whale song ranges from 20 Hz to over 10,000 Hz, with most acoustic energy typically concentrated in the 100-1000 Hz range. This vocal production and the anatomy of their inner ear indicate that these animals are most sensitive to low-frequency sound (Ketten 1992).

Numerous studies have shown that human activity can affect humpback whale behavior, including vessel activity (Bauer 1986; Norris 1994; Corkeron 1995; McCauley et al. 1996; Scheidat et al. 2004), oceanographic research (Frankel and Clark 2000; Frankel and Clark 2002), and sonar (Miller et al. 2000; Fristrup et al. 2003). If the humpback whale population continues to expand at its present rate (8%/year) it can be expected that greater numbers of whales will extend into waters off the Kona Coast. This is likely to increase the demand for whale watching vessels from the new harbor and this increase will have a negative impact on the whale population expansion. The increase in both the number of vessels and number of whales increases the chance for collisions.

Vessel collisions are also a major concern. The majority of whale strikes occur~~red~~ where whales and boats are most common, such as in ~~and boats watching are common as in~~ shallow waters between Lāna‘i and Maui. In a recent study, three of ~~conducted by NMFS on~~ 22 ~~27~~ recorded whale-vessel collisions ~~strikes~~ in the main Hawaiian Islands ~~, only two were recorded~~ occurred off the Kona coast. (Lammers et al. 2003). That study also found that 14 of the 22 collisions were reported between 1995 and 2003. This observed increase may result from more awareness of the issue, or from the greater number of both whales and vessels in Hawaiian waters. In Hawai‘i, data from 1972 to 1996 reveal at least six entanglements of humpback whales in commercial fishing equipment (Mazzuca et al. 1998). These data also indicate an increasing trend of entanglement since 1992 and a three-fold increase in death and entanglement occurrences related to human activity in 1996.

It is highly unlikely that humpback whales will approach to within the Level A or Level B impact “take” zones created by the explosive blasts of harbor construction. However, the sounds generated by these explosions will be within the frequency hearing range of humpback whales and could potentially be heard by whales between Kona and Maui. Modeling predicts that the maximum sound level two miles offshore the site is less than 150 dB re1 µPa, which is less than the threshold for Level B impacts. As the explosions are planned to occur daily for up to 9 months, the cumulative impact of this noise must be considered if construction is anticipated when whales are expected in the area (December 15 – March 30).~~In one instance, a fishing boat was pulling in a catch and was lifted by a whale. In the other instance, a whale was struck by a dive boat heading towards its diving spot.~~

Dolphins: A number of dolphin species are found in the waters near Honokōhau Harbor. Detailed information on all of these can be found in Appendix S. Spinner dolphins (*Stenella longirostris*) are regularly seen in shallow water and in close proximity to the project site. ~~Spinner dolphins (*Stenella longirostris*), often inhabit waters within Honokōhau Bay and at times intentionally congregate near the harbor channel to take advantage by bow-riding outgoing vessels. "Spinners" common name stems from their habit of leaping clear of the water and twirling in the air.~~ They are the smallest dolphins typically seen in Hawai‘i, with a mature size of 6 feet in length and 160 pounds.

Spinners school in pods of a few animals to ~~100~~ 180 or more, with pod sizes of 1-20 being most common (Östman-Lind et al. 2004). They ~~and show community behavior when~~ feed~~ing in~~ on mesopelagic fish, squid and shrimp in deep water at night, and rest in nearshore shallow waters during the day (Norris and Dohl 1980; Benoit-Bird et al. 2001). ~~when they come near shore to play and rest. On the Island of Hawai'i, Kealakekua Bay is one location of almost daily spinner visits, but they frequent many other bays along the coast and regularly rest in Honokōhau Bay.~~ There are seven primary resting areas along the Kona coast of Hawai'i, including Honokōhau Bay, where spinners are regularly seen near the harbor entrance (Östman-Lind et al. 2004). There is some evidence that the spinner dolphins may be resident to the area (Östman-Lind et al. 2004), making them more susceptible to repeated disturbance.

The hearing ability of spinner dolphins has not been measured. However, hearing of the related striped dolphin (*Stenella coeruleoalba*) was measured between 500 Hz and 160 kHz, with maximum sensitivity at 64 kHz (Kastelein et al. 2003). The hearing response of this single dolphin was less sensitive below 32 kHz than other dolphins. ~~As all marine mammals have very sensitive hearing, any loud underwater sounds have the potential to disturb dolphins as well. Given the sporting habit of spinners and other dolphins of bow-riding ships and small boat wakes, they are apparently not overtly impacted by vessel traffic noises.~~

Despite their limited sensitivity to low frequency sound, spinner dolphins have been shown to be impacted by human activity. Examples include interruption of resting activity and increases in the number of higher energy behaviors (Luna-Valiente and Bazúa-Durán 2006). Numerous studies describe changes in distribution (Haviland-Howell et al. in press) and short-term behavioral changes of dolphins in response to vessel traffic (Bejder et al. 1999; Scarpaci et al. 2000; Gregory and Rowden 2001; Nowacek et al. 2001; Van Parijs and Corkeron 2001; Ritter 2002; Lusseau 2003; Ng and Leung 2003). However, it has been established that for at least one population of bottlenose dolphins, these repeated short-term effects translate into long-term detrimental effects on the affected population (Bejder et al. 2006a; Bejder et al. 2006b).

In Hawai'i, some entanglements of spinner dolphins have been observed (Nitta and Henderson 1993; Rickards et al. 2001) but no estimate of annual human-caused mortality and serious injury is available. A habitat issue of increasing concern is the potential effect of swim-with-dolphin programs and other tourism activities focused on spinner dolphins around the main Hawaiian Islands (Östman-Lind et al. 2004).

Hawaiian Monk Seals: Endangered Hawaiian Monk Seals (*Monachus schauinslandi*, Hawaiian Name: 'Ilio holo I ka uaua) ~~are on the endangered species list . They~~ are rare, but not unknown along the Kona Coast. ~~Fortunately, monk seals are air breathing and spend the majority of their time above water where they are easily observed. If a monk seal is reported observed in the area, Kona Kai Ola would work with relevant agencies to protect the seal.~~ Most monk seals are found in the Northwest Hawaiian Islands, but recent aerial surveys estimated that there are 52 seals in the main Hawaiian Islands (Baker and Johanos 2004). There have been 13 sightings between 2003 and 2006 in the vicinity of Kaloko-Honokōhau National Historical Park (NOAA protected species division data) indicating regular, albeit low-level use of these areas by monk seals. ~~One~~Two birth on the Island of Hawai'i have~~s~~ been reported (Baker and Johanos 2004).

The best population estimates for Hawaiian monk seals (as of 2003) was 1,244 (Carretta et al. 2004). However the population is currently showing a decline that has been continuing since the 1950s (Antonelis et al. 2006).

Underwater hearing in the Hawaiian monk seal has been measured between 300 Hz to 40 kHz. Their most sensitive hearing is at 12 to 28 kHz, which is a narrower range compared to other phocids. Above 30 kHz, their hearing sensitivity drops markedly (Thomas et al. 1990).

Monk seals are very intolerant of human activity and are easily disturbed. When the U.S. military inhabited Sand Island and the Midway Islands and Kure Atoll, the monk seals disappeared until after the military left. Monk seals prefer to be solitary animals (Reeves et al., 2002).

Sea Turtles: Five species of sea turtles are known to frequent Hawaiian waters, with Hawaiian green sea turtles (*Chelonia mydas*) by far the most abundant at 97% of the total numbers, hawksbill turtles (*Eretmochelys imbricata*, 1.7% of total), olive ridley turtles (*Lepidochelys olivacea*, 0.8%), and occasional sightings of leatherback (*Dermochelys coriacea*) and loggerhead sea turtles (*Caretta caretta*, Chaloupka, et al, 2006, from stranding reports). Green sea turtles are the most plentiful large marine herbivore in the world and have experienced a very successful population recovery in Hawaiian waters since 1974 when harvest was outlawed in Hawai'~~i~~i, and 1978 when they became protected under the Endangered Species Act (Balazs, et al. 2004). Both green sea turtles and hawksbills are known to breed and nest on beaches within the main Hawaiian Islands, and have a 25-30 year generation time with a life span of 60-70 years (Balazs et al 2004). Total population numbers of green sea turtles in the Hawaiian archipelago have not been estimated, but the population has at least tripled since the 1970s and may now be approaching the carrying capacity of the islands (Chaloupka, et al. 2006).

Bartol et al. (1999) measured the hearing of juvenile loggerhead sea turtles using auditory evoked potentials to low-frequency tone bursts found the range of hearing to be from at least 250 to 750 Hz. The frequency range that was presented to the turtles was from 250 Hz to 1000 Hz (Bartol et al. 1999).

Most recently, Bartol and Ketten (2006) used auditory evoked potentials to determine the hearing capabilities of subadult green sea turtles and juvenile Kemp's ridleys. Subadult Hawaiian green sea turtles detected frequencies between 100 and 500 Hz, with their most sensitive hearing between 200 and 400 Hz. However, two juvenile green turtles tested in Maryland had a slightly expanded range of hearing when compared to the subadult greens tested in Hawai'i. These juveniles responded to sounds ranging from 100 to 800 Hz, with their most sensitive hearing range from 600 to 700 Hz. The two juvenile Kemp's ridleys had a more restricted range (100 to 500 Hz) with their most sensitive hearing falling between 100 and 200 Hz (Bartol and Ketten 2006).

Adult ~~G~~green turtles are primarily herbivorous often seen on reefs as deep as 100+ feet but much more common in shallower waters. Foraging behavior of green turtles is well documented and in Hawai‘i is typically characterized by numerous short dives (4 to 8 min) in shallow water (typically less than 3 m) with short surface intervals (less than 5 sec) (Rice et al. 1999).Resting periods are characterized by longer dives (over 20 min) in deeper water (4 to 40 m) with surface intervals averaging 2.8 min (Rice et al. 1999). The amount of time that turtles spend foraging versus resting is still largely unknown. Green turtles in Hawai‘i frequently use small caves and crevices in the sides of reefs as resting areas, and spend significant amounts of time on the tops of reefs (Balazs et al. 1987). Green turtles are known to be resident in Kiholo Bay, Hawai‘i (Balazs et al. 2000), and presumably other areas as well, potentially increasing their susceptibility to vessel collision and/or repeated disturbance. Two turtle “cleaning stations” have been reported near the mouth of Honokōhau Harbor. ~~During periods of calm water green sea turtles are often seen over very shallow reef flats where the choicest of algae are to be found. While some turtles may "rest" upon the surface, it is much more common to find them in small caves or wedged between coral heads where they are less subject to shark attacks. Green sea turtles may occasionally be seen far at sea (they nest in French Frigate Shoals in the NW Hawaiian Islands), but they are much more prevalent over the shallow shoreline areas where they forage for food.~~

Vessel collisions and potential noise impacts are a concern with regard to turtles. In a study of 3,861 turtle strandings in the main Hawaiian Islands from 1982 – 2003 (Chaloupka, et al. 2006), boat strikes accounted for only about 2.7 percent of the cases and were almost always fatal (95 percent). Entanglement in gill nets accounted for about six percent of strandings and also had a high rate of mortality (75 perce~~d~~nt). Hook and line entanglement (seven percent of strandings) was much less likely to result in the death of the turtle (52 percent mortality). At least 20 green sea turtles have stranded in Honokōhau Harbor or along the boundaries of Kaloko- Honokōhau National Historical Park. ~~Of all 3,861 strandings recorded in the Main Hawaiian Islands since 1982 only three occurred within 10 miles north or south of Honokōhau Harbor (Balazs, personal communication from NMFS database).~~

Recent increases in longline fisheries may be a serious source of mortality. Greens comprised 14% of the annual observed take of all species of turtles by the Hawai‘i-based longline fishery between 1990 to 1994 (NMFS 1998a). Over the period of 1994 to 1999, it was estimated that an annual average of 40 green sea turtles were caught by the Hawai‘i-based longline fishery (McCracken 2000).

Recent proliferation of a tumorous disease known as fibropapillomatosis (Herbst 1994) may reverse improvements in the status of the Hawaiian stock (NMFS 1998a), although recent modeling suggests that population levels continue to increase despite the disease (Chaloupka and Balazs 2005). The disease is characterized by grayish tumors of various sizes, particularly in the axial regions of the flippers and around the eyes. This debilitating condition can be fatal and neither a cause nor a cure has been identified.

Hawksbill turtles (Eretmochelys imbricate) are observed less often than green sea turtles near Honokōhau. About 20-30 female hawksbills nest annually in the Main Hawaiian Islands (NMFS 1998b). In 20 years of netting and hand-capturing turtles at numerous nearshore sites in Hawai‘i, only eight hawksbills (all immatures) have been encountered at capture sites including Kiholo Bay and Ka‘u (Hawai‘i), Palo‘ou (Moloka‘i) and Makaha (O‘ahu) (NMFS 1998b). It was only recently discovered that hawksbills appear to be specialist sponge carnivores (Meylan 1988). Previously they had been classified as opportunistic feeders on a wide variety of marine invertebrates and algae.

Increasing human populations and the concurrent destruction of habitat are also a major concern for the Pacific hawksbill populations (NMFS 1998b). Hawksbill turtles appear to be rarely caught in pelagic fisheries (McCracken, 2000). However, incidental catches of hawksbill turtles in Hawai‘i do occur, primarily in nearshore gillnets (NMFS 1998b). The primary threats to hawksbills in Hawai‘i are increased human presence, beach erosion and nest predation (*e.g.,* by mongooses) (NMFS 1998b).

~~3.9.5.2~~3.9.4.2 Anticipated Impacts and ~~Recommended~~ Proposed Mitigation

A complete analysis of the in-air and in-water potential acoustic impacts from the construction of the Kona Kai Ola small boat harbor was completed by Marine Acoustics, Inc.(MAI) and is included in this document as Appendix T-3. In conducting this analysis, the best available scientific, environmental, geologic, and meteorological data were obtained and used to calculate the acoustic transmission loss (TL) and subsequently to predict the received levels (RLs) at the five receiver sites. State of the art acoustic propagation models were employed in this analysis to determine in-air and in-water TL. MAI used the Acoustic Integration Model© (AIM©) to assess the impact of the predicted acoustic sound field on the species of marine mammals that could conceivably occur near the Kona Kai Ola project site.

The conclusion of that report determined that the criteria for Level A impacts to marine mammals for either in-air or in-water conditions at the receiver sites were never exceeded for the model source and receiver locations for non-blasting activities. However, these thresholds could be exceeded by the explosive blasting used to create the new harbor. For both in-air or in-water acoustic propagation, this only occurred when an animal was within about 200 meters (656 ft) of the explosion, This condition could only occur when the explosive source was at locations farthest north in the new harbor and closest to the existing harbor. This condition mandates that a safety range out to at least 200 meters (656 ft) of the source be shown to be clear of all marine mammals and sea turtle prior to each blast to preclude potential Level A takes.

The MAI report indicated that the in-air RLs for the explosive sources would exceed the assumed 100 dBA threshold for Level B harassment of pinnipeds (seals) for ranges out to about 0.4 nm (i.e., 800 yds [731 m]). This threshold is nominally for pinnipeds, but it should be extended to surface resting marine mammals and basking or beached sea turtles. Therefore, an in-air safety buffer of at least 731m from any explosive source is proposed, that should be maintained and found clear of marine mammals and basking or beached sea turtles prior to any blasts. It should be noted that although a receiver site was not modeled specifically in the existing harbor, that area is often within the range of this safety buffer and that extra care should be taken to ensure that no marine mammals or sea turtle are in the existing harbor prior to any blast. Analysis of the most restrictive Level B in-water explosive threshold shows that it is only exceeded when an animal is closer than 300 m (984 ft) from the explosive source.

Although the possibility exists for Level B impacts to marine mammals, based purely on the sound fields produced by the explosive blasts, analysis is the marine mammal distribution and movement as predicted by the AIM model, indicates that this is very unlikely situation. Therefore, it is expected that there will be much less than 0.5 Level B takes, with or without mitigation. But the mitigation safety buffer must still be enforced to preclude the unlikely possibility of marine mammals or sea turtle being near the explosive sources when they are used.

It should be recognized that several mitigation measures are already built into the proposed project. For example, the proposed practice to maintain a rock "dam" separating the construction site from the existing harbor reduces acoustic energy propagating to area potentially containing marine mammals or sea turtles. Also, this dam precludes animals from entering the construction area. This dam or land-bridge will be in place for all drilling and dredging activities, except for the removal of the land bridge itself.

Several other possible methods of mitigation are available to the Kona Kai Ola project, and feasibility, practicality, and benefit will be discussed with the National Marine Fisheries Service (NMFS) during consultation, and may be implemented subsequent to that consultation. The first possible mitigation technique is to acoustically monitor the potentially impacted areas during construction to: a) assess the accuracy of the modeling and b) to interact proactively with construction personnel to ensure that the identified threshold levels are not exceeded. Although the best available science and data was used to model the acoustics of the area, numerous conservative assumptions needed to be built into the modeling. By monitoring the actual levels received, in-situ corrections/updates to modeled parameters could potentially reduce the built--in conservativeness and reduce the potentially impacted areas. For example, the modeling assumes that all of the small voids in the bedrock are water-filled and therefore impart minimum attenuation on the acoustic signal as it propagates through. If even a small percentage of the voids are gas-filled, this attenuation would increase greatly and the impacted area would be reduced.

Another possible mitigation technique would be to augment the land-based visual observer, who it is assumed would verify that the area was clear the animals, with boat-based observers. This would increase the effectiveness of recognizing the presence of marine mammals and sea turtles in the potentially affected areas.

Additionally, interactions with the construction teams to alter the blasting methods modeled could potentially mitigate and reduce acoustic impacts to marine animals. A blasting expert will be consulted to develop a discontinuous non-linear blasting plan that will optimize cancellation of the explosion pressure wave into the marine environment. Examples of possible changes include: reducing charge size, reducing the depth drilled and blasted during any blast, reducing the number of blast holes or the volume of each blast, etc. The combination of these techniques with acoustic monitoring could potentially allow a large portion of the northern third of the harbor to be excavated with little or no potential impact to marine animals.

Interactions with NMFS during the consultation period will be used to examine these or any other techniques which may be identified. Also, the project is requesting help in identifying any possible method known to NMFS to establish and maintain turtle exclusion areas, especially in the existing harbor, without harassing the turtles. It may become apparent during those consultations that even with the identified buffer zones and mitigation techniques that an Incidental Harassment Authorization (IHA) is required, especially for the northern third of the proposed harbor.

Marine Acoustics, Inc. also completed a study of the expected ambient noise levels in Honokōhau Bay as a result of the increased vessel traffic from the expanded harbor. This report is included in this document as Appendix T-2. That report concluded that the average maximum daytime ambient noise levels would be expected to increase about 9.7 dB across the frequency spectrum from 100 Hz – 2 kHz, with the quadrupling of the vessels using the expanded harbor (i.e., the proposed action). Although significant, this increase would occur primarily during daylight hours, and the predicted median ambient noise would still be below 100 dB for all frequencies. The other significant factor is that there will be a quadrupling of the number of localized (i.e., small) individual sound fields in the area. These sound fields surround the individual boat that are contributing to the overall ambient noise. Noise levels in excess of 120 dB extend out to about 550 m (1804 ft) from these boats, with even high levels at closer ranges. Short of actual collisions with animals, Level A impacts are unlikely for noise levels typically generated by small boats. The Level B threshold nominally extends to approximately ten meters around each boat (depending on equipment such as size of motor, conditions of propeller and other equipment). Therefore potential Level B impacts to marine mammals and sea turtles would only occur within this range. Therefore, the chance for potential Level B impacts is small.

Completion of the harbor expansion project will increase the vessel traffic crossing the Hawaiian Islands Humpback Whale National Marine Sanctuary, the southern boundary of which is approximately four nautical miles north of Honokōhau Harbor. At a time when the whale population is growing, an increase of vessel traffic may increase the likelihood of vessel-whale collisions. Related to vessel traffic, an increase in whale watching activities is also likely. Vessels participating in these activities directly seek out higher whale population densities, increasing the likelihood of collisions, but also having the potential for disrupting whale behaviors such as resting, courting, mating or birthing.

As noted earlier, however, of the ~~27~~ 22 recorded whale strikes in the main Hawaiian Islands, only ~~two~~ three were recorded off the Kona coast. Sanctuary managers may need to implement additional regulations for private and/or commercial activities directly involving whale encounters. Mariner education programs, already in place as part of Sanctuary operations, will help to mitigate possible impacts due to increased boaters, and the proposed marine science center will complement Sanctuary educational programs.

~~Impacts to turtles may occur during construction of the marina. Since most of the marina will be excavated in a land-locked condition, turtles will not be subject to any potential harm from excavation. Experience during construction of the Ko Olina lagoons, and the expansion of the Barber's Point Harbor on O'ahu indicate that turtles abandoned their offshore (30-100 ft depth) resting habitats and concentrated in very near shore waters adjacent to the harbor and, at times, even within the active construction areas as soon as blasting and excavation began. Although no turtle injuries or mortalities were reported during either of those harbor construction activities, this should serve as a cautionary example for future coastal construction activities.~~

An increased level of impacts to turtles from increased boating and fishing activities may occur. ~~The level of impact documented by National Marine Fisheries Service is limited to only three turtle mortalities confirmed, since 1982, from a total of 3,861 strandings throughout the Main Hawaiian Islands~~. Of the 3,861 turtle strandings recorded from the Main Hawaiian Islands since 1982, 75% were mortalities, and of these about 4% (~est. 116, from Figure 3 of Chaloupka, et.al.) were from boat strikes and 3 of these occurred within 10 miles of Honokōhau Harbor. Data from NPS staff at the adjacent Kaloko-Honokōhau National Historical Park show a total of 20 strandings within the parking (19) and harbor (1) between 2000 and 2006 with one attributed to boat strike and 6 to fishing gear entanglement. Eleven additional gear entanglements and one additional boat strike were also recorded but not listed as strandings. Human caused impacts from fishing and boat strikes are anticipated to increase as turtle populations continue to increase and boating /fishing activities increase with the expanding harbor.

~~It would appear that anthropomorphic impact to turtles from boat strikes and fishing activities is very low along the Kona Coast adjacent to the existing harbor. It is likely that this is due in part to the relatively steep ocean bottom that limits the habitat of the turtles to the very nearshore areas away from the areas of heavy boat traffic~~. Recognition by the general public that sea turtles are protected ~~also~~ puts a heavy social pressure on fishermen who may inadvertently catch a sea turtle, and is likely a factor in the recovery of this species. Although no adverse impacts to turtles have been documented within the existing harbor, the close proximity of boats and turtles in this environment is cause for concern.

~~During land-based construction of the marina, no mitigation is necessary as previous experience has shown that turtles are not adversely impacted by these activities.~~ Once the land bridge is open, ~~however,~~ it is highly likely that turtles will be attracted into the new harbor and be subject to potential harm from in-water construction of piers or other facilities. During this period of time and until the harbor is operational, ~~it is recommended that a~~ mesh barrier will be ~~is~~ erected across the new harbor channel to exclude turtles from the inner basin. The mesh size needs to be selected in consultation with ~~regulatory~~ NMFS ~~agencies~~ to make sure it does not entangle turtles.

As the new harbor area will ~~likely~~possibly attract turtles to the basin (similar to the existing harbor) and an increase in boat traffic is expected in the harbor channel there will be an increased possibility of turtle strikes within the channel and new harbor area. To minimize this possibility it is ~~recommended~~ proposed that educational signs be erected around the harbor describing the turtles and warning boaters to be cautious while traversing harbor channels. The slow no-wake lane in the entrance channel should also be strictly enforced and the State should consider extending the slow no-wake zone further out to the first green buoy.

~~As all marine mammals have very sensitive hearing, any loud underwater sounds have the potential to disturb these creatures. Potential underwater acoustics may impact marine mammals and sea turtles during construction activities, such as blasting and pile driving. Appendix Q contains a study of underwater noise impacts during the construction and operation of the proposed project.~~

~~To mitigate impacts related to noise generated by construction activities, such as blasting and pile driving, a program to monitor sound levels and the presence of marine mammals and sea turtles will be implemented. Construction activities will be adjusted if whales, monk seals, dolphins or sea turtles are in the vicinity. Further, keeping the land bridge closed to the ocean until all major pile driving and blasting are completed will further avoid adverse impacts.~~

~~Increased boat traffic will result in increased low intensity sounds in the harbor area and along transit routes. The ecological role played by anthropomorphic sound in the marine environment has recently received heightened awareness. Evidence from declassified Department of Defense ocean recordings off of San Diego show that background sound levels off-shore of the harbor have increased approximately ten-fold in 30 years. Much of this increase in sound level has been ascribed to large ship traffic. While intense sound levels can adversely impact marine mammals and potentially other species, this level of sound pressure has not been shown to be produced by the small boats envisioned to occupy the new marina.~~

~~Adverse impacts of lower intensity noise, such as from small boat engines, have been very difficult to quantify. No definitive information is available to determine the level of impact produced by increase in small boat generated noise on fish, marine mammals and sea turtles. Given the sporting habit of spinners and other dolphins of bow-riding ships and small boat wakes, they are apparently not overtly impacted by vessel traffic noises.~~

~~However, boat-generated noises can be reduced by slowing boats to "slow-no-wake" in the main traffic lane of the entrance channel. The State could also consider extending the "slow-no-wake" lane out to the first green buoy. Appropriate signage to enforce these requirements is recommended.~~

~~3.9.6~~3.9.5 Ciguatera

Attachment 3

2 Alternatives Analysis

~~In typical land development projects, the initial planning process includes the exploration of alternatives to development objectives. In the EIS process, these alternatives are presented with a disclosure of reasons for the dismissal of non-preferred alternatives.~~

~~Kona Kai Ola does not follow this same pattern of alternatives evaluation.~~ As discussed in Section 1.4, the proposed Kona Kai Ola project is the result of agreements between JDI and the State DLNR and DHHL. The agreements and leases between the State and JDI stipulate the parameters of development for this site in terms of uses, quantities and size of many features, resulting in a limited range of land uses. Unlike a private property project, JDI is required to meet the criteria outlined in the agreements, thereby affording less flexibility in options and uses. From the developer's perspective, the agreements must also provide sufficient flexibility to allow for a development product that responds to market needs and provides a reasonable rate of return on the private investment.

The agreements between JDI and DLNR specify that the proposed harbor basin is to be 45 acres and accommodate 800 slips. This development proposal is the subject of this EIS. In response to DEIS comments, additional water quality studies and modeling were conducted. These studies determined that the water circulation in a 45-acre 800-slip marina would be insufficient to maintain the required standard of water quality. The models of water circulation suggest that a new 25-acre harbor basin could successfully maintain required water quality in the new harbor. Comments on the DEIS from DLNR, from other government agencies, the neighbors and the general community also called for the consideration of alternatives in the EIS, including a project with a smaller harbor basin and less density of hotel and time-share units.

In response to these comments on the DEIS, three alternatives are evaluated in this Final EIS and include Alternative 1, which is a plan with a 25-acre 400-slip harbor basin including a decrease in hotel and time-share units; Alternative 2, which is an alternative that had been previously discussed but not included in the proposed project, that includes an 800-slip harbor and a golf course; and Alternative 3, the no-project alternative. Each alternative is included in the EIS with an evaluation of their potential impacts. These project alternatives are presented to compare the levels of impacts and mitigation measures of the proposed project and alternative development schemes pursuant to requirements set forth in Chapter 343, HRS.

~~JDI is required to provide a new marina basin not less than 45 acres and a minimum of 800 new boat slips. Further, the agreements provide the following options for land uses at the project site:~~

- ~~Golf Course~~
- ~~Retail Commercial Facilities~~
- ~~Hotel Development Parcels~~
- ~~Marina Development Parcels~~
- ~~Community Benefit Development Parcels~~

~~JDI is not pursuing the golf course option and is proposing instead to create various water features throughout the project site. All other optional uses have been incorporated in Kona Kai Ola.~~

2.1 Project Alternatives

2.1.1 Alternative 1: 400-Slip Marina

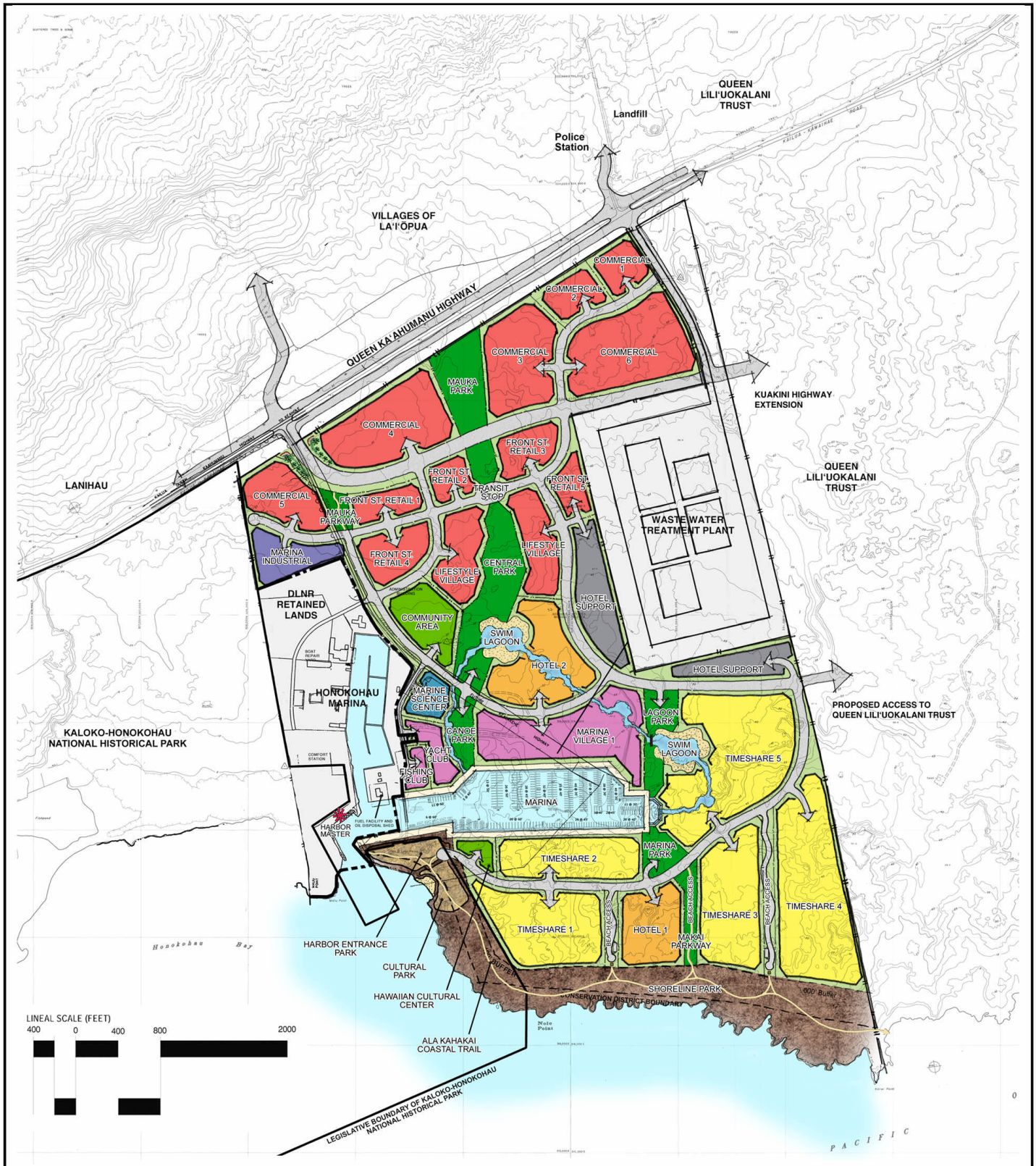
Studies conducted in response to DEIS comments found the construction and operation of an 800-slip marina may significantly impact the water quality within the marina and along the shoreline. Specifically, the Harbor Water Quality Modeling Study, as contained in Appendix U, found that the water circulation in a 45-acre 800-slip harbor was insufficient to maintain an acceptable level of water quality. Further, the existing harbor channel, which would serve both the existing and new harbors, could not adequately serve the increased boat traffic generated by an 800-slip marina during peak traffic. Mitigation measures to accommodate peak boat traffic included the widening of the existing channel, an action that would entail a complex process of Federal and State approvals and encounter significant environmental concern.

Concerns related to the proposed density of hotel and time-share units were also expressed in comments to the DEIS from members of the public, neighbors to the project site, especially the Kaniohale Community Association, and government agencies. Common themes in DEIS comments were related to impacts regarding traffic, project requirements of potable water and infrastructure systems, including sewer, drainage, utility and solid waste systems, and socioeconomic impacts.

In response to the water quality study results, and to the DEIS comments, an alternative plan was developed with a smaller marina with less boat slips, and a related decrease in hotel and time share units. Illustrated in Figure G, Alternative 1 reflects this lesser density project, and features a 400-slip marina encompassing 25 acres. For the purposes of the Alternative 1 analysis, JDI assumed 1,100 time-share units and 400 hotel rooms. Project components include:

- 400 hotel units on 34 acres
- 1,100 time-share units on 106 acres
- 143 acres of commercial uses
- 11 acres of marina support facilities
- 214 acres of parks, roads, open spaces, swim lagoons and community use areas

In addition, Alternative 1 would include the construction of a new intersection of Kealakehe Parkway with Queen Ka'ahumanu Highway, and the extension of Kealakehe Parkway to join Kuakini Highway to cross the lands of Queen Lili'uokalani Trust, and connecting with Kuakini Highway in Kailua-Kona. This is a significant off-site infrastructure improvement and is included in the agreements between the State and JDI.



Source: PBR HAWAII

Plan is conceptual only and subject to change

Figure G: Alternative 1: 400-Slip Marina

LEGEND

- TIME SHARE
- HOTEL
- RETAIL / COMMERCIAL
- MARINA RETAIL
- MARINA SUPPORT / COMMERCIAL
- MARINE SCIENCE CENTER
- COMMUNITY AREA / CULTURAL CENTER
- SWIM LAGOON
- MARINA
- UTILITIES
- PARKS & GREEN SPACE
- SHORELINE
- HARBOR ENTRANCE PARK / CULTURAL PARK

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Like the proposed project, Alternative 1 would have a strong ocean orientation, and project components that support this theme would include various water features including seawater lagoons and a marine science center. The new Alternative 1 harbor would include a yacht club, fishing club, a canoe park, and a cultural park with a focus on Hawaiian maritime cultural heritage of the voyaging canoe. The coastal area would be protected with a shoreline park with trails and public access parking for walking and shoreline fishing, and a cultural park surrounding the heiau, the cultural sites and 'Alula for community use. Additional Alternative 1 community areas would include facilities and space for community use, including programs of the Kona Kai Ola Community Foundation, which supports community programs in health care, culture, education, and employment training for the local community, especially to native Hawaiians. Like the original proposed plan, Alternative 1 includes 40 percent of the land in parks, roads, open spaces, swim lagoons and community use areas.

2.1.2 Alternative 2: Golf Course Feature

Alternative 2 was among the alternatives discussed at a community charrette in September 2003. It includes a golf course, which is a permitted use in the DLNR agreement and DHHL lease. As Figure H illustrates, an 18-hole championship golf course would occupy 222 acres on the southern portion of the project site. As with the proposed project, Alternative 2 includes an 800-slip marina on a minimum of 45 acres.

To support the economic viability of the project, other Alternative 2 uses include:

- Golf course clubhouse on three acres
- 1,570 visitor units on 88 acres fronting the marina
- 118 acres of commercial uses
- 23 acres of community uses

Community uses in Alternative 2 include an amphitheater, a canoe facilities park, a community health center, a Hawaiian cultural center and fishing village, a marine science center and employment training center. The sea water lagoon features contained in the proposed project and Alternative 1 are not included in this alternative.

2.1.3 Alternative 3: No Action

In Alternative 3, the project site would be left vacant, and the proposed marina, hotel and time-share facilities, commercial and marina industrial complexes, and community-oriented uses would not be realized.

~~The economic viability and sustainability of the project is determined by the density and uses proposed. Because JDI is obligated to develop an 800-slip marina for the State, complete road improvements, and provide various public enhancement features at its own expense, the density proposed for the income generating features of the development must be sufficient to provide an acceptable level of economic return for JDI. The market study, which is discussed in Section 4.6, reviewed various development schemes and determined that the currently proposed density and mix is the optimum to meet the anticipated financing and development cost obligations for the public features associated with the development.~~

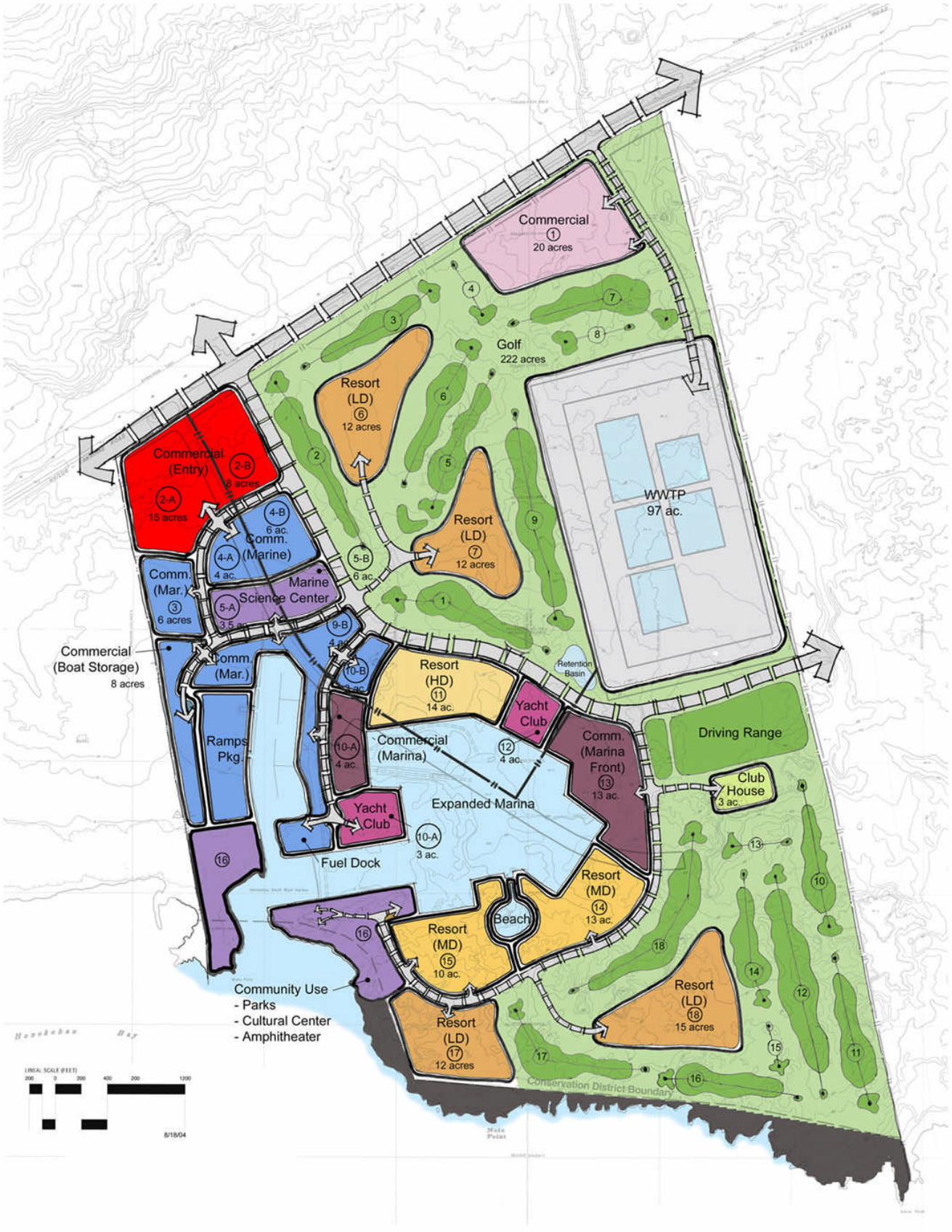

Figure H. Alternative 2: Golf Course Alternative

Legend

N E S W

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2.2 Alternatives Analysis

As discussed in Section 2.1, the proposed Kona Kai Ola project (also referred to as "proposed project") is defined by development requirements related for a marina and the related uses that would be needed to generate a reasonable rate of return that covers development costs.

Beginning with Section 2.2.1, the alternative development concepts are comparatively assessed for potential impacts that may reasonably be expected to result from each alternative. Following is an overview of the primary observations of such assessment.

Alternative 1 includes half of the State-required boat slips and 60 percent of the proposed hotel and time-share units and, due to the decreased density, this alternative would generate significantly less environmental and socio-economic impacts. A harbor water quality model found the reduction of the volume of the new marina basin by about half (approximately 25 acres) significantly improved the water circulation and quality. Further, the reduced number of boat slips would generate less boat traffic, thereby reducing congestion and the need to mitigate impacts further by the widening of the existing harbor channel.

A project with fewer hotel and time-share units and increased commercial space with a longer (14 years) absorption period would change the mix of employment offered by the project, and slightly increase the overall employment count. The public costs/benefits associated with Alternative 1 would change, compared to the proposed project, with a general increase in tax collections, and a general decrease in per capita costs. Detailed discussion of Alternative 1 potential economic impacts are provided in Section 4.6.6. Comparisons of levels of impact are presented throughout this FEIS.

While this analysis might indicate that the 25-acre marina in Alternative 1 would be the more prudent choice, the DLNR agreement establishes the minimum size and slip capacity of the marina at 45 acres and 800 slips, respectively. Amendments to the DLNR agreement would be required in order to allow Alternative 1 to proceed as the preferred alternative. Hence, selection of the preferred alternative is an unresolved issue at the writing of this FEIS.

Alternative 2, the golf course alternative, was not previously considered to be the preferred alternative primarily because market conditions at the time of project development might not likely support another golf course. Further, DHHL has a strategy goal to have more revenue-generating activities on the commercial lease lands within the project area. In addition, concerns have been expressed as to environmental impacts of coastal golf courses, including the potential adverse impact on Kona's water supply if potable water is used for golf course irrigation.

While Alternative 3, the no-project alternative, would not generate adverse impacts related to development of these lands associated with the construction and long-term operations, it would also not allow for an expanded public marina that would meet public need and generate income for the public sector. Further, the no-project alternative would foreclose the opportunity to create a master-planned State-initiated development that would result in increased tax revenue, recreation options and community facilities. Crucial privately-funded improvements, such as the marina, regional roadway and circulation improvements, and improvements to the existing wastewater treatment plant, would not be implemented. Private funds toward the development of community-oriented facilities such as parks, other recreational facilities, and public access would not be contributed.

~~Hence, the only valid alternative to the proposed project is the no-action alternative. In this alternative, the project site would be left vacant, and the proposed marina, hotel and time-share facilities, commercial and marina industrial complexes, and community-oriented uses would not be realized.~~

~~The no-project alternative would therefore not generate adverse impacts associated with the construction and long-term operations would not occur.~~

~~Likewise, the creation of a master-planned state-initiated development, resulting in increased employment, tax revenue, recreation options and community facilities, would not be created. Privately-funded improvements, such as the marina, regional roadway and circulation improvements, and improvements to the existing wastewater treatment plant, would not be implemented. Private funds toward the development of community-oriented facilities such as parks, other recreational facilities and public access would not be contributed.~~

Further, the creation of revenue-producing businesses on the DHHL property to fund homestead programs would not occur, resulting in fewer potential benefits for Hawaiians.

Hence, the agreements and leases between the State and JDI indicate that the no-action alternative is not in the public interest~~has been rejected at this time~~.

2.2.1 Impact Comparison

Grading and Excavation

The proposed project requires grading and excavation. Both actions may impact groundwater due to rainfall runoff during construction. Alternative 1 would require a significantly smaller excavation for the marina basin and would therefore carry a lesser risk of potential adverse effects on water quality. Alternative 2 would require the same basin excavation as the proposed project, and would also include extensive grading and filling to build the golf course, the latter of which would generate additional impacts. Alternative 3 would result in no change to the geography, topography and geology.

Further discussion on grading and excavation is contained in Section 3.3.

Natural Drainage

Most precipitation infiltrates into the porous ground at the site, and no significant sheet flow is likely. Alternative 1 would generate similar levels of impacts on natural drainage as those of the proposed project and thus require similar mitigation measures. The golf course in Alternative 2 would not be as porous since the site would be graded, soil would be placed, and grass and other landscaping would be grown. Sheet flow and runoff can occur on a golf course, and drainage patterns might change. Alternative 3 would result in no change to the existing natural drainage pattern. Further discussion on natural drainage is contained in Section 3.4.

Air Quality

Air quality will be affected by construction activities, as well as pollutants from vehicular, industrial, natural, and agricultural sources. Alternative 1 would generate less construction air quality impacts than the proposed project due to the reduced amount of intensive groundwork associated with the smaller marina basin and fewer long-term impacts by reducing traffic 35 and 40 percent during, respectively, AM and PM peak traffic times. Construction of Alternative 2 would result in fugitive dust and exhaust from equipment and is expected to generate the same level of air quality impact as the proposed project. Alternative 3 would result in no change to existing air quality. Further discussion on air quality is contained in Section 3.5.

Terrestrial Environment

To provide additional habitat for shorebirds and some visiting seabirds, the project proposes to construct a brackishwater pond area suitable for avian fauna, including stilts, coots and ducks. While habitat expansion is beneficial, there is also a possibility that these species may be exposed to activity that may harm them. Alternative 1 would not include a brackish water pond, but will include 5 acres of seawater features, which is 74 percent less than the 19 acres of seawater features in the proposed project. While this would reduce beneficial impacts, it would also decrease exposure to potentially harmful activity. Alternative 2 does not include the brackish water pond features, but would include drainage retention basins that would attract avian fauna and expose them to chemicals used to maintain golf course landscaping. While Alternative 3 would result in no increase in potentially harmful activity, it would also not provide additional habitat for avian fauna. Further discussion on the terrestrial environment is contained in Section 3.7.

Groundwater

Groundwater at the project site occurs as a thin basal brackish water lens. It is influenced by tides and varies in flow direction and salt content. The existing Honokōhau Harbor acts as a drainage point for local groundwater. Any impact to groundwater flow from the proposed harbor is likely to be localized. The proposed marina basin will not result in any significant increase in groundwater flow to the coastline, but rather a concentration and redirection of the existing flows to the harbor entrance.

There will be differences in the flow to the marina entrance between the proposed project and Alternative 1. Alternative 1, being smaller in size, will have less impact on groundwater flow than the proposed marina. Alternative 2 will have a similar impact to groundwater quality as the proposed project. Alternative 2 may also impact water quality by contributing nutrients and biocides to the groundwater from the golf course. Alternative 3 would result in no change in existing groundwater conditions. Further discussion on groundwater is contained in Section 3.8.1.

Surface Water

There are no significant natural freshwater streams or ponds at the site, but there are brackish anchialine pools. Surface water at the project site will be influenced by rainfall. Runoff typically percolates rapidly through the permeable ground. The proposed project will include some impermeable surfaces, which together with building roofs, will change runoff and seepage patterns.

Alternative 1 is a lower density project that is expected to have proportionally less impact on surface water and runoff patterns and less potential impact on water quality than the proposed project. Alternative 2 would have more impact on surface water quality than the proposed project due to fertilizers and biocides carried by runoff from the golf course. Alternative 3 would result in no change to surface water conditions. Further discussion on surface water is contained in Section 3.8.2.

Nearshore Environment and Coastal Waters

The potential adverse impacts to the marine environment from the proposed project are due to the construction of an 800-slip marina and the resulting inflow of higher salinity seawater and inadequate water circulation, both of which are anticipated to impair water quality to the extent of falling below applicable standards. One possible mitigation measure is to significantly reduce the size of the marina expansion.

The reduced marina size (from 45 to 25 acres) and reduced lagoon acreage in Alternative 1 are expected to result in a proportionate reduction in seawater discharging into the new harbor and increased water circulation. Alternative 2 includes the same marina basin size and is therefore subject to the same factors that are expected to adversely affect water quality.

In the existing Honokōhau Harbor, water quality issues focus on the potential for pollutants, sediments, mixing and discharge into the nearshore marine waters. Before the harbor was constructed, any pollutants entrained within the groundwater were believed to have been diffused over a broad coastline.

The water quality in the proposed harbor depends on several components. These include salinity, nutrients, and sediments that come from the ocean, rainfall runoff, water features with marine animals, and dust. The smaller project offered as Alternative 1 is expected to produce a reduced amount of pollutants and reduce the risk of adverse impact upon water quality.

It is notable that the 45-acre marina basin planned in the proposed project and Alternative 2 only becomes viable from a water quality impact standpoint if the additional brackish groundwater inflow into the new marina exceeds 60 mgd. The resulting flushing from such inflow would be expected to better maintain water quality. However, it is unclear whether 60 mgd of brackish groundwater would be available. As proposed in Alternative 1, reduction of the volume of the new marina basin by 45 percent will significantly improve the flushing and water quality because the lower volume can be flushed by the available groundwater flow.

In addition, there could be higher rainfall runoff from the Alternative 2 golf course into the harbor, because the grassed golf course will be less porous than the natural surface. The golf course will also require relatively high levels of fertilizer, biocides, and irrigation, all of which could contribute to adverse water quality impacts.

Further discussion on nearshore environment and coastal waters is contained in Section 3.9.1.

Anchialine Pools

Anchialine pools are located north of Honokōhau Harbor, and south of the harbor on the project site. The marine life in these pools is sensitive to groundwater quality, and changes due to construction and operation of the project could degrade the viability of the pool ecosystem. In the southern complex, 3 anchialine pools with a combined surface area of $20m^2$ would be eliminated due to the harbor construction in the proposed project and Alternatives 1 and 2.

Predicting the extent of change in groundwater flow is difficult if not impossible even with numerous boreholes and intense sampling. The actual flow of groundwater towards the sea is minimal today, and tidal measurements show that tide fluctuations represent more than 90 percent in actual harbor tides. The fluctuations occur simultaneous with the ocean/harbor tide, which indicate a vertical and horizontal pressure regime between bore hole 6 and the ocean and harbor. Hence, the tides alone create a mixing system that increases salinity, as the flow approaches the point of discharge which will be either the channel or the shore. Another factor that could influence groundwater quality is the increased local recharge from irrigation between the channel and shore. This will add fresh water to the lens locally but is not quantified at this time.

Quantification of these impacts, including the flow of groundwater through each pond, is therefore extremely difficult. The shallow lavas are of the pahoehoe type and have a relatively high horizontal permeability. In surface depressions or undulations, the pahoehoe lavas have a tendency to lose vertical permeability from sedimentation thus restricting water exchange within the individual pools. This is normally reflected in both the salinity and temperature and this information has been adequately studied in the pools.

Changes in groundwater quality may or may not impact biological communities in the anchialine and estuarine environment. In either case, it is important to understand these relationships to effectively manage the resource. If there is significant deviation from the baseline especially in regard to nutrients, pathogens, and toxins, a mitigation plan to determine the cause and take decisive appropriate action will be implemented.

Due to the uncertainty of changes in groundwater flow and quality due to marina construction, the variability in impacts between the proposed project and Alternatives 1 and 2 is unknown at this time. Alternative 3 would result in no change in groundwater flow. While this would eliminate the potential for adverse impacts, Alternative 3 would also continue the pattern of existing degradation related to human activity and the introduction of alien species. Further discussion on anchialine pools is contained in Section 3.9.2.

Marine Fishing Impacts

The proposed marina will increase the number of boats in the area and it is reasonable to assume that a portion of these new boats will engage in fishing activities. The increase in boats in the area would be primarily related to the marlin and tuna / pelagic fishery, coral reefs due to extractive fisheries, and SCUBA activities. The pressure on fish and invertebrate stocks is expected to increase with or without the marina. Harbor expansion provides the opportunity to address existing conditions to consolidate, focus, and fund management and enforcement activities at one location.

Compared to the proposed project, Alternative 1 would result in a 21 percent decrease in boat traffic, thereby lessening the potential for marine fishing impacts. The level of impacts in Alternative 2 would be similar to that of the proposed project. Alternative 3 would result in no change in existing marine fishing conditions, and no opportunity to address already existing pressure on fish and invertebrate stocks. Further discussion on marine fishing impacts is contained in Section 3.9.3.

Cultural and Archaeological Resources

The proposed project will integrate cultural and archaeological resources in the overall development. Archaeological sites recommended for preservation will be preserved, and cultural practices will be encouraged. Kona Kai Ola includes a canoe park, and a cultural park with a focus on Hawaiian maritime cultural heritage of the voyaging canoe. Proposed is a 400-foot shoreline setback that would serve as a buffer between the ocean and developed areas. This coastal area would be protected with a shoreline park with trails and public access parking for walking and shoreline fishing, and a cultural park surrounding the heiau, the cultural sites and ʻAlula for community use.

Alternative 1 would contain all of the cultural archaeological features and the shoreline setback area would be 400 feet in the northern portion of the site and increase to 600 feet in the southern portion. Alternative 2 would preserve cultural and archaeological resources, but does not include a 400-foot shoreline setback. Alternative 3 would result in no change to existing cultural and archaeological resources and no addition of cultural and community facilities and activities. Further discussion on cultural and archaeological resources is contained in, respectively, Sections 4.1 and 4.2.

Noise

Project-generated noise is due to construction equipment and blasting, boats, marina activities, vehicle traffic, and the Kealakehe Wastewater Treatment Plant operations. Alternative 1 would generate less noise impacts due to reduced construction activities, fewer boats, less traffic and less on-site activity. Alternative 2 would also generate less noise due to reduced traffic and less on-site activity, but noise related to the excavation of the marina basin and an increase in the number of boats would be similar to that of the proposed project. Further discussion on noise impacts is presented in Section 4.4.

Socioeconomic Impacts

The proposed project will generate an increase in de facto population of an estimated 5,321 persons due to the increase in hotel and time-share units. The estimated de facto population increase in Alternative 1 is 37 percent less, at 3,363 persons, than the proposed project. The de facto population increase in Alternative 2 is similar to Alternative 1.

Employment in the commercial components will nearly double in Alternative 1, from a stabilized level of 1,429 full-time equivalent (FTE) positions in the proposed project to 2,740 in the Alternative 1.

Under Alternative 1, the total operating economic activity at Kona Kai Ola will increase due to the added commercial space more than off-setting the fewer visitor units, moving upward from $557.6 million per year to circa $814.3 million annually. The total base economic impact resulting from development and operation of Alternative 1 will similarly be higher by between 35 and 45 percent than that of the proposed project.

Alternative 1, which has a reduced marina size of 25 acres, and fewer hotel and time-share units, would have a meaningful market standing, create significant economic opportunities, and provide a net benefit to State and County revenues. From a market perspective, a smaller Kona Kai Ola would still be the only mixed use community in the Keahole to Kailua-Kona Corridor offering competitive hotel and time-share product.

The estimated absorption periods for marketable components of Alternative 1 are generally shorter than those for the same components in the proposed project. Marina slips under Alternative 1 are estimated to be absorbed within 2 years after groundbreaking, as compared with 9 years for absorption of slips in the proposed project. Hotel rooms under Alternative 1 are estimated to be absorbed within 4 years after groundbreaking, as compared with 7 years under the proposed project. Time-share units would be absorbed within 10 years under Alternative 1, while 15 years are projected under the proposed project. Due to the planned increase in commercial facilities under Alternative 1, the absorption period of commercial space is estimated at 14 years, as compared with 8 years for absorption of such facilities under the proposed project.

The State and County will still both receive a net benefit (tax receipts relative to public expenditures) annually on a stabilized basis under the Alternative 1. The County net benefits will be some $12.2 million per year under the Alternative 1 versus $14.9 million under the proposed project. The State net benefits will increase under the Alternative 1 to about $37.5 million annually, up substantially from the $11.4 million in the proposed project.

Due to the lower de facto population at build-out, the effective stabilized public costs for both the State and County will decline meaningfully under the Alternative 1, dropping from $7.7 million annually for the County and $36.5 million for the State, to $4.9 million and $23 million per year, respectively.

Alternative 3 would result in no increase in de facto population and improvement to economic conditions. Further discussion on social and economic impacts are contained in, respectively, Sections 4.5 and 4.6.

Vehicular Traffic

The proposed project will impact the nearby road network that currently is congested during peak traffic times. The proposed project includes roadway improvements that would reduce the impact and improve roadway conditions for the regional community.

Alternative 1 includes the same roadway system improvements as the proposed project, yet would reduce vehicular traffic by 35 percent when compared to the proposed project. Alternative 2 would have similar traffic conditions and roadway improvements as Alternative 1. Alternative 3 would result in no increase in traffic and no roadway improvements.

Marina Traffic Study

The increase in boat traffic due to the proposed 800-slip marina would cause entrance channel congestion during varying combinations of existing and new marina peak traffic flow. Worst case conditions of active sport fishing weekend and summer holiday recreational traffic result in traffic volumes exceeding capacity over a short afternoon period. Mitigation to address boat traffic in the proposed project include widening the entrance channel, traffic control, implementation of a permanent traffic control tower, or limiting vessel size.

Alternative 1 would result in a 21 percent reduction in boat traffic congestion under average existing conditions and ten percent reduction during peak existing conditions. The reduction to 400 slips also reduces the impacts of congestion at the entrance channel, thereby reducing the need for any modifications to the entrance channel.

Alternative 2 would have the same level of boat traffic as the proposed project. Alternative 3 would not meet the demand for additional boat slips and would not generate additional boat traffic. Further discussion on marina traffic is contained in Section 4.8.

Police, Fire and Medical Services

The proposed project will impact police, fire and medical services due to an increase in de facto population and increased on-site activity. Alternatives 1 and 2 would have similar levels of impact as the proposed project due to increased on-site activity. Further discussion on police, fire and medical services are contained, respectively, in Sections 4.10.1, 4.10.2 and 4.10.3.

Drainage and Storm Water Facilities

The proposed project will increase drainage flows, quantities, velocities, erosion, and sediment runoff.

Alternative 1 involves a reduction of the project density that would reduce storm runoff from the various land uses due to a reduction in impervious surfaces associated with hotel and time-share development and to the creation of more open space. However, roadway areas will increase by about 30 percent in Alternative 1. Storm runoff from proposed streets would therefore increase; thus requiring additional drainage facilities and possibly resulting in no net savings. The golf course in Alternative 2 may also change drainage characteristics from those of the proposed project and may not reduce impacts. Alternative 3 would result in no change in existing conditions and no improvements to drainage infrastructure. Further discussion on drainage and storm water facilities is contained in Section 4.10.5

Wastewater Facilities

The proposed development is located within the service area of the Kealakehe WWTP and a sewer system will be installed that connects to the WWTP. The sewer system will be comprised of a network of gravity sewers, force mains, and pumping stations which collect and convey wastewater to the existing Kealakehe WWTP. Project improvements will incorporate the usage of recycled / R1 water. Improvements implemented by the proposed project will also accommodate the needs of the regional service population.

Alternative 1 would generate approximately 10 percent less wastewater flow than the proposed project. Wastewater flow in Alternative 2 is undetermined. Alternative 3 would result in no additional flow, as well as no improvements that will benefit the regional community. Further discussion on wastewater facilities is contained in Section 4.10.6.

Potable Water Facilities

The proposed project average daily water demand is estimated at 1.76 million gallons per day. Existing County sources are not adequate to meet this demand and source development is required. The developer is working with DLNR and two wells have been identified that will produce a sustainable yield that will serve the project. These wells will also serve water needs beyond the project.

Alternative 1 would result in net decrease of about five percent of potable water demand. Alternative 2 may have a lower water demand than the proposed project as long as potable water is not used for irrigation. Alternative 3 would result in no additional flow, as well as no source development that will benefit the regional community. Further discussion on potable water facilities is contained in Section 4.10.8.

Energy and Communications

Regarding Alternative 1, preliminary estimates for electrical, telecommunications, and cable resulted in a net demand load that remains similar to the proposed project. Further discussion on energy and communications is contained in Section 4.10.9.1.

The proposed project will increase the demand for electrical energy and telecommunications. The demand would be reduced in Alternative 1 because the number of boat slips and units would decrease. Similarly, Alternative 2 would have fewer units than the proposed project and therefore reduce energy demands. Further reduction in energy demand for either alternative could be achieved by using seawater air conditioning (SWAC) and other energy reduction measures, as planned by the developer. Further discussion on energy and telecommunications is contained in Section 4.10.9.2.

Water Features and Lagoons

The proposed project includes a brackishwater pond, lagoons, and marine life exhibits supplied by clean seawater. The water features in Alternative 1 would significantly decrease by 74 percent from 19 acres in the proposed project to five acres in Alternative 1. This decrease in water features would result in a corresponding decrease in water source requirements and seawater discharge. Alternative 2 does not include the seawater features. Alternative 3 would result in no additional demand for water source requirements and seawater discharge.

2.2.2 Conformance with Public Plans and Policies

State of Hawai'i

Chapter 343, Hawai'i Revised Statutes

Compliance with this chapter is effected, as described in Section 5.1.1 in regard to the proposed project and the alternatives discussed.

- State Land Use Law, Chapter 205, Hawai'i Revised Statutes

  The discussion in Section 5.1.2 is directly applicable to Alternative 1, the proposed project. Alternative 1 will involve a setback of 400 feet that increases to 600 feet along the southern portion of the project site's shoreline area. Alternative 2 does not provide for such a setback, but may still require approvals from DLNR for cultural, recreational, and community uses and structures within the Conservation district.

- Coastal Zone Management Program, Chapter 205A, Hawai'i Revised Statutes

  Recreational Resources:

  In addition to the discussion of consistency with the associated objective and policies, as described in Section 5.1.3, the reduction from the proposed project's 800-slip marina to a 400-slip marina under Alternative 1 will still expand the region's boating opportunities and support facilities. The existing harbor entrance will still be utilized under this alternative; however, potential risks relating to boat traffic and congestion in the marina entrance area will be reduced significantly. The 400-600 foot shoreline setback, public parks, trails, cultural areas, community facilities, and marine science center remain important recreational components under Alternative 1.

Alternative 2 includes a golf course component, which would add a more passive recreation to the active and social components, such as boating, fishing, swimming, trails, walkways, parks, marine life, educational and interactive areas that are also part of the project. The golf course would enhance the range of leisure and recreational opportunities offered at Kona Kai Ola.

Alternative 2, like the proposed project, will expand the region's boating opportunities and support facilities through its 800-slip marina. However, the potential adverse impacts of increased boat traffic from the size of the marina are significant enough to offset the benefits of increased boating opportunities.

Coastal Ecosystems:

The discussion in Section 5.1.3 is directly applicable to Alternative 1.

Alternative 1 not only reduces the number of slips proposed by 50 percent, but it also reduces the size of the marina from 45 acres to 25 acres. The 25-acre marina will increase the body of water within the existing harbor, but to a significantly lesser extent than the proposed project's estimated increase, which is also applicable to the 45-acre size that is proposed for the marina under Alternative 2.

The findings of the Harbor Water Quality Modeling Study conclude that a reduction in the size of the harbor expansion is an alternative that will mitigate the risk of significant impacts upon water quality within the marina and existing harbor. Accordingly, the reduction in both the number of slips and the size of the marina basin under Alternative 1, in combination with proper facilities design, public education, and enforcement of harbor rules and regulations, would result in fewer long-term impacts to water quality and coastal ecosystems. Short-term (construction-related) impacts would likely remain the same although the reduction in the total acreage of excavation is expected to result in a shorter duration of such impacts.

In addition to its 800-slip marina and potential adverse impacts upon water quality and the marine environment, Alternative 2 includes a golf course component, which has the potential to impact coastal ecosystems by increasing the nutrient loading in surface runoff and groundwater and also by introducing pesticides, herbicides, and other chemicals common in golf course use and management into the nearshore waters surrounding the project site.

Economic Uses

Although reduced in the number of slips, the smaller marina under Alternative 1 will nevertheless serve public demand for more boating facilities in West Hawai'i and is consistent with the objective and policies and discussion set forth in Section 5.1.3. The economic impacts of Alternative 2, while comparable to those of the proposed project's marina development, are notably marginal as to the golf course component, based on the marketability analysis that indicates a condition of saturation within the region.

Coastal Hazards

The discussion and considerations set forth in Section 5.1.3 are also applicable to Alternatives 1 and 2 and indicate compliance with the objective and policies addressed. Tsunami risks mainly affect the large shoreline setback area that is proposed for the project and Alternative 1. Alternative 2 projects a transient accommodation site that is partially within the tsunami hazard zone and thus carries a higher hazard risk. However, the essential requirement for these alternatives, as well as the proposed project, is a well-prepared and properly implemented evacuation plan.

Beach Protection

Discussion and considerations set forth in Section 5.1.3 are also applicable to Alternatives 1 and 2 and indicate compliance with the objective and policies addressed. Alternative 1 and, to a lesser extent, Alternative 2, will retain the shoreline area in its natural condition.

Similar to the proposed project, Alternative 1 provides for a shoreline setback of considerable width within which no structure, except for possible culturally-related structures, would be allowed. Alternatives 1 and 2 will thus be designed to avoid erosion of structures and minimize interference with natural shoreline processes.

Marine Resources

The discussion in Section 5.1.3 is also applicable to Alternative 1 which is described to be an alternative that is specifically projected to mitigate anticipated adverse impacts on water quality and the marine environment that might otherwise result from the original harbor design and scale, which is also incorporated in Alternative 2 . The reduced marina size under Alternative 1 is projected to meet water quality standards and enable greater compliance with the objective and policies addressed in this section.

Alternative 2 includes a golf course component and thus the potential to adversely impact marine resources by increasing the nutrient loading in surface runoff and groundwater and also by introducing pesticides, herbicides, and other chemicals common in golf course use and management into the nearshore waters surrounding the project site.

Hawai'i State Plans, Chapter 226, Hawai'i Revised Statutes

Section 226-4 (State goals), 5 (Objectives and policies for population, and 6 (Objective and policies for economy in general):

The discussion in Section 5.1.4 is applicable to Alternatives 1 and 2, in addition to the proposed project. These development concepts generally conform to the goals, objectives, and policies set forth in these sections because they will provide some degree of economic viability, stability, and sustainability for future generations. Kona Kai Ola will convert essentially vacant land into a mixed-use development with a distinctive marina and boating element, providing a wide range of recreational, business, and employment opportunities to the community.

Section 226-8 Objective and policies for the economy – the visitor industry:

Alternatives 1 and 2 will be consistent with the State's economic objective and policies relating to the tourism industry for the same reasons that are discussed in regard to the proposed project in Section 5.1.4. They will incorporate JDI's commitment to sustainability principles in the planning and design of the development concepts in Alternatives 1 and 2. Although the total hotel and time-share unit count is reduced to approximately 1,500 in Alternatives 1 and 2, the transient accommodations component of these alternatives will still further the State's objective and policies for increased visitor industry employment opportunities and training, foster better visitor understanding of Hawai'i's cultural values, and contribute to the synergism of this mixed-use project concept that addresses the needs of the neighboring community, as well as the visitor industry.

Section 226-11 Objectives and policies for the physical environment: land-based, shoreline and marine resources:

Alternative 1 is expected to involve less potential adverse impacts upon these environmental resources than the proposed project. Likewise, and Alternative 2 would have less adverse impact because of its reduction in the size of the marina and in the total hotel and time-share unit count. Alternative 1 carries less potential risk to water quality and related impacts upon the marine environment and anchialine pool ecosystems. Although approximately three anchialine pools are expected to be destroyed, the great majority of pools will be preserved within and outside of the proposed 400-foot shoreline setback.

The golf course component in Alternative 2 has the potential to impact marine resources by increasing the nutrient loading in surface runoff and groundwater and also by introducing pesticides, herbicides, and other chemicals common in golf course use and management into the marina basin and nearshore waters surrounding the project site. It also has the potential to adversely affect the anchialine pools by introducing the chemicals into the pond systems.

Section 226-12 Objective and policies for the physical environment: scenic, natural beauty, and historic resources:

The discussion in Section 5.1.4 is directly applicable to Alternative 1 and describes the compliance with the objective and policies addressed.

The golf course component of Alternative 2 would create a park-like view that would potentially enhance the beauty of the project site and surrounding areas when considered in combination with the existing rugged natural beauty of the area.

Just as with the proposed project, Alternatives 1 and 2 would also be designed to blend with the natural terrain and to honor and protect the cultural history, resources, and practices of these lands.

Section 226-13 Objectives and policies for the physical environment: land, air and water quality:

As stated above, because of the reduction in both the number of slips and the size of the marina basin, with proper facilities design, public education and enforcement of harbor rules and regulations, Alternative 1 is anticipated to cause fewer long-term impacts to water quality than either the proposed project or Alternative 2. Based on the findings of the Harbor Water Quality Modeling Study, water quality resulting from a reduced marina basin size as proposed under Alternative 1 is expected to be similar to existing conditions.

As previously noted, Alternative 2 has the potential to adversely impact water quality by increasing the nutrient loading in surface runoff and groundwater by introducing pesticides, herbicides and other chemicals common in golf course development and maintenance into the marina basin and nearshore waters surrounding the project site.

Section 226-14 Objectives and policies for facility systems - general:

Alternatives 1 and 2 will conform to the objective and policies of this section on the grounds that are discussed in regard to the proposed project in Section 5.1.4. The master-planning and phasing of the project concepts under these alternatives will be coordinated with associated public and private infrastructural planning and related private and public infrastructural financing. The cost of the marina construction and project-related infrastructure is to be borne by the developer, resulting in considerable savings for the public. In addition, the projected lease revenue from these public lands will provide additional public benefits by establishing a revenue stream for capital improvements and maintenance of a range of State facilities.

Section 226-15 Objectives and policies for facility systems - solid and liquid wastes:

In addition to the developer's commitment to sustainable development design, the project will involve upgrades to the County of Hawai'i's Kealakehe Wastewater Treatment Plant to meet current needs, as well as the project's future needs. This commitment is applicable to Alternatives 1 and 2, as well as the proposed project that is discussed in Section 5.1.4.

Section 226-16 Objectives and policies for facility systems – water:

The discussion of water conservation methods and the need to secure additional potable water sources in Section 5.1.4 is also applicable to Alternative 1 and demonstrates conformity to the objective and policies for water facilities. Alternative 2 involves greater irrigation demands in regard to its golf course component and greater potable water demands for human consumption than those for Alternative 1. Alternative 2 is expected to face more serious challenges in securing adequate and reliable sources of water.

Section 229-17 Objectives and policies for facility systems – transportation:

Alternatives 1 and 2 will conform to this objective and policies because they will present water transportation opportunities, including the possible use of transit water shuttles to Kailua-Kona, as described in regard to the proposed project in Section 5.1.4.

Section 226-18 Objectives and policies for facility systems – energy:

Alternatives 1 and 2 conform to these objective and policies through the use of energy efficient design and technology and commitment to the use and production of renewable energy to serve the project's needs. Solar energy production, solar hot water heating, and the use of deep cold seawater for cooling systems are currently identified as means of saving substantial electrical energy costs for the community and the developer.

Section 226-23 Objectives and policies for socio-cultural advancement – leisure:

Alternative 1 conforms to this objective and related policies for the reasons offered in Section 5.1.4 in regard to the proposed project. Alternative 1 will be of greater conformity with the policy regarding access to significant natural and cultural resources in light of the 400-600 foot shoreline setback that has been designed for this alternative.

Although it does not propose the considerable shoreline setback that is planned for Alternative 1, Alternative 2 is consistent with this objective and related policies in incorporating opportunities for shoreline-oriented activities, such as the walking trails. In addition, the golf course component adds a more passive recreation alternative to the active and social components, such as boating, fishing, swimming, trails, walkways, parks, marine life educational and interactive areas that are also part of the project. The golf course would enhance the range of leisure and recreational opportunities offered at Kona Kai Ola.

Section 226-25 Objectives and policies for socio-cultural advancement-culture:

The discussion in Section 5.1.4 is relevant to Alternatives 1 and 2 and demonstrate their conformity the objective and policies of this section.

Both alternatives involve the preservation and protection of cultural features that have been identified by the Cultural Impact Assessment and archaeological studies for the project area. Both provide for public shoreline access, and both will continue the policy of close consultation with the local Hawaiian community and cultural and lineal descendants in the planning of cultural resource preservation and protection.

Section 226-103 Economic priority guidelines:

Alternatives 1 and 2 conform to these guidelines for the same reasons that are set forth in Section 5.1.4. They involve private investment in a public project that will create economic diversification through a mix of marina, industrial, commercial, visitor, and cultural facilities. This presents a wide range of entrepreneurial opportunities, long-term employment opportunities, and job training opportunities.

Section 226-104 Population growth and land resources priority guidelines:

As described in Section 5.1.4, the policy support for the proposed project also extends to the similar development concepts considered in Alternatives 1 and 2. Those alternatives conform to the guidelines of this section because they involve an urban development under parameters and within geographical bounds that are supported by the County's General Plan, a preliminary form of the Kona Community Development Plan, the County's Keahole to Kailua Regional Development Plan, and the reality of being located along the primary commercial/industrial corridor between Keahole Airport and Kailua-Kona. As with the proposed project, the development concepts of Alternatives 1 and 2 are essentially alternatives for the implementation and "in-filling" of the urban expansion area in North Kona.

DHHL Hawai'i Island Plan

This 2002 plan projects DHHL's Honokōhau makai lands for commercial use. As compared to the proposed project and Alternative 2, Alternative 1 presents an expanded commercial component that provides greater compliance with the plan, while addressing certain beneficiaries' concerns about the scale of the marina originally required in the Project. Alternative 2 also conforms to the recommended commercial uses in the makai lands but to a lesser degree than Alternative 1 because of its more limited commercial component. Like the proposed project, its marina size and number of slips raise environmental issues, as more specifically discussed in Part 3, and community concerns.

County of Hawai'i General Plan

HCGP Section 4 – Environmental Quality Goals, Policies and Courses of Action:

Alternative 1 is consistent with this section. It presents a reduction in both the number of slips and the size of the marina basin that, in combination with proper facilities design, public education and enforcement of harbor rules and regulations, would result in very few long term impacts to water quality. Based on the findings of the Harbor Water Quality Modeling Study, water quality would remain similar to existing conditions.

Alternative 2 is the least consistent with this section. In addition to the potential significant impacts of its 800 slip marina basin, its golf course component has the potential to adversely impact marine resources by increasing the nutrient loading in surface runoff and groundwater and also by introducing pesticides, herbicides and other chemicals common in golf course use and management into the nearshore waters surrounding the project site. It also has the potential to adversely affect the anchialine pools beyond their current conditions by introducing such substances into the pool systems.

HCGP Section 7 – Natural Beauty Goals and Policies:

Alternative 2 conforms to some degree with this section. Its golf course component would create a park-like view that would potentially enhance the beauty of the project site and surrounding areas when considered in combination with the existing rugged natural beauty of the area, as demonstrated in other makai golf courses within the region.

HCGP Section 8 – Natural Resources and Shoreline:

Alternative 1 is most consistent with the goals and policies of this section. It would require considerably less marina excavation than the proposed project and Alternative 2 and would reduce the potential risk of long-term adverse impacts to water quality. Based on the findings of the Harbor Water Quality Modeling Study, water quality would remain similar to existing conditions with the degree of reduction in marina basin size that is proposed under Alternative 1. This reduction is also expected to reduce potential impacts upon anchialine pools and their ecosytems, as well as shoreline and marine resources that are affected by water quality. Alternative 1 also retains the shoreline preservation and protection concepts that are proposed in and described for the Project.

HCGP Section 10 – Public Facilities Goals and Policies:

The discussion in Section 5.2.1. in relation to the proposed project is applicable to Alternatives 1 and 2. Improvements to public facilities are are integral to the Kona Kai Ola development. The provision of additional boat slips and numerous road improvements, including a makai extension of Kuakini Highway south to Kailua-Kona are incorporated into plans for the project's development. In light of these elements, Alternatives 1 and 2 are consistent with the goals and policies of this section.

HCGP Section 11 – Public Utility Goals, Policies:

As with the proposed project, Alternatives 1 and 2 are consistent with the goals and policies of this section, based on the relevant grounds set forth in Section 5.2.1. The developer is committed to design, fund, and develop environmentally sensitive and energy efficient utility systems to the extent possible, as described previously in Part 5. Its master planning provides for the coordinated development of such systems with the objective of achieving significant savings for the public. As previously-mentioned example, the project development involves the upgrading of the Kealakehe Wastewater Treatment Plant.

HCGP Section 12 – Recreation:

Alternative 1 is consistent with the goals, policies, and courses of action for North Kona in this section.

Although the number of slips is reduced under Alternative 1, the region's boating opportunities and support facilities will still be expanded. The existing marina entrance would still be utilized under this alternative. However, concerns relating to increased activity leading to increased congestion in the marina entrance area would be mitigated to a certain extent. The 400-600 foot shoreline setback, public parks, trails, cultural areas, community facilities and marine science center remain important components of Alternative 1.

The golf course component of Alternative 2 would add a more passive recreation to the active and social components, such as boating, fishing, swimming, trails, walkways, parks, marine life, educational and interactive areas that are also part of the project. The golf course would enhance the range of leisure and recreational opportunities offered at Kona Kai Ola. Alternative 2 is also considered to be consistent with this section.

HCGP Section 13 and 13.2 – Transportation:

The reduced marina component under Alternative 1 will still provide transportation opportunities and provide for possible use of transit water shuttles to Kailua-Kona, although to a lesser degree than under the proposed project and Alternative 2 . However, in each scenario, internal people-movers are planned, and numerous roadway improvements are planned for coordination with public agencies, including but not limited to the construction of the Kuakini Highway extension between Honokōhau and Kailua-Kona. Accordingly, both Alternatives 1 and 2 are consistent with the goals, policies, and courses of action for North Kona under these sections of the General Plan.

HCGP Section 14.3 – Commercial Development:

For the reasons presented in the discussion under Section 226-104 of the State Plan, the planned commercial component under Alternatives 1 and 2 are consistent with this section.

HCGP Section 14.8 – Open Space:

Alternatives 1 and 2 are consistent with the goals and policies of this section. Alternative 1 provides a considerable (400-600 foot) shoreline setback along the entire ocean frontage of the project site as a means of protecting the area's scenic and open space resources, as well as natural and cultural resources. Although it does not incorporate the shoreline setback planned in Alternative 1, Alternative 2 provides a golf course component would contribute to the amount of open space that is currently proposed and allow additional view corridors to be created.

Community Development Plans

Community development plans are being formulated for different regions in the County in order to supplement the County's General Plan. The Kona Kai Ola project is located in the Kona Community Development Plan (CDP) area. Maps associated with the preliminary work phases

of the Kona CDP include the Kona Kai Ola project site within the "Preferred Urban Growth" boundary of the North Kona district. The Kona CDP process is guided by a Steering Committee composed of a broad cross-section of the community. The Steering Committee will eventually complete its work and recommend the CDP's adoption.

After the DEIS was published, the Kona CDP has progressed to the development of plans for the major urban growth corridor north of Kailua-Kona. The Kona CDP has produced a draft plan showing a transit oriented development that includes a midlevel public transit corridor along the mauka residential elevation, and a makai transit corridor that runs along a proposed new frontage road just makai and parallel to Queen Kaahumanu Highway. The development plan for Alternative 1 includes the Kuakini Highway as part of this proposed frontage road and transit line from Kailua Kona to the Kealakehe area, along with a transit stop at Kona Kai Ola. The Alternative 1 plan also includes a road that could be extended to be part of the proposed frontage road should it be approved and implemented. In addition, the Kona CDP has continued to emphasize the principles of smart growth planning with mixed use urban areas where people can live, work, play and learn in the same region. Kona Kai Ola has been specifically designed to be consistent with this policy in order to provide a stable employment base close to where people live in the mauka residential areas already planned for DHHL and HHFDC lands.

It should be noted that currently and over the years, the 1990 Keāhole to Kailua Development Plan (K-to-K Plan) guides land use actions by the public and private sectors. It is intended to carry out the General Plan goals and policies related to the development of the portion of North Kona area, including the Kona Kai Ola site. The "Preferred Growth Plan" of the Keāhole to Kailua Development Plan identifies the project site as a new regional urban center to include commercial, civic, and financial business related uses, an expanded "Harbor Complex," a shoreline road, and a shoreline park. The proposed project and the development concepts in Alternatives 1 and 2 are therefore consistent with the recommendations in the Keāhole to Kailua Development Plan.

Hawai'i County Zoning

As shown on Figure AA, the project site is zoned "Open". Under Section 25-5-160 of the Hawai'i County Code, "The O (Open) district applies to areas that contribute to the general welfare, the full enjoyment, or the economic well-being of open land type use which has been established, or is proposed. The object of this district is to encourage development around it such as a golf course and park, and to protect investments which have been or shall be made in reliance upon the retention of such open type use, to buffer an otherwise incompatible land use or district, to preserve a valuable scenic vista or an area of special historical significance, or to protect and preserve submerged land, fishing ponds, and lakes (natural or artificial tide lands)".

Some of the proposed uses at Kona Kai Ola are permitted uses in the Open zone such as:

- Heiau, historical areas, structures, and monuments;
- Natural features, phenomena, and vistas as tourist attractions;
- Private recreational uses involving no aboveground structure except dressing rooms and comfort stations;

- Public parks;
- Public uses and structures, as permitted under Section 25-4-11.

In addition to those uses permitted outright, the following uses are permitted after issuance of a use permit:

- Yacht harbors and boating facilities; provided that the use, in its entirety, is compatible with the stated purpose of the O district.
- Uses considered directly accessory to the uses permitted in this section shall also be permitted in the O district.

The proposed time-share and hotel units and commercial uses would not be consistent with the zoning designation of "Open". Project implementation therefore requires rezoning of portions of the project to the appropriate zoning category or use permits for certain uses.

Special Management Area

As shown in Figure AB, the entire project area up to the highway is within the coastal zone management zone known as the Special Management Area ("SMA"). At the County level, implementation of the CZM Program is through the review and administering of the SMA permit regulations. Kona Kai Ola complies with and implements the objectives and policies of the Coastal Zone Management (CZM) Program, and a full discussion is provided in Section 5.1.3. The development concepts in the proposed project and Alternatives 1 and 2 will be subject to applicable SMA rules and regulations.

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February 1, 2007

Dayan Vithanage
Oceanit
Oceanit Center
828 Fort Street Mall, 6th Floor
Honolulu HI 96813

Dear Dayan Vithanage,

I am writing regarding the proposed **Kona Kai Ola** development being put forth by Jacoby Development, Inc., in regards to Tax Map Keys: 7-4-008:071-072 , 7-4-008:003 (portion) and 7-4-008:099. I DO NOT support the project for a variety of reasons including:

- **The project does not fit with the Hawai`i County General Plan (GP).**
- **The project does not fit into the Kona Community Development Plan (CDP) process nor community vision for the proposed development area.** The community wants to protect coastal property (in particular, the targeted area) as public open space and is of the opinion that building hotels (especially near the coastline) is not advisable. This plan is not supported by the community.
- **Kona's severe lack of infrastructure** was recently addressed by the County Council passing a moratorium-type resolution "no rezoning until infrastructure catches up with existing and already-approved development" which could likely be followed by an ordinance to that effect. The Kona Kai Ola development proposal will only add to infrastructure problems and is not in agreement with the County Council's moratorium resolution. Hawaii County's administration has come out against the proposed development.
- **Traffic** is a huge problem in the area and the DEIS study admits that this and other roadways will be overburdened by added construction traffic from the time construction begins**.** Why should Kona residents sacrifice their time and quality of life by sitting in traffic, experiencing toxic air pollution, excessive noise, runoff, death of wildlife, for decades in order for Jacoby to maximize its profits on this public land**?**
- **This plan is developer-generated**. "Smart growth" is community-generated built on a model of balanced, future land use. Communities like Kona are burdened with unplanned, piecemeal, developer-generated growth.
- The development is not truly sustainable as it purports to be.

There are environmental, safety, loss of open space, coastal degradation and increased urbanization issues regarding the proposed harbor expansion and near shore development, which cannot be mitigated, as admitted by the developer on page 159 of the DEIS**.** According to the DEIS, Jacoby's plan relies heavily on the help of public money and personnel to protect the natural resources which it admits will otherwise be ruined by its development. Accepting unwanted private development is not the only alternative to maintaining facilities and protecting resources. Developments such as this invite only well-heeled boaters at the expense of the local fishing and general community. In Governor Lingle's 2007 State of the State address she stated that Hawaii needs to move away from an economy based on land development, due to the limited amount of land here in our island state and move toward an economy based on high technology. Approving this development flies in the face of what Governor Lingle and the Kona community desire for their community. It would be unethical to allow commercial use and development to override public interest.

Sincerely,

Kim Murphy

Kim Murphy PO Box 492232, Kea'au, HI 96749

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PO Box 498232
Kea'au HI 96749

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oceanit
innovation through engineering & scientific excellence

July 23, 2007

Kim Murphy
P.O. Box 492232
Kea'au, Hawai'i 96749

Dear Ms. Murphy:

Subject: Kona Kai Ola Draft Environmental Impact Statement
Response to Your Comments Dated February 1, 2007

Thank you for your comments on the Kona Kai Ola Draft Environmental Impact Statement. Our responses are based on the order of your bulleted points, which are italicized.

- *The project does not fit with the Hawai'i County General Plan*

  Response:

  We disagree with this statement. In December 2005, the County Planning Director proposed that the DLNR portion of the Kona Kai Ola project that was designated "Open" in the 2005 General Plan, be amended to "Urban Expansion Area." On November 29, 2006, the Hawai'i County Council approved this amendment.

  Kona Kai Ola is consistent with the Urban Expansion Area designation. The agreement between the developer and the State identifies hotel and time-share uses as possible development at Kona Kai Ola. The project is not a resort. A resort is a concept in which visitors are attracted to spend most, if not all, of their stay within the resort area through the design of amenities that fulfill the needs of a particular visitor market segment. This self-containment is achieved to varying degrees in resort development, depending on the natural, historic/cultural, and recreational resources within a resort site and the intended scale of the resort.

  State and County laws recognize this distinction between a "resort" and a "hotel" or "time-share unit." Section 514E-5, Hawai'i Revised Statutes, authorizes time-share units to be located in a resort area or any other area in which a county may by ordinance allow a hotel unit. The Hawai'i County Code correspondingly permits hotels and time-share units in non-resort zoning districts. The proposed project may include up to 700 hotel units and 1,803 time-share units, and depending on the eventual location of these project components, rezoning may be required for implementation.

- *The project does not fit into the Kona Community Development Plan (CDP) process nor community vision for the proposed development area.*

Oceanit Center 828 Fort Street Mall, Suite 600 Honolulu, Hawaii 96813 Phone: 808.531.3017 Fax: 808.531.3177
www.oceanit.com

Response:

Since the DEIS was published, JDI has considered alternatives to the proposed project. Alternative 1, which is discussed below, is consistent with the current draft of the Kona CDP and the community vision for the proposed development area.

As explained in the DEIS, the agreement between JDI and the State of Hawai'i established a required scope and scale of the project for which the impact analysis was provided. Several comments have addressed the fact that alternatives other than the No Project Alternative were not addressed in the DEIS Section 2, Alternatives Analysis.

Kona Kai Ola is of the position that alternative actions other than a No Project alternative are not currently feasible without an amendment to the agreement with the State. Agency and public comments in response to the DEIS, as well as additional information generated as a result of inquiry into issues raised by the comments, have been helpful in identifying alternative actions that will serve the State's goal of providing additional marina slips for the Kona area. These alternative actions also serve to reduce or mitigate anticipated effects of the proposed development.

Thus, agencies such as the Land Division of the Department of Land and Natural Resources, the U.S. Department of the Interior Fish and Wildlife Service, the Planning Department of the County of Hawai'i, and the Office of Environmental Quality Control (OEQC), as well as community organizations have commented that a reduced scale marina and related facilities should be considered. The OEQC has also asked that the alternative of a reduced scale project be evaluated under the assumption that DHHL may determine that a downsized project would be preferred.

In response to these comments on the DEIS and in consideration of measures to mitigate anticipated impacts, the EIS Section 2, Alternatives Analysis, has been revised to describe the following alternatives, which are discussed in more detail in the EIS:

- Alternative 1 is a project involving a 400-slip marina, 400 hotel units, 1,100 time share-units, and commercial and support facilities. This alternative would enhance water quality and avoid the need to widen the existing harbor entrance channel, as well as reduce traffic and socioeconomic impacts.
- Alternative 2 is an alternative that had been previously discussed, but not included in the proposed project that includes an 800-slip harbor and a golf course.
- Alternative 3 is the no-action alternative.

A comparison between impacts related to the proposed project concept and impacts related to Alternative 1 indicates that a reduction in the acreage and number of slips in the marina, as well as the reduction in hotel and time-share units, would generate less environmental, social and economic impacts. Although positive economic impacts would be reduced, Alternative 1 can be

considered as a preferable alternative because of reduced environmental impacts. However, while it can be concluded that the 25-acre marina in Alternative 1 would be the preferred size, the DLNR agreement establishes the size of the marina at 45 acres and 800 slips. An amendment to the DLNR agreement is required in order to allow Alternative 1 to proceed. Hence, selection of Alternative 1 is an unresolved issue at this time. The additional EIS text that includes the added EIS Section 2, Alternative Analysis, is contained in Attachment 1 of this letter.

Since the DEIS was published, the Kona CDP has progressed to the development of plans for the major urban growth corridor north of Kailua-Kona. The Kona CDP has produced a draft plan showing a transit oriented development that includes a midlevel public transit corridor along the mauka residential elevation, and a makai transit corridor that runs along a proposed new frontage road just makai and parallel to Queen Ka'ahumanu Highway.

To make sure that Kona Kai Ola is consistent with this new Kona CDP transit oriented plan, Alternative 1 was prepared and includes the Kuakini Highway as part of this proposed frontage road and transit line from Kailua Kona to the Kealakehe area, along with a transit stop at Kona Kai Ola. The Alternative 1 plan also includes a road that could be extended to be part of the proposed frontage road should it be approved and implemented.

In addition, the Kona CDP has continued to emphasize the principles of smart growth planning with mixed use urban areas where people can live, work, play and learn in the same region. Kona Kai Ola has been specifically designed to be consistent with this policy in order to provide a stable employment base close to where people live in the mauka residential areas already planned for DHHL and HHFDC lands.

- *Kona's severe lack of infrastructure was recently addressed by the County Council passing a moratorium-type resolution "no rezoning until infrastructure catches up with existing and already-approved development" which could likely be followed by an ordinance to that effect. The Kona Kai Ola development proposal will only add to the infrastructure problems and is not in agreement with the County Council's moratorium resolution. Hawai'i County's administration has come out against the proposed development.*

  Response: Your statement and question are based on several inaccuracies, and we hereby discuss each one.

  Kona Kai Ola includes crucial privately-funded infrastructure improvements, such as the marina, regional roadway and circulation improvements, and improvements to the existing wastewater treatment plant.

  The proposed marina will improve the water transportation system by increasing the number of boat slips and expand marina-related facilities. This will meet a public demand that already exists.

  The roadway system will also be improved beyond mitigation for project-related impacts. In Phase 1 of the project, JDI will not only provide access to the commercial parcel, but also address regional traffic issues through the

improvements of the roadway system. JDI plans to improve the intersection of the Queen Ka'ahumanu Highway and the Kealakehe WWTP Access Road. The Kealakehe WWTP Access Road is planned to be realigned and widened to an 80-foot road right-of-way (ROW) that will serve the Commercial Parcel No. 1 and eventually intersect with the proposed Kuakini Highway Extension to the west. Such improvements will ensure that the project minimizes its own impacts while improving existing conditions. Further, with development of Kona Kai Ola, the Kuakini Highway extension road is anticipated to be built on a more accelerated schedule than would occur without the Kona Kai Ola project.

The anticipated infrastructure improvements to the wastewater treatment plant are anticipated to actually improve the health and safety of the community by improving an older facility up to meet higher operational standards. All structures will be built to current building and safety codes, while access to the shore and around the site will be improved.

We further note that the project has 15-year implementation time frame, which will allow for timely improvements to the overall infrastructure systems.

- *Traffic is a huge problem in the area and the DEIS study admits that this and other roadways will be overburdened by added construction traffic from the time construction begins. Why should Kona residents sacrifice their time and quality of life by sitting in traffic, experiencing toxic air pollution, excessive noise, runoff, death of wildlife, for decades in order for Jacoby to maximize its profits on this land?*

  Response:

  The DEIS study does not "admit[s] that this and other roadways will be overburdened by added construction traffic from the time construction begins." Rather in Section 7. Relationship between Short Term Uses of the Environment and the Maintenance of Long Term Productivity, the DEIS states that "Construction traffic would increase during work hours as cut material from the new harbor is transported if needed off-site. . . Due to the scope of the project, the anticipated phasing of the project encompasses a 15 year build-out. Most of the heavy grading, earth movement, marina construction and the majority of the infrastructure improvements will most likely be completed during the beginning of the build-out."

  Regarding your statement about residents "sitting in traffic," the roadway system will be improved beyond mitigation for project-related impacts and will improve existing conditions. Further, with development of Kona Kai Ola, the Kuakini Highway extension road is anticipated to be built on a more accelerated schedule than would occur without the Kona Kai Ola project.

  The term "toxic air pollution" is inaccurate. The Air Quality Impact Study finds that the project will have short and long term air quality impacts and that impacts will either be mitigated or within State and national air quality standards. Mitigation measures during the construction phase will be employed based on an effective dust control plan. Further, all construction activities will comply with State Air Pollution Control regulations and the provisions of Section 11-60.1-33, HAR. All grading operations will be conducted in full compliance with dust and

erosion control requirements of the County of Hawai'i's Grading Ordinance. After construction of the project, implementation of air quality mitigation measures for long-term traffic impacts are not needed, as projected emissions are expected to remain within both state and national air quality standards.

The term "excessive noise" is inaccurate. It is not expected that construction-related project-generated noise will impact adjacent properties as they are mostly vacant or industrial. The only areas that may be affected are the Honokōhau Harbor users and the Fishing Club located south of Kealakehe Parkway. Commercial, hotel and time-share buildings completed in the initial phases may also be affected by construction noise due to subsequent phases as they are in very close proximity to the construction site.

Construction blasting, if required for the new marina, could produce noise impacts. However, blasting at construction sites near populated areas is usually accomplished by using numerous small charges detonated with small time delays. Blast mats can also be used to assist in directing the explosive energy into the rock, controlling flying debris, and muffling the noise. With the appropriate blast design techniques, the noise from blasting can be controlled to minimize noise impacts. In cases where construction noise exceeds, or is expected to exceed, the State's "maximum permissible" property line noise levels, a permit will be obtained from the State DOH to allow the operation of vehicles, cranes, construction equipment, power tools, etc., which emit noise levels in excess of the "maximum permissible" levels.

Regarding runoff, as discussed in EIS Section 4.10.5, Drainage and Storm Water Facilities, the proposed project will increase the proportion of impervious surfaces on the subject property through paving and reconfigure the topography, thereby adding to total runoff. Roadways in the new developed configuration will be dedicated to the County of Hawai'i, so the storm drainage system will be required to conform to the Department of Public Works Storm Drainage Standards. Mitigation measures to address runoff impacts include the use of drywells, which will require an Underground Injection Well Permit from the Department of Health, Safe Drinking Water Branch, and recommendations from a hydrogeologist will be sought to assist with the design of the drywell system.

Further, bioretention, which is a Best Management Practice (BMP), will be utilized in series to incorporate several storm water treatment mechanisms in a sequence to enhance the treatment of runoff. By combining structural and/or nonstructural treatment methods in series rather than singularly, the level and reliability of pollutant removal is raised. Another means to reduce the potential for groundwater contamination is to increase soil depth above the standard in landscaped areas. This will allow chemicals to be held in the soils longer for more complete plant uptake and breakdown of these chemicals by soil microbes. A specific guide for chemical application by landscape maintenance personnel will be a beneficial tool to help avoid contamination of groundwater resources.

The "death of wildlife" is a misleading statement. The Fauna Impact Study, as summarized in EIS Section 7, found that it is not expected that the development of the proposed Kona Kai Ola property will have significant impacts on native avian or mammalian resources present within the North Kona District. Further, Kona Kai Ola will provide additional habitat for shorebirds and some visiting

seabirds through the establishment of a brackish water pond area suitable for avian fauna, including stilts, coots and ducks. This is a positive impact and water features will constitute a managed ecosystem that will protect these species.

Finally, the project is not intended for JDI to "maximize its profits on this land." Kona Kai Ola will be funded by private investment and will generate a reasonable rate of return. The project will result in crucial privately-funded improvements, such as the marina, regional roadway and circulation improvements, and improvements to the existing wastewater treatment plant. Private funds will also be used in the development of community-oriented facilities such as parks, other recreational facilities and public access.

- *This plan is developer-generated. "Smart growth" is community generated built on a model of balanced, future land use. Communities like Kona are burdened with unplanned, piecemeal, developer-generated growth.*

  Response: Your definition of smart growth is inconsistent with generally accepted smart growth principles, which are outlined by the Smart Growth Network (http://www.smartgrowth.org/). Smart growth recognizes connections between development and quality of life. It leverages new growth to improve the community. Smart growth principles that are applicable to Kona Kai Ola are as follows:

  - Create walkable neighborhoods: Kona Kai Ola will be a walkable development. The development will be easily navigable on-foot or on a bike, and will include numerous walking and biking trails linking site features.
  - Encourage community and stakeholder collaboration: From November 2005 through June 2007, over 920 Big Island community members have participated in Kona Kai Ola presentations. Community input gathered from these presentations and facilitated by JDI's smart growth expertise, has shaped the vision for Kona Kai Ola.
  - Make development decisions predictable, fair and cost effective: The EIS documents provide full disclosure of project impacts and mitigation, as well as phasing and implementation time frame. This information provides a predictable scenario for what will happen at Kona Kai Ola in the future. Further, the project represents a fair and cost effective use of public lands that will infuse private investment into the community while meeting public needs. DLNR and DHHL will both receive monthly lease rents and a percentage of revenues from the Kona Kai Ola project.
  - Mix land uses: The vision for Kona Kai Ola is an environmentally sustainable marina-focused development featuring a mix of uses including visitor and resident-serving commercial enterprises, hotels and time-share units, marina services, open space and community-benefiting facilities including public infrastructure improvements in a pedestrian friendly setting surrounding the marina and seawater lagoons.
  - Preserve open space, farmland, natural beauty and critical environmental areas: Kona Kai Ola will be designed to protect and preserve the area's scenic and open space resources. Consistent with the project's sustainability goals, 40 percent of the project site will be retained in open space. Further, Kona Kai Ola includes a 400-foot buffer zone along the shoreline that will be

preserved as open space. Improvements within this buffer zone will be limited to lateral shoreline public trails, mauka-makai access trails from the project site, and cultural or environmental-related improvements related to existing features within the buffer zone. No buildings or structures shall be built within the 400-foot shoreline setback area, with the possible exception of structures that are directly related to native Hawaiian cultural resources in the buffer zone and that are requested by JDI's cultural advisors.

- Provide a variety of transportation choices: Kona Kai Ola will reduce transportation related impacts through provision of mass transit options. The project will provide public transit service linking the airport and the new harbor village and Kailua Village. The development will also establish a transit system to transport people around the project site. Further, Kona Kai Ola will be a walkable development. The development will be easily navigable on-foot or on a bike. The plan will include numerous walking and biking trails linking site features. Additionally, reducing site temperatures will enhance the walkability of the site.

- *The developer is not truly sustainable as it purports to be.*

  Response: JDI has made a corporate commitment to environmental sustainability in all its work. In Kona Kai Ola, JDI intends to incorporate the latest environmental design and technology to create an energy efficient, low environmental impact, sustainable development at Kona Kai Ola. The vision for the project is to develop a project that has minimal impact on the environment by striving to significantly reduce water consumption, waste disposal, energy use and carbon dioxide emissions.

  One key to measuring the sustainability of the project's design and operation is to use the Leadership in Energy and Environmental Design (LEED) Green Building Rating System. The LEED Green Building Rating System is the nationally accepted benchmark for the design, construction, and operation of high performance green buildings. LEED gives building developers and operators the tools they need to have an immediate and measurable impact on their buildings' performance (LEED 2006). JDI has experience with the LEED certification process from its other projects both for individual buildings, and for large campus infrastructure as well. JDI intends to pursue, at a minimum, Silver LEED certification for its development of the Kona Kai Ola project.

In the last paragraph of your letter, you refer to the discussion in Section 9, Probable Adverse Environmental Impacts Which Cannot Be Avoided. We note that this section is not admittance, but a sincere effort to disclose information that is consistent with the requirements of Chapter 343, Hawai'i Revised Statutes. Further, while the impacts are unavoidable, the project will make every effort to minimize the impacts, and offset the negative effects with positive contributions to the community.

We strongly disagree with your statement that "Jacoby's plan relies heavily on the help of public money and personnel to protect the natural resources which it admits will otherwise be ruined by its development." Kona Kai Ola includes crucial privately-funded infrastructure improvements, such as the marina, regional roadway and circulation improvements, and improvements to the existing wastewater treatment plant. Further,

with the use of private funds, JDI will protect natural resources through the various measures that preserve and enhance the environment.

Further, the proposed marina is *not* only for "well-heeled boaters at the expense of the local fishing and general community." The demand for additional boat slips and marina facilities originates from the local fishing and general community, and, in recognition of this community need, the State has initiated the effort to expand the harbor and marina facilities through the Kona Kai Ola project.

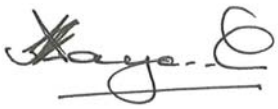
We strongly disagree with your statement that it "would be unethical to allow commercial use and development to override public interest." On the contrary, DLNR and DHHL both independently requested a private developer to develop these public lands in order to generate revenues to support the public programs of these agencies. In addition, Kona Kai Ola will bring in private investment for infrastructure improvements that would mitigate project impacts while serving the wider community. Private funds will also be used in the development of community-oriented facilities such as parks, other recreational facilities and public access.

Finally, several project features will enhance the public experience on these lands. These community-oriented features include various water features such as seawater lagoons with a marine wildlife park and a marine science center, a yacht club, fishing club, a canoe park, and a cultural park with a focus on the Hawaiian maritime cultural heritage of the voyaging canoe. The coastal area would be protected with a shoreline park with trails and public access parking for walking and shoreline fishing, and a cultural park surrounding the heiau, the cultural sites and 'Alula for community use. Additional project community areas would include facilities and space for community use, including programs of the Kona Kai Ola Community Foundation, which supports community programs in health care, culture, education, and employment training for the local community, especially to native Hawaiians.

Hence, public interest will be served, rather than "overridden," through the development of the Kona Kai Ola project.

Your comment letter and this response are included in the Final Environmental Impact Statement. We appreciate your participation in the environmental review process. Please submit a request to our office if you would like to receive a printed or electronic copy of the Final Environmental Impact Statement, or portions thereof.

Sincerely,



Dayan Vithanage, P.E., PhD.
Director of Engineering

cc: Office of Environmental Quality Control
State Department of Hawaiian Home Lands
Jacoby Development, Inc.

Attachment 1

2 Alternatives Analysis

~~In typical land development projects, the initial planning process includes the exploration of alternatives to development objectives. In the EIS process, these alternatives are presented with a disclosure of reasons for the dismissal of non-preferred alternatives.~~

~~Kona Kai Ola does not follow this same pattern of alternatives evaluation.~~ As discussed in Section 1.4, the proposed Kona Kai Ola project is the result of agreements between JDI and the State DLNR and DHHL. The agreements and leases between the State and JDI stipulate the parameters of development for this site in terms of uses, quantities and size of many features, resulting in a limited range of land uses. Unlike a private property project, JDI is required to meet the criteria outlined in the agreements, thereby affording less flexibility in options and uses. From the developer's perspective, the agreements must also provide sufficient flexibility to allow for a development product that responds to market needs and provides a reasonable rate of return on the private investment.

The agreements between JDI and DLNR specify that the proposed harbor basin is to be 45 acres and accommodate 800 slips. This development proposal is the subject of this EIS. In response to DEIS comments, additional water quality studies and modeling were conducted. These studies determined that the water circulation in a 45-acre 800-slip marina would be insufficient to maintain the required standard of water quality. The models of water circulation suggest that a new 25-acre harbor basin could successfully maintain required water quality in the new harbor. Comments on the DEIS from DLNR, from other government agencies, the neighbors and the general community also called for the consideration of alternatives in the EIS, including a project with a smaller harbor basin and less density of hotel and time-share units.

In response to these comments on the DEIS, three alternatives are evaluated in this Final EIS and include Alternative 1, which is a plan with a 25-acre 400-slip harbor basin including a decrease in hotel and time-share units; Alternative 2, which is an alternative that had been previously discussed but not included in the proposed project, that includes an 800-slip harbor and a golf course; and Alternative 3, the no-project alternative. Each alternative is included in the EIS with an evaluation of their potential impacts. These project alternatives are presented to compare the levels of impacts and mitigation measures of the proposed project and alternative development schemes pursuant to requirements set forth in Chapter 343, HRS.

~~JDI is required to provide a new marina basin not less than 45 acres and a minimum of 800 new boat slips. Further, the agreements provide the following options for land uses at the project site:~~

- ~~Golf Course~~
- ~~Retail Commercial Facilities~~
- ~~Hotel Development Parcels~~
- ~~Marina Development Parcels~~
- ~~Community Benefit Development Parcels~~

~~JDI is not pursuing the golf course option and is proposing instead to create various water features throughout the project site. All other optional uses have been incorporated in Kona Kai Ola.~~

2.1 Project Alternatives

2.1.1 Alternative 1: 400-Slip Marina

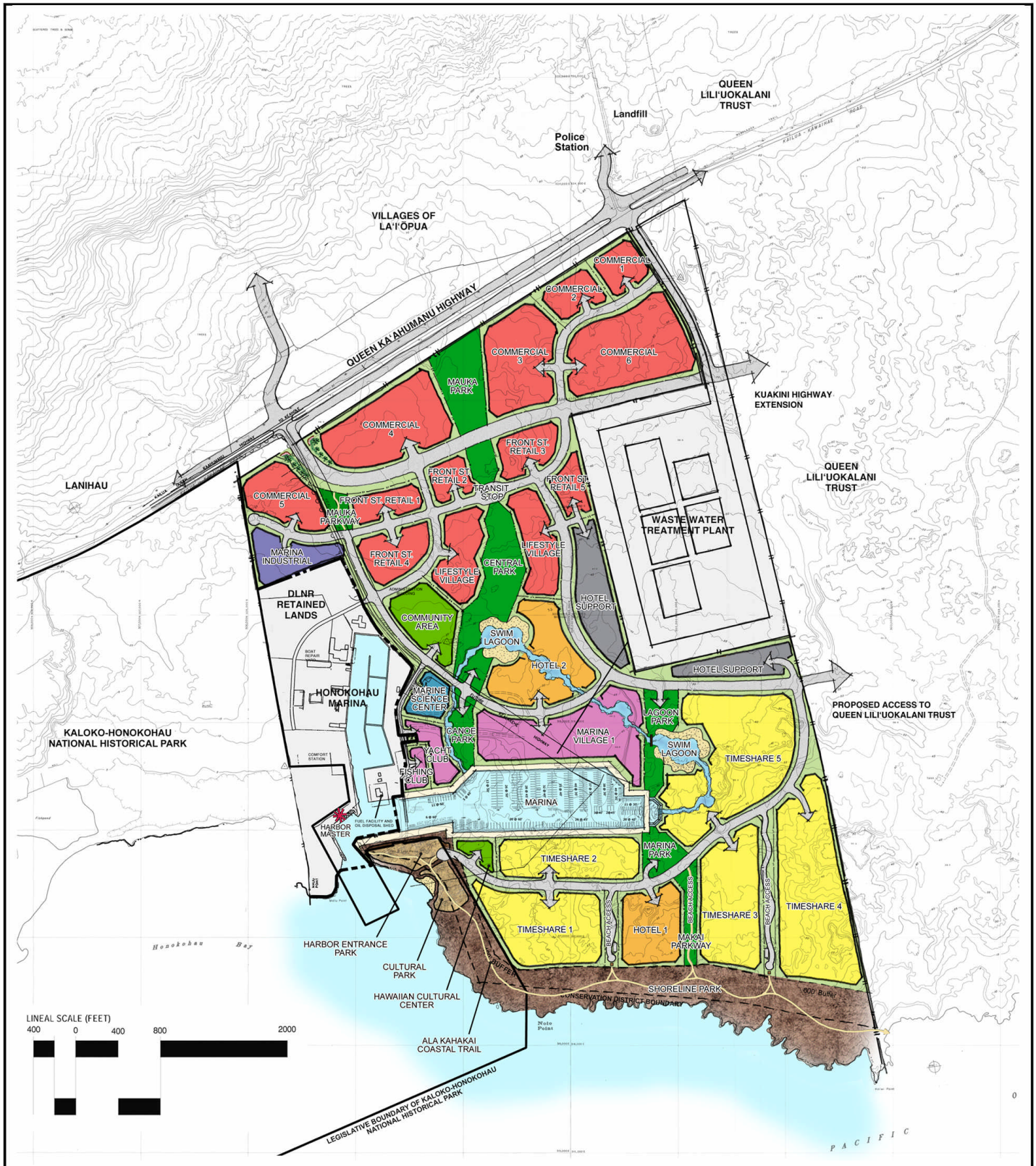
Studies conducted in response to DEIS comments found the construction and operation of an 800-slip marina may significantly impact the water quality within the marina and along the shoreline. Specifically, the Harbor Water Quality Modeling Study, as contained in Appendix U, found that the water circulation in a 45-acre 800-slip harbor was insufficient to maintain an acceptable level of water quality. Further, the existing harbor channel, which would serve both the existing and new harbors, could not adequately serve the increased boat traffic generated by an 800-slip marina during peak traffic. Mitigation measures to accommodate peak boat traffic included the widening of the existing channel, an action that would entail a complex process of Federal and State approvals and encounter significant environmental concern.

Concerns related to the proposed density of hotel and time-share units were also expressed in comments to the DEIS from members of the public, neighbors to the project site, especially the Kaniohale Community Association, and government agencies. Common themes in DEIS comments were related to impacts regarding traffic, project requirements of potable water and infrastructure systems, including sewer, drainage, utility and solid waste systems, and socioeconomic impacts.

In response to the water quality study results, and to the DEIS comments, an alternative plan was developed with a smaller marina with less boat slips, and a related decrease in hotel and time share units. Illustrated in Figure G, Alternative 1 reflects this lesser density project, and features a 400-slip marina encompassing 25 acres. For the purposes of the Alternative 1 analysis, JDI assumed 1,100 time-share units and 400 hotel rooms. Project components include:

- 400 hotel units on 34 acres
- 1,100 time-share units on 106 acres
- 143 acres of commercial uses
- 11 acres of marina support facilities
- 214 acres of parks, roads, open spaces, swim lagoons and community use areas

In addition, Alternative 1 would include the construction of a new intersection of Kealakehe Parkway with Queen Ka'ahumanu Highway, and the extension of Kealakehe Parkway to join Kuakini Highway to cross the lands of Queen Lili'uokalani Trust, and connecting with Kuakini Highway in Kailua-Kona. This is a significant off-site infrastructure improvement and is included in the agreements between the State and JDI.



Source: PBR HAWAII

Plan is conceptual only and subject to change

Figure G: Alternative 1: 400-Slip Marina

LEGEND

- TIME SHARE
- HOTEL
- RETAIL / COMMERCIAL
- MARINA RETAIL
- MARINA SUPPORT / COMMERCIAL
- MARINE SCIENCE CENTER
- COMMUNITY AREA / CULTURAL CENTER
- SWIM LAGOON
- MARINA
- UTILITIES
- PARKS & GREEN SPACE
- SHORELINE
- HARBOR ENTRANCE PARK / CULTURAL PARK

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Like the proposed project, Alternative 1 would have a strong ocean orientation, and project components that support this theme would include various water features including seawater lagoons and a marine science center. The new Alternative 1 harbor would include a yacht club, fishing club, a canoe park, and a cultural park with a focus on Hawaiian maritime cultural heritage of the voyaging canoe. The coastal area would be protected with a shoreline park with trails and public access parking for walking and shoreline fishing, and a cultural park surrounding the heiau, the cultural sites and 'Alula for community use. Additional Alternative 1 community areas would include facilities and space for community use, including programs of the Kona Kai Ola Community Foundation, which supports community programs in health care, culture, education, and employment training for the local community, especially to native Hawaiians. Like the original proposed plan, Alternative 1 includes 40 percent of the land in parks, roads, open spaces, swim lagoons and community use areas.

2.1.2 Alternative 2: Golf Course Feature

Alternative 2 was among the alternatives discussed at a community charrette in September 2003. It includes a golf course, which is a permitted use in the DLNR agreement and DHHL lease. As Figure H illustrates, an 18-hole championship golf course would occupy 222 acres on the southern portion of the project site. As with the proposed project, Alternative 2 includes an 800-slip marina on a minimum of 45 acres.

To support the economic viability of the project, other Alternative 2 uses include:

- Golf course clubhouse on three acres
- 1,570 visitor units on 88 acres fronting the marina
- 118 acres of commercial uses
- 23 acres of community uses

Community uses in Alternative 2 include an amphitheater, a canoe facilities park, a community health center, a Hawaiian cultural center and fishing village, a marine science center and employment training center. The sea water lagoon features contained in the proposed project and Alternative 1 are not included in this alternative.

2.1.3 Alternative 3: No Action

In Alternative 3, the project site would be left vacant, and the proposed marina, hotel and time-share facilities, commercial and marina industrial complexes, and community-oriented uses would not be realized.

~~The economic viability and sustainability of the project is determined by the density and uses proposed. Because JDI is obligated to develop an 800-slip marina for the State, complete road improvements, and provide various public enhancement features at its own expense, the density proposed for the income generating features of the development must be sufficient to provide an acceptable level of economic return for JDI. The market study, which is discussed in Section 4.6, reviewed various development schemes and determined that the currently proposed density and mix is the optimum to meet the anticipated financing and development cost obligations for the public features associated with the development.~~

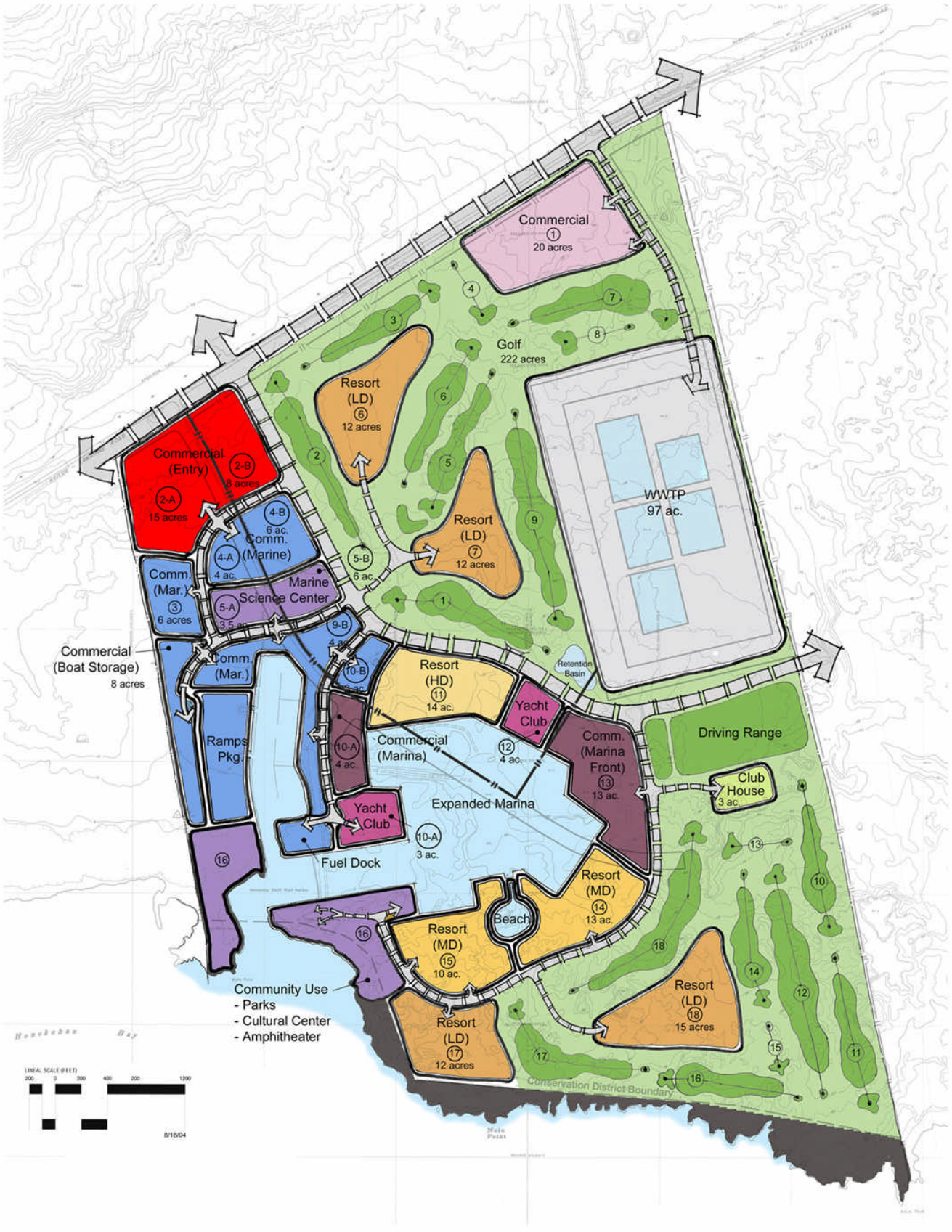

Figure H. Alternative 2: Golf Course Alternative

Legend

N E S W

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2.2 Alternatives Analysis

As discussed in Section 2.1, the proposed Kona Kai Ola project (also referred to as "proposed project") is defined by development requirements related for a marina and the related uses that would be needed to generate a reasonable rate of return that covers development costs.

Beginning with Section 2.2.1, the alternative development concepts are comparatively assessed for potential impacts that may reasonably be expected to result from each alternative. Following is an overview of the primary observations of such assessment.

Alternative 1 includes half of the State-required boat slips and 60 percent of the proposed hotel and time-share units and, due to the decreased density, this alternative would generate significantly less environmental and socio-economic impacts. A harbor water quality model found the reduction of the volume of the new marina basin by about half (approximately 25 acres) significantly improved the water circulation and quality. Further, the reduced number of boat slips would generate less boat traffic, thereby reducing congestion and the need to mitigate impacts further by the widening of the existing harbor channel.

A project with fewer hotel and time-share units and increased commercial space with a longer (14 years) absorption period would change the mix of employment offered by the project, and slightly increase the overall employment count. The public costs/benefits associated with Alternative 1 would change, compared to the proposed project, with a general increase in tax collections, and a general decrease in per capita costs. Detailed discussion of Alternative 1 potential economic impacts are provided in Section 4.6.6. Comparisons of levels of impact are presented throughout this FEIS.

While this analysis might indicate that the 25-acre marina in Alternative 1 would be the more prudent choice, the DLNR agreement establishes the minimum size and slip capacity of the marina at 45 acres and 800 slips, respectively. Amendments to the DLNR agreement would be required in order to allow Alternative 1 to proceed as the preferred alternative. Hence, selection of the preferred alternative is an unresolved issue at the writing of this FEIS.

Alternative 2, the golf course alternative, was not previously considered to be the preferred alternative primarily because market conditions at the time of project development might not likely support another golf course. Further, DHHL has a strategy goal to have more revenue-generating activities on the commercial lease lands within the project area. In addition, concerns have been expressed as to environmental impacts of coastal golf courses, including the potential adverse impact on Kona's water supply if potable water is used for golf course irrigation.

While Alternative 3, the no-project alternative, would not generate adverse impacts related to development of these lands associated with the construction and long-term operations, it would also not allow for an expanded public marina that would meet public need and generate income for the public sector. Further, the no-project alternative would foreclose the opportunity to create a master-planned State-initiated development that would result in increased tax revenue, recreation options and community facilities. Crucial privately-funded improvements, such as the marina, regional roadway and circulation improvements, and improvements to the existing wastewater treatment plant, would not be implemented. Private funds toward the development of community-oriented facilities such as parks, other recreational facilities, and public access would not be contributed.

~~Hence, the only valid alternative to the proposed project is the no-action alternative. In this alternative, the project site would be left vacant, and the proposed marina, hotel and time-share facilities, commercial and marina industrial complexes, and community-oriented uses would not be realized.~~

~~The no-project alternative would therefore not generate adverse impacts associated with the construction and long-term operations would not occur.~~

~~Likewise, the creation of a master-planned state-initiated development, resulting in increased employment, tax revenue, recreation options and community facilities, would not be created. Privately-funded improvements, such as the marina, regional roadway and circulation improvements, and improvements to the existing wastewater treatment plant, would not be implemented. Private funds toward the development of community-oriented facilities such as parks, other recreational facilities and public access would not be contributed.~~

Further, the creation of revenue-producing businesses on the DHHL property to fund homestead programs would not occur, resulting in fewer potential benefits for Hawaiians.

Hence, the agreements and leases between the State and JDI indicate that the no-action alternative is not in the public interest~~has been rejected at this time~~.

2.2.1 Impact Comparison

Grading and Excavation

The proposed project requires grading and excavation. Both actions may impact groundwater due to rainfall runoff during construction. Alternative 1 would require a significantly smaller excavation for the marina basin and would therefore carry a lesser risk of potential adverse effects on water quality. Alternative 2 would require the same basin excavation as the proposed project, and would also include extensive grading and filling to build the golf course, the latter of which would generate additional impacts. Alternative 3 would result in no change to the geography, topography and geology.

Further discussion on grading and excavation is contained in Section 3.3.

Natural Drainage

Most precipitation infiltrates into the porous ground at the site, and no significant sheet flow is likely. Alternative 1 would generate similar levels of impacts on natural drainage as those of the proposed project and thus require similar mitigation measures. The golf course in Alternative 2 would not be as porous since the site would be graded, soil would be placed, and grass and other landscaping would be grown. Sheet flow and runoff can occur on a golf course, and drainage patterns might change. Alternative 3 would result in no change to the existing natural drainage pattern. Further discussion on natural drainage is contained in Section 3.4.

Air Quality

Air quality will be affected by construction activities, as well as pollutants from vehicular, industrial, natural, and agricultural sources. Alternative 1 would generate less construction air quality impacts than the proposed project due to the reduced amount of intensive groundwork associated with the smaller marina basin and fewer long-term impacts by reducing traffic 35 and 40 percent during, respectively, AM and PM peak traffic times. Construction of Alternative 2 would result in fugitive dust and exhaust from equipment and is expected to generate the same level of air quality impact as the proposed project. Alternative 3 would result in no change to existing air quality. Further discussion on air quality is contained in Section 3.5.

Terrestrial Environment

To provide additional habitat for shorebirds and some visiting seabirds, the project proposes to construct a brackishwater pond area suitable for avian fauna, including stilts, coots and ducks. While habitat expansion is beneficial, there is also a possibility that these species may be exposed to activity that may harm them. Alternative 1 would not include a brackish water pond, but will include 5 acres of seawater features, which is 74 percent less than the 19 acres of seawater features in the proposed project. While this would reduce beneficial impacts, it would also decrease exposure to potentially harmful activity. Alternative 2 does not include the brackish water pond features, but would include drainage retention basins that would attract avian fauna and expose them to chemicals used to maintain golf course landscaping. While Alternative 3 would result in no increase in potentially harmful activity, it would also not provide additional habitat for avian fauna. Further discussion on the terrestrial environment is contained in Section 3.7.

Groundwater

Groundwater at the project site occurs as a thin basal brackish water lens. It is influenced by tides and varies in flow direction and salt content. The existing Honokōhau Harbor acts as a drainage point for local groundwater. Any impact to groundwater flow from the proposed harbor is likely to be localized. The proposed marina basin will not result in any significant increase in groundwater flow to the coastline, but rather a concentration and redirection of the existing flows to the harbor entrance.

There will be differences in the flow to the marina entrance between the proposed project and Alternative 1. Alternative 1, being smaller in size, will have less impact on groundwater flow than the proposed marina. Alternative 2 will have a similar impact to groundwater quality as the proposed project. Alternative 2 may also impact water quality by contributing nutrients and biocides to the groundwater from the golf course. Alternative 3 would result in no change in existing groundwater conditions. Further discussion on groundwater is contained in Section 3.8.1.

Surface Water

There are no significant natural freshwater streams or ponds at the site, but there are brackish anchialine pools. Surface water at the project site will be influenced by rainfall. Runoff typically percolates rapidly through the permeable ground. The proposed project will include some impermeable surfaces, which together with building roofs, will change runoff and seepage patterns.

Alternative 1 is a lower density project that is expected to have proportionally less impact on surface water and runoff patterns and less potential impact on water quality than the proposed project. Alternative 2 would have more impact on surface water quality than the proposed project due to fertilizers and biocides carried by runoff from the golf course. Alternative 3 would result in no change to surface water conditions. Further discussion on surface water is contained in Section 3.8.2.

Nearshore Environment and Coastal Waters

The potential adverse impacts to the marine environment from the proposed project are due to the construction of an 800-slip marina and the resulting inflow of higher salinity seawater and inadequate water circulation, both of which are anticipated to impair water quality to the extent of falling below applicable standards. One possible mitigation measure is to significantly reduce the size of the marina expansion.

The reduced marina size (from 45 to 25 acres) and reduced lagoon acreage in Alternative 1 are expected to result in a proportionate reduction in seawater discharging into the new harbor and increased water circulation. Alternative 2 includes the same marina basin size and is therefore subject to the same factors that are expected to adversely affect water quality.

In the existing Honokōhau Harbor, water quality issues focus on the potential for pollutants, sediments, mixing and discharge into the nearshore marine waters. Before the harbor was constructed, any pollutants entrained within the groundwater were believed to have been diffused over a broad coastline.

The water quality in the proposed harbor depends on several components. These include salinity, nutrients, and sediments that come from the ocean, rainfall runoff, water features with marine animals, and dust. The smaller project offered as Alternative 1 is expected to produce a reduced amount of pollutants and reduce the risk of adverse impact upon water quality.

It is notable that the 45-acre marina basin planned in the proposed project and Alternative 2 only becomes viable from a water quality impact standpoint if the additional brackish groundwater inflow into the new marina exceeds 60 mgd. The resulting flushing from such inflow would be expected to better maintain water quality. However, it is unclear whether 60 mgd of brackish groundwater would be available. As proposed in Alternative 1, reduction of the volume of the new marina basin by 45 percent will significantly improve the flushing and water quality because the lower volume can be flushed by the available groundwater flow.

In addition, there could be higher rainfall runoff from the Alternative 2 golf course into the harbor, because the grassed golf course will be less porous than the natural surface. The golf course will also require relatively high levels of fertilizer, biocides, and irrigation, all of which could contribute to adverse water quality impacts.

Further discussion on nearshore environment and coastal waters is contained in Section 3.9.1.

Anchialine Pools

Anchialine pools are located north of Honokōhau Harbor, and south of the harbor on the project site. The marine life in these pools is sensitive to groundwater quality, and changes due to construction and operation of the project could degrade the viability of the pool ecosystem. In the southern complex, 3 anchialine pools with a combined surface area of $20m^2$ would be eliminated due to the harbor construction in the proposed project and Alternatives 1 and 2.

Predicting the extent of change in groundwater flow is difficult if not impossible even with numerous boreholes and intense sampling. The actual flow of groundwater towards the sea is minimal today, and tidal measurements show that tide fluctuations represent more than 90 percent in actual harbor tides. The fluctuations occur simultaneous with the ocean/harbor tide, which indicate a vertical and horizontal pressure regime between bore hole 6 and the ocean and harbor. Hence, the tides alone create a mixing system that increases salinity, as the flow approaches the point of discharge which will be either the channel or the shore. Another factor that could influence groundwater quality is the increased local recharge from irrigation between the channel and shore. This will add fresh water to the lens locally but is not quantified at this time.

Quantification of these impacts, including the flow of groundwater through each pond, is therefore extremely difficult. The shallow lavas are of the pahoehoe type and have a relatively high horizontal permeability. In surface depressions or undulations, the pahoehoe lavas have a tendency to lose vertical permeability from sedimentation thus restricting water exchange within the individual pools. This is normally reflected in both the salinity and temperature and this information has been adequately studied in the pools.

Changes in groundwater quality may or may not impact biological communities in the anchialine and estuarine environment. In either case, it is important to understand these relationships to effectively manage the resource. If there is significant deviation from the baseline especially in regard to nutrients, pathogens, and toxins, a mitigation plan to determine the cause and take decisive appropriate action will be implemented.

Due to the uncertainty of changes in groundwater flow and quality due to marina construction, the variability in impacts between the proposed project and Alternatives 1 and 2 is unknown at this time. Alternative 3 would result in no change in groundwater flow. While this would eliminate the potential for adverse impacts, Alternative 3 would also continue the pattern of existing degradation related to human activity and the introduction of alien species. Further discussion on anchialine pools is contained in Section 3.9.2.

Marine Fishing Impacts

The proposed marina will increase the number of boats in the area and it is reasonable to assume that a portion of these new boats will engage in fishing activities. The increase in boats in the area would be primarily related to the marlin and tuna / pelagic fishery, coral reefs due to extractive fisheries, and SCUBA activities. The pressure on fish and invertebrate stocks is expected to increase with or without the marina. Harbor expansion provides the opportunity to address existing conditions to consolidate, focus, and fund management and enforcement activities at one location.

Compared to the proposed project, Alternative 1 would result in a 21 percent decrease in boat traffic, thereby lessening the potential for marine fishing impacts. The level of impacts in Alternative 2 would be similar to that of the proposed project. Alternative 3 would result in no change in existing marine fishing conditions, and no opportunity to address already existing pressure on fish and invertebrate stocks. Further discussion on marine fishing impacts is contained in Section 3.9.3.

Cultural and Archaeological Resources

The proposed project will integrate cultural and archaeological resources in the overall development. Archaeological sites recommended for preservation will be preserved, and cultural practices will be encouraged. Kona Kai Ola includes a canoe park, and a cultural park with a focus on Hawaiian maritime cultural heritage of the voyaging canoe. Proposed is a 400-foot shoreline setback that would serve as a buffer between the ocean and developed areas. This coastal area would be protected with a shoreline park with trails and public access parking for walking and shoreline fishing, and a cultural park surrounding the heiau, the cultural sites and ʻAlula for community use.

Alternative 1 would contain all of the cultural archaeological features and the shoreline setback area would be 400 feet in the northern portion of the site and increase to 600 feet in the southern portion. Alternative 2 would preserve cultural and archaeological resources, but does not include a 400-foot shoreline setback. Alternative 3 would result in no change to existing cultural and archaeological resources and no addition of cultural and community facilities and activities. Further discussion on cultural and archaeological resources is contained in, respectively, Sections 4.1 and 4.2.

Noise

Project-generated noise is due to construction equipment and blasting, boats, marina activities, vehicle traffic, and the Kealakehe Wastewater Treatment Plant operations. Alternative 1 would generate less noise impacts due to reduced construction activities, fewer boats, less traffic and less on-site activity. Alternative 2 would also generate less noise due to reduced traffic and less on-site activity, but noise related to the excavation of the marina basin and an increase in the number of boats would be similar to that of the proposed project. Further discussion on noise impacts is presented in Section 4.4.

Socioeconomic Impacts

The proposed project will generate an increase in de facto population of an estimated 5,321 persons due to the increase in hotel and time-share units. The estimated de facto population increase in Alternative 1 is 37 percent less, at 3,363 persons, than the proposed project. The de facto population increase in Alternative 2 is similar to Alternative 1.

Employment in the commercial components will nearly double in Alternative 1, from a stabilized level of 1,429 full-time equivalent (FTE) positions in the proposed project to 2,740 in the Alternative 1.

Under Alternative 1, the total operating economic activity at Kona Kai Ola will increase due to the added commercial space more than off-setting the fewer visitor units, moving upward from $557.6 million per year to circa $814.3 million annually. The total base economic impact resulting from development and operation of Alternative 1 will similarly be higher by between 35 and 45 percent than that of the proposed project.

Alternative 1, which has a reduced marina size of 25 acres, and fewer hotel and time-share units, would have a meaningful market standing, create significant economic opportunities, and provide a net benefit to State and County revenues. From a market perspective, a smaller Kona Kai Ola would still be the only mixed use community in the Keahole to Kailua-Kona Corridor offering competitive hotel and time-share product.

The estimated absorption periods for marketable components of Alternative 1 are generally shorter than those for the same components in the proposed project. Marina slips under Alternative 1 are estimated to be absorbed within 2 years after groundbreaking, as compared with 9 years for absorption of slips in the proposed project. Hotel rooms under Alternative 1 are estimated to be absorbed within 4 years after groundbreaking, as compared with 7 years under the proposed project. Time-share units would be absorbed within 10 years under Alternative 1, while 15 years are projected under the proposed project. Due to the planned increase in commercial facilities under Alternative 1, the absorption period of commercial space is estimated at 14 years, as compared with 8 years for absorption of such facilities under the proposed project.

The State and County will still both receive a net benefit (tax receipts relative to public expenditures) annually on a stabilized basis under the Alternative 1. The County net benefits will be some $12.2 million per year under the Alternative 1 versus $14.9 million under the proposed project. The State net benefits will increase under the Alternative 1 to about $37.5 million annually, up substantially from the $11.4 million in the proposed project.

Due to the lower de facto population at build-out, the effective stabilized public costs for both the State and County will decline meaningfully under the Alternative 1, dropping from $7.7 million annually for the County and $36.5 million for the State, to $4.9 million and $23 million per year, respectively.

Alternative 3 would result in no increase in de facto population and improvement to economic conditions. Further discussion on social and economic impacts are contained in, respectively, Sections 4.5 and 4.6.

Vehicular Traffic

The proposed project will impact the nearby road network that currently is congested during peak traffic times. The proposed project includes roadway improvements that would reduce the impact and improve roadway conditions for the regional community.

Alternative 1 includes the same roadway system improvements as the proposed project, yet would reduce vehicular traffic by 35 percent when compared to the proposed project. Alternative 2 would have similar traffic conditions and roadway improvements as Alternative 1. Alternative 3 would result in no increase in traffic and no roadway improvements.

Marina Traffic Study

The increase in boat traffic due to the proposed 800-slip marina would cause entrance channel congestion during varying combinations of existing and new marina peak traffic flow. Worst case conditions of active sport fishing weekend and summer holiday recreational traffic result in traffic volumes exceeding capacity over a short afternoon period. Mitigation to address boat traffic in the proposed project include widening the entrance channel, traffic control, implementation of a permanent traffic control tower, or limiting vessel size.

Alternative 1 would result in a 21 percent reduction in boat traffic congestion under average existing conditions and ten percent reduction during peak existing conditions. The reduction to 400 slips also reduces the impacts of congestion at the entrance channel, thereby reducing the need for any modifications to the entrance channel.

Alternative 2 would have the same level of boat traffic as the proposed project. Alternative 3 would not meet the demand for additional boat slips and would not generate additional boat traffic. Further discussion on marina traffic is contained in Section 4.8.

Police, Fire and Medical Services

The proposed project will impact police, fire and medical services due to an increase in de facto population and increased on-site activity. Alternatives 1 and 2 would have similar levels of impact as the proposed project due to increased on-site activity. Further discussion on police, fire and medical services are contained, respectively, in Sections 4.10.1, 4.10.2 and 4.10.3.

Drainage and Storm Water Facilities

The proposed project will increase drainage flows, quantities, velocities, erosion, and sediment runoff.

Alternative 1 involves a reduction of the project density that would reduce storm runoff from the various land uses due to a reduction in impervious surfaces associated with hotel and time-share development and to the creation of more open space. However, roadway areas will increase by about 30 percent in Alternative 1. Storm runoff from proposed streets would therefore increase; thus requiring additional drainage facilities and possibly resulting in no net savings. The golf course in Alternative 2 may also change drainage characteristics from those of the proposed project and may not reduce impacts. Alternative 3 would result in no change in existing conditions and no improvements to drainage infrastructure. Further discussion on drainage and storm water facilities is contained in Section 4.10.5

Wastewater Facilities

The proposed development is located within the service area of the Kealakehe WWTP and a sewer system will be installed that connects to the WWTP. The sewer system will be comprised of a network of gravity sewers, force mains, and pumping stations which collect and convey wastewater to the existing Kealakehe WWTP. Project improvements will incorporate the usage of recycled / R1 water. Improvements implemented by the proposed project will also accommodate the needs of the regional service population.

Alternative 1 would generate approximately 10 percent less wastewater flow than the proposed project. Wastewater flow in Alternative 2 is undetermined. Alternative 3 would result in no additional flow, as well as no improvements that will benefit the regional community. Further discussion on wastewater facilities is contained in Section 4.10.6.

Potable Water Facilities

The proposed project average daily water demand is estimated at 1.76 million gallons per day. Existing County sources are not adequate to meet this demand and source development is required. The developer is working with DLNR and two wells have been identified that will produce a sustainable yield that will serve the project. These wells will also serve water needs beyond the project.

Alternative 1 would result in net decrease of about five percent of potable water demand. Alternative 2 may have a lower water demand than the proposed project as long as potable water is not used for irrigation. Alternative 3 would result in no additional flow, as well as no source development that will benefit the regional community. Further discussion on potable water facilities is contained in Section 4.10.8.

Energy and Communications

Regarding Alternative 1, preliminary estimates for electrical, telecommunications, and cable resulted in a net demand load that remains similar to the proposed project. Further discussion on energy and communications is contained in Section 4.10.9.1.

The proposed project will increase the demand for electrical energy and telecommunications. The demand would be reduced in Alternative 1 because the number of boat slips and units would decrease. Similarly, Alternative 2 would have fewer units than the proposed project and therefore reduce energy demands. Further reduction in energy demand for either alternative could be achieved by using seawater air conditioning (SWAC) and other energy reduction measures, as planned by the developer. Further discussion on energy and telecommunications is contained in Section 4.10.9.2.

Water Features and Lagoons

The proposed project includes a brackishwater pond, lagoons, and marine life exhibits supplied by clean seawater. The water features in Alternative 1 would significantly decrease by 74 percent from 19 acres in the proposed project to five acres in Alternative 1. This decrease in water features would result in a corresponding decrease in water source requirements and seawater discharge. Alternative 2 does not include the seawater features. Alternative 3 would result in no additional demand for water source requirements and seawater discharge.

2.2.2 Conformance with Public Plans and Policies

State of Hawai'i

Chapter 343, Hawai'i Revised Statutes

Compliance with this chapter is effected, as described in Section 5.1.1 in regard to the proposed project and the alternatives discussed.

- State Land Use Law, Chapter 205, Hawai'i Revised Statutes

  The discussion in Section 5.1.2 is directly applicable to Alternative 1, the proposed project. Alternative 1 will involve a setback of 400 feet that increases to 600 feet along the southern portion of the project site's shoreline area. Alternative 2 does not provide for such a setback, but may still require approvals from DLNR for cultural, recreational, and community uses and structures within the Conservation district.

- Coastal Zone Management Program, Chapter 205A, Hawai'i Revised Statutes

  Recreational Resources:

  In addition to the discussion of consistency with the associated objective and policies, as described in Section 5.1.3, the reduction from the proposed project's 800-slip marina to a 400-slip marina under Alternative 1 will still expand the region's boating opportunities and support facilities. The existing harbor entrance will still be utilized under this alternative; however, potential risks relating to boat traffic and congestion in the marina entrance area will be reduced significantly. The 400-600 foot shoreline setback, public parks, trails, cultural areas, community facilities, and marine science center remain important recreational components under Alternative 1.

Alternative 2 includes a golf course component, which would add a more passive recreation to the active and social components, such as boating, fishing, swimming, trails, walkways, parks, marine life, educational and interactive areas that are also part of the project. The golf course would enhance the range of leisure and recreational opportunities offered at Kona Kai Ola.

Alternative 2, like the proposed project, will expand the region's boating opportunities and support facilities through its 800-slip marina. However, the potential adverse impacts of increased boat traffic from the size of the marina are significant enough to offset the benefits of increased boating opportunities.

Coastal Ecosystems:

The discussion in Section 5.1.3 is directly applicable to Alternative 1.

Alternative 1 not only reduces the number of slips proposed by 50 percent, but it also reduces the size of the marina from 45 acres to 25 acres. The 25-acre marina will increase the body of water within the existing harbor, but to a significantly lesser extent than the proposed project's estimated increase, which is also applicable to the 45-acre size that is proposed for the marina under Alternative 2.

The findings of the Harbor Water Quality Modeling Study conclude that a reduction in the size of the harbor expansion is an alternative that will mitigate the risk of significant impacts upon water quality within the marina and existing harbor. Accordingly, the reduction in both the number of slips and the size of the marina basin under Alternative 1, in combination with proper facilities design, public education, and enforcement of harbor rules and regulations, would result in fewer long-term impacts to water quality and coastal ecosystems. Short-term (construction-related) impacts would likely remain the same although the reduction in the total acreage of excavation is expected to result in a shorter duration of such impacts.

In addition to its 800-slip marina and potential adverse impacts upon water quality and the marine environment, Alternative 2 includes a golf course component, which has the potential to impact coastal ecosystems by increasing the nutrient loading in surface runoff and groundwater and also by introducing pesticides, herbicides, and other chemicals common in golf course use and management into the nearshore waters surrounding the project site.

Economic Uses

Although reduced in the number of slips, the smaller marina under Alternative 1 will nevertheless serve public demand for more boating facilities in West Hawai'i and is consistent with the objective and policies and discussion set forth in Section 5.1.3. The economic impacts of Alternative 2, while comparable to those of the proposed project's marina development, are notably marginal as to the golf course component, based on the marketability analysis that indicates a condition of saturation within the region.

Coastal Hazards

The discussion and considerations set forth in Section 5.1.3 are also applicable to Alternatives 1 and 2 and indicate compliance with the objective and policies addressed. Tsunami risks mainly affect the large shoreline setback area that is proposed for the project and Alternative 1. Alternative 2 projects a transient accommodation site that is partially within the tsunami hazard zone and thus carries a higher hazard risk. However, the essential requirement for these alternatives, as well as the proposed project, is a well-prepared and properly implemented evacuation plan.

Beach Protection

Discussion and considerations set forth in Section 5.1.3 are also applicable to Alternatives 1 and 2 and indicate compliance with the objective and policies addressed. Alternative 1 and, to a lesser extent, Alternative 2, will retain the shoreline area in its natural condition.

Similar to the proposed project, Alternative 1 provides for a shoreline setback of considerable width within which no structure, except for possible culturally-related structures, would be allowed. Alternatives 1 and 2 will thus be designed to avoid erosion of structures and minimize interference with natural shoreline processes.

Marine Resources

The discussion in Section 5.1.3 is also applicable to Alternative 1 which is described to be an alternative that is specifically projected to mitigate anticipated adverse impacts on water quality and the marine environment that might otherwise result from the original harbor design and scale, which is also incorporated in Alternative 2 . The reduced marina size under Alternative 1 is projected to meet water quality standards and enable greater compliance with the objective and policies addressed in this section.

Alternative 2 includes a golf course component and thus the potential to adversely impact marine resources by increasing the nutrient loading in surface runoff and groundwater and also by introducing pesticides, herbicides, and other chemicals common in golf course use and management into the nearshore waters surrounding the project site.

Hawai'i State Plans, Chapter 226, Hawai'i Revised Statutes

Section 226-4 (State goals), 5 (Objectives and policies for population, and 6 (Objective and policies for economy in general):

The discussion in Section 5.1.4 is applicable to Alternatives 1 and 2, in addition to the proposed project. These development concepts generally conform to the goals, objectives, and policies set forth in these sections because they will provide some degree of economic viability, stability, and sustainability for future generations. Kona Kai Ola will convert essentially vacant land into a mixed-use development with a distinctive marina and boating element, providing a wide range of recreational, business, and employment opportunities to the community.

Section 226-8 Objective and policies for the economy – the visitor industry:

Alternatives 1 and 2 will be consistent with the State's economic objective and policies relating to the tourism industry for the same reasons that are discussed in regard to the proposed project in Section 5.1.4. They will incorporate JDI's commitment to sustainability principles in the planning and design of the development concepts in Alternatives 1 and 2. Although the total hotel and time-share unit count is reduced to approximately 1,500 in Alternatives 1 and 2, the transient accommodations component of these alternatives will still further the State's objective and policies for increased visitor industry employment opportunities and training, foster better visitor understanding of Hawai'i's cultural values, and contribute to the synergism of this mixed-use project concept that addresses the needs of the neighboring community, as well as the visitor industry.

Section 226-11 Objectives and policies for the physical environment: land-based, shoreline and marine resources:

Alternative 1 is expected to involve less potential adverse impacts upon these environmental resources than the proposed project. Likewise, and Alternative 2 would have less adverse impact because of its reduction in the size of the marina and in the total hotel and time-share unit count. Alternative 1 carries less potential risk to water quality and related impacts upon the marine environment and anchialine pool ecosystems. Although approximately three anchialine pools are expected to be destroyed, the great majority of pools will be preserved within and outside of the proposed 400-foot shoreline setback.

The golf course component in Alternative 2 has the potential to impact marine resources by increasing the nutrient loading in surface runoff and groundwater and also by introducing pesticides, herbicides, and other chemicals common in golf course use and management into the marina basin and nearshore waters surrounding the project site. It also has the potential to adversely affect the anchialine pools by introducing the chemicals into the pond systems.

Section 226-12 Objective and policies for the physical environment: scenic, natural beauty, and historic resources:

The discussion in Section 5.1.4 is directly applicable to Alternative 1 and describes the compliance with the objective and policies addressed.

The golf course component of Alternative 2 would create a park-like view that would potentially enhance the beauty of the project site and surrounding areas when considered in combination with the existing rugged natural beauty of the area.

Just as with the proposed project, Alternatives 1 and 2 would also be designed to blend with the natural terrain and to honor and protect the cultural history, resources, and practices of these lands.

Section 226-13 Objectives and policies for the physical environment: land, air and water quality:

As stated above, because of the reduction in both the number of slips and the size of the marina basin, with proper facilities design, public education and enforcement of harbor rules and regulations, Alternative 1 is anticipated to cause fewer long-term impacts to water quality than either the proposed project or Alternative 2. Based on the findings of the Harbor Water Quality Modeling Study, water quality resulting from a reduced marina basin size as proposed under Alternative 1 is expected to be similar to existing conditions.

As previously noted, Alternative 2 has the potential to adversely impact water quality by increasing the nutrient loading in surface runoff and groundwater by introducing pesticides, herbicides and other chemicals common in golf course development and maintenance into the marina basin and nearshore waters surrounding the project site.

Section 226-14 Objectives and policies for facility systems - general:

Alternatives 1 and 2 will conform to the objective and policies of this section on the grounds that are discussed in regard to the proposed project in Section 5.1.4. The master-planning and phasing of the project concepts under these alternatives will be coordinated with associated public and private infrastructural planning and related private and public infrastructural financing. The cost of the marina construction and project-related infrastructure is to be borne by the developer, resulting in considerable savings for the public. In addition, the projected lease revenue from these public lands will provide additional public benefits by establishing a revenue stream for capital improvements and maintenance of a range of State facilities.

Section 226-15 Objectives and policies for facility systems - solid and liquid wastes:

In addition to the developer's commitment to sustainable development design, the project will involve upgrades to the County of Hawai'i's Kealakehe Wastewater Treatment Plant to meet current needs, as well as the project's future needs. This commitment is applicable to Alternatives 1 and 2, as well as the proposed project that is discussed in Section 5.1.4.

Section 226-16 Objectives and policies for facility systems – water:

The discussion of water conservation methods and the need to secure additional potable water sources in Section 5.1.4 is also applicable to Alternative 1 and demonstrates conformity to the objective and policies for water facilities. Alternative 2 involves greater irrigation demands in regard to its golf course component and greater potable water demands for human consumption than those for Alternative 1. Alternative 2 is expected to face more serious challenges in securing adequate and reliable sources of water.

Section 229-17 Objectives and policies for facility systems – transportation:

Alternatives 1 and 2 will conform to this objective and policies because they will present water transportation opportunities, including the possible use of transit water shuttles to Kailua-Kona, as described in regard to the proposed project in Section 5.1.4.

Section 226-18 Objectives and policies for facility systems – energy:

Alternatives 1 and 2 conform to these objective and policies through the use of energy efficient design and technology and commitment to the use and production of renewable energy to serve the project's needs. Solar energy production, solar hot water heating, and the use of deep cold seawater for cooling systems are currently identified as means of saving substantial electrical energy costs for the community and the developer.

Section 226-23 Objectives and policies for socio-cultural advancement – leisure:

Alternative 1 conforms to this objective and related policies for the reasons offered in Section 5.1.4 in regard to the proposed project. Alternative 1 will be of greater conformity with the policy regarding access to significant natural and cultural resources in light of the 400-600 foot shoreline setback that has been designed for this alternative.

Although it does not propose the considerable shoreline setback that is planned for Alternative 1, Alternative 2 is consistent with this objective and related policies in incorporating opportunities for shoreline-oriented activities, such as the walking trails. In addition, the golf course component adds a more passive recreation alternative to the active and social components, such as boating, fishing, swimming, trails, walkways, parks, marine life educational and interactive areas that are also part of the project. The golf course would enhance the range of leisure and recreational opportunities offered at Kona Kai Ola.

Section 226-25 Objectives and policies for socio-cultural advancement-culture:

The discussion in Section 5.1.4 is relevant to Alternatives 1 and 2 and demonstrate their conformity the objective and policies of this section.

Both alternatives involve the preservation and protection of cultural features that have been identified by the Cultural Impact Assessment and archaeological studies for the project area. Both provide for public shoreline access, and both will continue the policy of close consultation with the local Hawaiian community and cultural and lineal descendants in the planning of cultural resource preservation and protection.

Section 226-103 Economic priority guidelines:

Alternatives 1 and 2 conform to these guidelines for the same reasons that are set forth in Section 5.1.4. They involve private investment in a public project that will create economic diversification through a mix of marina, industrial, commercial, visitor, and cultural facilities. This presents a wide range of entrepreneurial opportunities, long-term employment opportunities, and job training opportunities.

Section 226-104 Population growth and land resources priority guidelines:

As described in Section 5.1.4, the policy support for the proposed project also extends to the similar development concepts considered in Alternatives 1 and 2. Those alternatives conform to the guidelines of this section because they involve an urban development under parameters and within geographical bounds that are supported by the County's General Plan, a preliminary form of the Kona Community Development Plan, the County's Keahole to Kailua Regional Development Plan, and the reality of being located along the primary commercial/industrial corridor between Keahole Airport and Kailua-Kona. As with the proposed project, the development concepts of Alternatives 1 and 2 are essentially alternatives for the implementation and "in-filling" of the urban expansion area in North Kona.

DHHL Hawai'i Island Plan

This 2002 plan projects DHHL's Honokōhau makai lands for commercial use. As compared to the proposed project and Alternative 2, Alternative 1 presents an expanded commercial component that provides greater compliance with the plan, while addressing certain beneficiaries' concerns about the scale of the marina originally required in the Project. Alternative 2 also conforms to the recommended commercial uses in the makai lands but to a lesser degree than Alternative 1 because of its more limited commercial component. Like the proposed project, its marina size and number of slips raise environmental issues, as more specifically discussed in Part 3, and community concerns.

County of Hawai'i General Plan

HCGP Section 4 – Environmental Quality Goals, Policies and Courses of Action:

Alternative 1 is consistent with this section. It presents a reduction in both the number of slips and the size of the marina basin that, in combination with proper facilities design, public education and enforcement of harbor rules and regulations, would result in very few long term impacts to water quality. Based on the findings of the Harbor Water Quality Modeling Study, water quality would remain similar to existing conditions.

Alternative 2 is the least consistent with this section. In addition to the potential significant impacts of its 800 slip marina basin, its golf course component has the potential to adversely impact marine resources by increasing the nutrient loading in surface runoff and groundwater and also by introducing pesticides, herbicides and other chemicals common in golf course use and management into the nearshore waters surrounding the project site. It also has the potential to adversely affect the anchialine pools beyond their current conditions by introducing such substances into the pool systems.

HCGP Section 7 – Natural Beauty Goals and Policies:

Alternative 2 conforms to some degree with this section. Its golf course component would create a park-like view that would potentially enhance the beauty of the project site and surrounding areas when considered in combination with the existing rugged natural beauty of the area, as demonstrated in other makai golf courses within the region.

HCGP Section 8 – Natural Resources and Shoreline:

Alternative 1 is most consistent with the goals and policies of this section. It would require considerably less marina excavation than the proposed project and Alternative 2 and would reduce the potential risk of long-term adverse impacts to water quality. Based on the findings of the Harbor Water Quality Modeling Study, water quality would remain similar to existing conditions with the degree of reduction in marina basin size that is proposed under Alternative 1. This reduction is also expected to reduce potential impacts upon anchialine pools and their ecosytems, as well as shoreline and marine resources that are affected by water quality. Alternative 1 also retains the shoreline preservation and protection concepts that are proposed in and described for the Project.

HCGP Section 10 – Public Facilities Goals and Policies:

The discussion in Section 5.2.1. in relation to the proposed project is applicable to Alternatives 1 and 2. Improvements to public facilities are are integral to the Kona Kai Ola development. The provision of additional boat slips and numerous road improvements, including a makai extension of Kuakini Highway south to Kailua-Kona are incorporated into plans for the project's development. In light of these elements, Alternatives 1 and 2 are consistent with the goals and policies of this section.

HCGP Section 11 – Public Utility Goals, Policies:

As with the proposed project, Alternatives 1 and 2 are consistent with the goals and policies of this section, based on the relevant grounds set forth in Section 5.2.1. The developer is committed to design, fund, and develop environmentally sensitive and energy efficient utility systems to the extent possible, as described previously in Part 5. Its master planning provides for the coordinated development of such systems with the objective of achieving significant savings for the public. As previously-mentioned example, the project development involves the upgrading of the Kealakehe Wastewater Treatment Plant.

HCGP Section 12 – Recreation:

Alternative 1 is consistent with the goals, policies, and courses of action for North Kona in this section.

Although the number of slips is reduced under Alternative 1, the region's boating opportunities and support facilities will still be expanded. The existing marina entrance would still be utilized under this alternative. However, concerns relating to increased activity leading to increased congestion in the marina entrance area would be mitigated to a certain extent. The 400-600 foot shoreline setback, public parks, trails, cultural areas, community facilities and marine science center remain important components of Alternative 1.

The golf course component of Alternative 2 would add a more passive recreation to the active and social components, such as boating, fishing, swimming, trails, walkways, parks, marine life, educational and interactive areas that are also part of the project. The golf course would enhance the range of leisure and recreational opportunities offered at Kona Kai Ola. Alternative 2 is also considered to be consistent with this section.

HCGP Section 13 and 13.2 – Transportation:

The reduced marina component under Alternative 1 will still provide transportation opportunities and provide for possible use of transit water shuttles to Kailua-Kona, although to a lesser degree than under the proposed project and Alternative 2 . However, in each scenario, internal people-movers are planned, and numerous roadway improvements are planned for coordination with public agencies, including but not limited to the construction of the Kuakini Highway extension between Honokōhau and Kailua-Kona. Accordingly, both Alternatives 1 and 2 are consistent with the goals, policies, and courses of action for North Kona under these sections of the General Plan.

HCGP Section 14.3 – Commercial Development:

For the reasons presented in the discussion under Section 226-104 of the State Plan, the planned commercial component under Alternatives 1 and 2 are consistent with this section.

HCGP Section 14.8 – Open Space:

Alternatives 1 and 2 are consistent with the goals and policies of this section. Alternative 1 provides a considerable (400-600 foot) shoreline setback along the entire ocean frontage of the project site as a means of protecting the area's scenic and open space resources, as well as natural and cultural resources. Although it does not incorporate the shoreline setback planned in Alternative 1, Alternative 2 provides a golf course component would contribute to the amount of open space that is currently proposed and allow additional view corridors to be created.

Community Development Plans

Community development plans are being formulated for different regions in the County in order to supplement the County's General Plan. The Kona Kai Ola project is located in the Kona Community Development Plan (CDP) area. Maps associated with the preliminary work phases

of the Kona CDP include the Kona Kai Ola project site within the "Preferred Urban Growth" boundary of the North Kona district. The Kona CDP process is guided by a Steering Committee composed of a broad cross-section of the community. The Steering Committee will eventually complete its work and recommend the CDP's adoption.

After the DEIS was published, the Kona CDP has progressed to the development of plans for the major urban growth corridor north of Kailua-Kona. The Kona CDP has produced a draft plan showing a transit oriented development that includes a midlevel public transit corridor along the mauka residential elevation, and a makai transit corridor that runs along a proposed new frontage road just makai and parallel to Queen Kaahumanu Highway. The development plan for Alternative 1 includes the Kuakini Highway as part of this proposed frontage road and transit line from Kailua Kona to the Kealakehe area, along with a transit stop at Kona Kai Ola. The Alternative 1 plan also includes a road that could be extended to be part of the proposed frontage road should it be approved and implemented. In addition, the Kona CDP has continued to emphasize the principles of smart growth planning with mixed use urban areas where people can live, work, play and learn in the same region. Kona Kai Ola has been specifically designed to be consistent with this policy in order to provide a stable employment base close to where people live in the mauka residential areas already planned for DHHL and HHFDC lands.

It should be noted that currently and over the years, the 1990 Keāhole to Kailua Development Plan (K-to-K Plan) guides land use actions by the public and private sectors. It is intended to carry out the General Plan goals and policies related to the development of the portion of North Kona area, including the Kona Kai Ola site. The "Preferred Growth Plan" of the Keāhole to Kailua Development Plan identifies the project site as a new regional urban center to include commercial, civic, and financial business related uses, an expanded "Harbor Complex," a shoreline road, and a shoreline park. The proposed project and the development concepts in Alternatives 1 and 2 are therefore consistent with the recommendations in the Keāhole to Kailua Development Plan.

Hawai'i County Zoning

As shown on Figure AA, the project site is zoned "Open". Under Section 25-5-160 of the Hawai'i County Code, "The O (Open) district applies to areas that contribute to the general welfare, the full enjoyment, or the economic well-being of open land type use which has been established, or is proposed. The object of this district is to encourage development around it such as a golf course and park, and to protect investments which have been or shall be made in reliance upon the retention of such open type use, to buffer an otherwise incompatible land use or district, to preserve a valuable scenic vista or an area of special historical significance, or to protect and preserve submerged land, fishing ponds, and lakes (natural or artificial tide lands)".

Some of the proposed uses at Kona Kai Ola are permitted uses in the Open zone such as:

- Heiau, historical areas, structures, and monuments;
- Natural features, phenomena, and vistas as tourist attractions;
- Private recreational uses involving no aboveground structure except dressing rooms and comfort stations;

- Public parks;
- Public uses and structures, as permitted under Section 25-4-11.

In addition to those uses permitted outright, the following uses are permitted after issuance of a use permit:

- Yacht harbors and boating facilities; provided that the use, in its entirety, is compatible with the stated purpose of the O district.
- Uses considered directly accessory to the uses permitted in this section shall also be permitted in the O district.

The proposed time-share and hotel units and commercial uses would not be consistent with the zoning designation of "Open". Project implementation therefore requires rezoning of portions of the project to the appropriate zoning category or use permits for certain uses.

Special Management Area

As shown in Figure AB, the entire project area up to the highway is within the coastal zone management zone known as the Special Management Area ("SMA"). At the County level, implementation of the CZM Program is through the review and administering of the SMA permit regulations. Kona Kai Ola complies with and implements the objectives and policies of the Coastal Zone Management (CZM) Program, and a full discussion is provided in Section 5.1.3. The development concepts in the proposed project and Alternatives 1 and 2 will be subject to applicable SMA rules and regulations.

Lynn Olival
4346 Kalia Place
Kailua Kona, HI 96740

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January 31, 2007

Mr. Scott Condra
Jacoby Development, Inc.
171 17th Street, NW Suite 1550
Atlanta, GA 30363

Subject: DEIS- Kona Kai Ola, Kealakehe, North Kona District, Island of Hawaii

Dear Mr. Condra,

I am a fourth generation kama'aina who has been coming to Kona since 1961. There were two hotels then- the Kona Inn and the King Kamehameha. When I moved from Hilo in 1979 there were a few more, but only one traffic light at Kuakini and Palani road. There have been many changes on the Big Island in the last ten years especially.

Twenty seven years later there are approximately 4500 units of hotel rooms on the Kona coast. Being in the car rental business for over 15 years, I know that these hotels do not operate at anywhere near 100%.

The rapid development in Kona within the last 10 years has put serious pressures on the infrastructure such as water, roads, sewage treatment, housing and the job market. The newspapers are full of stories of Kona's fast growth problems.

The proposed development is not right for downtown Kona. What is the justification for proposing 2300 more units at one site? In addition, the Kaloko-Honokohau National Park next door is home to numerous species of marine life that will be adversely affected by the dredging of the harbor to make way for 800 more slips! How can our precious ocean accommodate this many more boats?

I have seen the reef life and the large fish catches dwindle year after year. How many granders are left? Anyone who was a child before 1970 knows that the ocean life is not as it was. So many species are declining in numbers.

There are numerous anchiline pools with rare species of shrimp that will be adversely affected by the blasting and pollution caused by this proposed project.

On another point, my understanding is that the projected slip fee for the boat slips is significantly higher than our local fisherman can afford. The project is going to only be accessible to a select few.

This proposed project does not in any way enhance our Kona Coast. It will only add to the already overtaxed infrastructure and make our quality of life and the natural environment even more degraded.

This project should not take place in Kona.

Sincerely,

Lynn Olival

Cc: DLNR, Oceanit Center, OEQC

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Lynn Olival
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Kailua Kona HI 96740

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innovation through engineering & scientific excellence

July 23, 2007

Lynn Olival
4346 Kalia Place
Kailua-Kona, Hawai'i 96740

Dear Ms. Olival:

Subject: Kona Kai Ola Draft Environmental Impact Statement
Response to Your Comments Dated January 31, 2007

Thank you for your comments on the Kona Kai Ola Draft Environmental Impact Statement.

We acknowledge your concerns about the size of the project, and note that, since the DEIS was published, an alternatives analysis was conducted that explored a smaller marina and less hotel and timeshare units. As explained in the DEIS, the agreement between JDI and the State of Hawai'i established a required scope and scale of the project for which the impact analysis was provided. Several comments have addressed the fact that alternatives other than the No Project Alternative were not addressed in the DEIS Section 2, Alternatives Analysis.

We are of the position that alternative actions other than a No Project alternative are not currently feasible without an amendment to the agreement with the State. Agency and public comments in response to the DEIS, as well as additional information generated as a result of inquiry into issues raised by the comments, have been helpful in identifying alternative actions that will serve the State's goal of providing additional marina slips for the Kona area. These alternative actions also serve to reduce or mitigate anticipated effects of the proposed development.

Thus, agencies such as the Land Division of the Department of Land and Natural Resources, the U.S. Department of the Interior Fish and Wildlife Service, the Planning Department of the County of Hawai'i, and the Office of Environmental Quality Control (OEQC), as well as community organizations have commented that a reduced scale marina and related facilities should be considered. The OEQC has also asked that the alternative of a reduced scale project be evaluated under the assumption that DHHL may determine that a downsized project would be preferred.

In response to these comments on the DEIS and in consideration of measures to mitigate anticipated impacts, the EIS Section 2, Alternatives Analysis, has been revised to describe the following alternatives, which are discussed in more detail in the EIS:

Oceanit Center 828 Fort Street Mall, Suite 600 Honolulu, Hawaii 96813 Phone: 808.531.3017 Fax: 808.531.3177
www.oceanit.com

- Alternative 1 is a project involving a 400-slip marina, 400 hotel units, 1,100 time-share units, and commercial and support facilities. This alternative would enhance water quality and avoid the need to widen the existing harbor entrance channel, as well as reduce traffic and socioeconomic impacts.

- Alternative 2 is an alternative that had been previously discussed, but not included in the proposed project that includes an 800-slip harbor and a golf course.

- Alternative 3 is the no-action alternative.

A comparison between impacts related to the proposed project concept and impacts related to Alternative 1 indicates that a reduction in the acreage and number of slips in the marina, as well as the reduction in hotel and time-share units, would generate less environmental, traffic, social and economic impacts. Although positive economic impacts would be reduced, Alternative 1 can be considered as a preferable alternative because of reduced environmental impacts. However, while it can be concluded that the 25-acre marina in Alternative 1 would be the preferred size, the DLNR agreement establishes the size of the marina at 45 acres and 800 slips. An amendment to the DLNR agreement is required in order to allow Alternative 1 to proceed. Hence, selection of Alternative 1 is an unresolved issue at this time. The additional EIS text that includes the added EIS Section 2, Alternative Analysis, is contained in Attachment 1 of this letter.

Also, several additional studies were conducted to expand our understanding of existing conditions, identify project impacts and proposed appropriate mitigation measures. Additional studies conducted in response to DEIS comments included:

- An Inventory and Assessment of Anchialine Pools Including Management and Mitigation Recommendations

- Marina Harbor Water Quality Study

- Evidence and Implications of Saline Cold Groundwater

- Groundwater Effects on Anchialine Pools

- Supplemental Groundwater Sampling and Analyses for Priority Pollutants

- Description of Marine Mammal and Sea Turtle Species

- Acoustic Analysis of Potential Impacts (related to construction-generated underwater acoustics)

- Ambient Noise Measurements and Estimation Study

- Workforce Housing Impacts Assessment

Your concern about ocean water quality is acknowledged and the Marina Harbor Water Quality Study evaluated water quality impacts due to construction of an 800-slip marina on 45 acres. A three dimensional water quality model was calibrated and run to determine the impacts of development on the water quality of the harbor and the nearshore area. The model simulated different scenarios and determined the changes to the harbor and nearshore environment.

The model study found that construction of the 45-acre 800 slip marina in the proposed project increases the flushing time of the harbor significantly. It also modifies the two layer flow system that currently maintains good water quality in the harbor. As an alternative a smaller 25-acre 400 slip marina, as contained in Alternative 1, was tested in the model. The model results showed that reducing the marina size is an important factor in maintaining water quality independent of the groundwater flow increase.

Regarding anchialine pools, additional studies found that the DEIS assessment that all anchialine pools will be barren with the construction of the harbor may be premature. Additional studies indicated that with the construction of the new harbor basin, the anchialine pools makai of the proposed basin may not necessarily increase in salinity to levels unhealthy for anchialine pool fauna. In addition, these studies determined that there are ways to mitigate potential impacts. Mitigation measures to facilitate the long term health of the remaining anchialine pools will be based on environmental monitoring, which is vital as an early warning system to detect potential environmental degradation. As a mitigation measure, bioretention, which is a Best Management Practice (BMP), is a highly appropriate application for the proposed development to prevent any nonpoint source pollution of groundwater. Another mitigation measure that may be included in the management plan is salinity adjustment of the anchialine pools to maintain healthy habitat for the anchialine ecosystem by surcharging man-made anchialine pools created adjacent to or in the vicinity of natural pools with low salinity well water.

Regarding boat slip fees, the project is intended to provide community-oriented features for residents and visitors alike. These community-oriented features include various water features such as seawater lagoons with a marine wildlife park and a marine science center, a yacht club, fishing club, a canoe park, and a cultural park with a focus on Hawaiian maritime cultural heritage of the voyaging canoe. The coastal area would be protected with a shoreline park with trails and public access parking for walking and shoreline fishing, and a cultural park surrounding the heiau, the cultural sites and ‘Alula for community use. While it too early to predict boat slip fees, the general community orientation of Kona Kai Ola will be reflected in marina operations.

Your comment letter and this response are included in the Final Environmental Impact Statement. We appreciate your participation in the environmental review process. Please submit a request to our office if you would like to receive a printed or electronic copy of the Final Environmental Impact Statement, or portions thereof.

Sincerely,

Dayan Vithanage, P.E., PhD.
Director of Engineering

cc: Office of Environmental Quality Control
State Department of Hawaiian Home Lands
Jacoby Development, Inc.

Attachment 1

2 Alternatives Analysis

~~In typical land development projects, the initial planning process includes the exploration of alternatives to development objectives. In the EIS process, these alternatives are presented with a disclosure of reasons for the dismissal of non-preferred alternatives.~~

~~Kona Kai Ola does not follow this same pattern of alternatives evaluation.~~ As discussed in Section 1.4, the proposed Kona Kai Ola project is the result of agreements between JDI and the State DLNR and DHHL. The agreements and leases between the State and JDI stipulate the parameters of development for this site in terms of uses, quantities and size of many features, resulting in a limited range of land uses. Unlike a private property project, JDI is required to meet the criteria outlined in the agreements, thereby affording less flexibility in options and uses. From the developer's perspective, the agreements must also provide sufficient flexibility to allow for a development product that responds to market needs and provides a reasonable rate of return on the private investment.

The agreements between JDI and DLNR specify that the proposed harbor basin is to be 45 acres and accommodate 800 slips. This development proposal is the subject of this EIS. In response to DEIS comments, additional water quality studies and modeling were conducted. These studies determined that the water circulation in a 45-acre 800-slip marina would be insufficient to maintain the required standard of water quality. The models of water circulation suggest that a new 25-acre harbor basin could successfully maintain required water quality in the new harbor. Comments on the DEIS from DLNR, from other government agencies, the neighbors and the general community also called for the consideration of alternatives in the EIS, including a project with a smaller harbor basin and less density of hotel and time-share units.

In response to these comments on the DEIS, three alternatives are evaluated in this Final EIS and include Alternative 1, which is a plan with a 25-acre 400-slip harbor basin including a decrease in hotel and time-share units; Alternative 2, which is an alternative that had been previously discussed but not included in the proposed project, that includes an 800-slip harbor and a golf course; and Alternative 3, the no-project alternative. Each alternative is included in the EIS with an evaluation of their potential impacts. These project alternatives are presented to compare the levels of impacts and mitigation measures of the proposed project and alternative development schemes pursuant to requirements set forth in Chapter 343, HRS.

~~JDI is required to provide a new marina basin not less than 45 acres and a minimum of 800 new boat slips. Further, the agreements provide the following options for land uses at the project site:~~

- ~~Golf Course~~
- ~~Retail Commercial Facilities~~
- ~~Hotel Development Parcels~~
- ~~Marina Development Parcels~~
- ~~Community Benefit Development Parcels~~

~~JDI is not pursuing the golf course option and is proposing instead to create various water features throughout the project site. All other optional uses have been incorporated in Kona Kai Ola.~~

2.1 Project Alternatives

2.1.1 Alternative 1: 400-Slip Marina

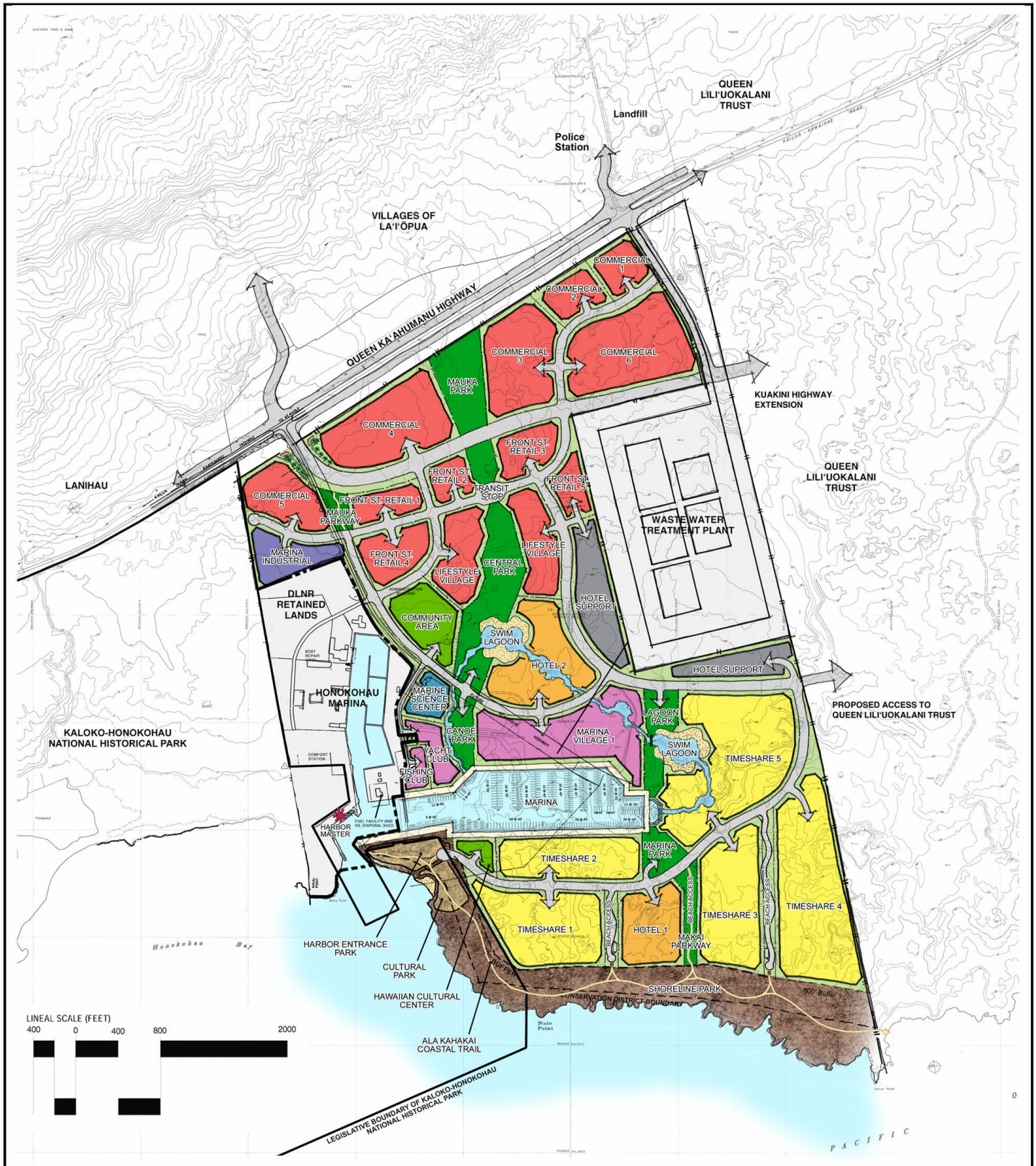
Studies conducted in response to DEIS comments found the construction and operation of an 800-slip marina may significantly impact the water quality within the marina and along the shoreline. Specifically, the Harbor Water Quality Modeling Study, as contained in Appendix U, found that the water circulation in a 45-acre 800-slip harbor was insufficient to maintain an acceptable level of water quality. Further, the existing harbor channel, which would serve both the existing and new harbors, could not adequately serve the increased boat traffic generated by an 800-slip marina during peak traffic. Mitigation measures to accommodate peak boat traffic included the widening of the existing channel, an action that would entail a complex process of Federal and State approvals and encounter significant environmental concern.

Concerns related to the proposed density of hotel and time-share units were also expressed in comments to the DEIS from members of the public, neighbors to the project site, especially the Kaniohale Community Association, and government agencies. Common themes in DEIS comments were related to impacts regarding traffic, project requirements of potable water and infrastructure systems, including sewer, drainage, utility and solid waste systems, and socioeconomic impacts.

In response to the water quality study results, and to the DEIS comments, an alternative plan was developed with a smaller marina with less boat slips, and a related decrease in hotel and time share units. Illustrated in Figure G, Alternative 1 reflects this lesser density project, and features a 400-slip marina encompassing 25 acres. For the purposes of the Alternative 1 analysis, JDI assumed 1,100 time-share units and 400 hotel rooms. Project components include:

- 400 hotel units on 34 acres
- 1,100 time-share units on 106 acres
- 143 acres of commercial uses
- 11 acres of marina support facilities
- 214 acres of parks, roads, open spaces, swim lagoons and community use areas

In addition, Alternative 1 would include the construction of a new intersection of Kealakehe Parkway with Queen Ka'ahumanu Highway, and the extension of Kealakehe Parkway to join Kuakini Highway to cross the lands of Queen Lili'uokalani Trust, and connecting with Kuakini Highway in Kailua-Kona. This is a significant off-site infrastructure improvement and is included in the agreements between the State and JDI.



Source: PBR HAWAII

Plan is conceptual only and subject to change

Figure G: Alternative 1: 400-Slip Marina

LEGEND

- TIME SHARE
- HOTEL
- RETAIL / COMMERCIAL
- MARINA RETAIL
- MARINA SUPPORT / COMMERCIAL
- MARINE SCIENCE CENTER
- COMMUNITY AREA / CULTURAL CENTER
- SWIM LAGOON
- MARINA
- UTILITIES
- PARKS & GREEN SPACE
- SHORELINE
- HARBOR ENTRANCE PARK / CULTURAL PARK

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JDI
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Like the proposed project, Alternative 1 would have a strong ocean orientation, and project components that support this theme would include various water features including seawater lagoons and a marine science center. The new Alternative 1 harbor would include a yacht club, fishing club, a canoe park, and a cultural park with a focus on Hawaiian maritime cultural heritage of the voyaging canoe. The coastal area would be protected with a shoreline park with trails and public access parking for walking and shoreline fishing, and a cultural park surrounding the heiau, the cultural sites and 'Alula for community use. Additional Alternative 1 community areas would include facilities and space for community use, including programs of the Kona Kai Ola Community Foundation, which supports community programs in health care, culture, education, and employment training for the local community, especially to native Hawaiians. Like the original proposed plan, Alternative 1 includes 40 percent of the land in parks, roads, open spaces, swim lagoons and community use areas.

2.1.2 Alternative 2: Golf Course Feature

Alternative 2 was among the alternatives discussed at a community charrette in September 2003. It includes a golf course, which is a permitted use in the DLNR agreement and DHHL lease. As Figure H illustrates, an 18-hole championship golf course would occupy 222 acres on the southern portion of the project site. As with the proposed project, Alternative 2 includes an 800-slip marina on a minimum of 45 acres.

To support the economic viability of the project, other Alternative 2 uses include:

- Golf course clubhouse on three acres
- 1,570 visitor units on 88 acres fronting the marina
- 118 acres of commercial uses
- 23 acres of community uses

Community uses in Alternative 2 include an amphitheater, a canoe facilities park, a community health center, a Hawaiian cultural center and fishing village, a marine science center and employment training center. The sea water lagoon features contained in the proposed project and Alternative 1 are not included in this alternative.

2.1.3 Alternative 3: No Action

In Alternative 3, the project site would be left vacant, and the proposed marina, hotel and time-share facilities, commercial and marina industrial complexes, and community-oriented uses would not be realized.

~~The economic viability and sustainability of the project is determined by the density and uses proposed. Because JDI is obligated to develop an 800-slip marina for the State, complete road improvements, and provide various public enhancement features at its own expense, the density proposed for the income generating features of the development must be sufficient to provide an acceptable level of economic return for JDI. The market study, which is discussed in Section 4.6, reviewed various development schemes and determined that the currently proposed density and mix is the optimum to meet the anticipated financing and development cost obligations for the public features associated with the development.~~

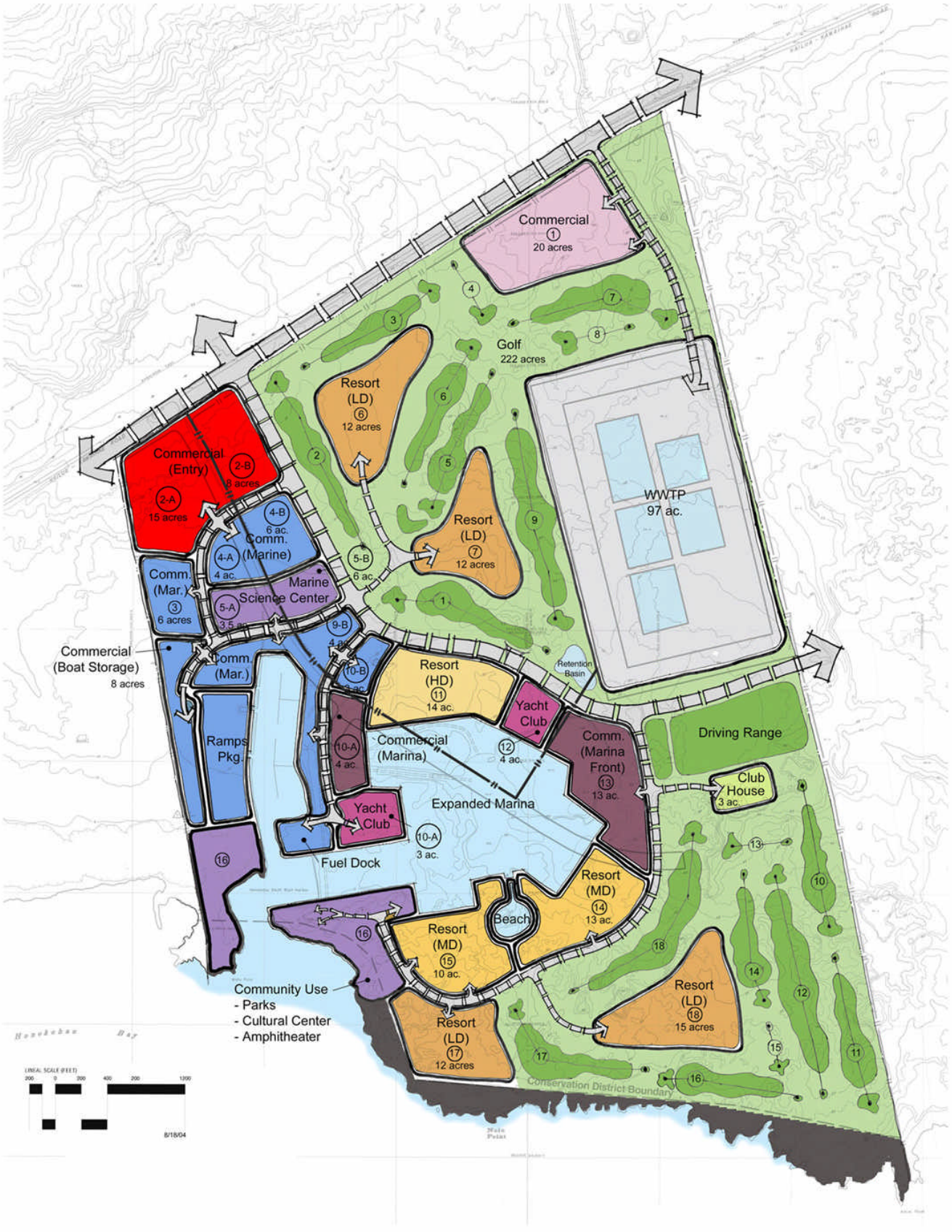

Figure H. Alternative 2: Golf Course Alternative

Legend

N E S W

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2.2 Alternatives Analysis

As discussed in Section 2.1, the proposed Kona Kai Ola project (also referred to as "proposed project") is defined by development requirements related for a marina and the related uses that would be needed to generate a reasonable rate of return that covers development costs.

Beginning with Section 2.2.1, the alternative development concepts are comparatively assessed for potential impacts that may reasonably be expected to result from each alternative. Following is an overview of the primary observations of such assessment.

Alternative 1 includes half of the State-required boat slips and 60 percent of the proposed hotel and time-share units and, due to the decreased density, this alternative would generate significantly less environmental and socio-economic impacts. A harbor water quality model found the reduction of the volume of the new marina basin by about half (approximately 25 acres) significantly improved the water circulation and quality. Further, the reduced number of boat slips would generate less boat traffic, thereby reducing congestion and the need to mitigate impacts further by the widening of the existing harbor channel.

A project with fewer hotel and time-share units and increased commercial space with a longer (14 years) absorption period would change the mix of employment offered by the project, and slightly increase the overall employment count. The public costs/benefits associated with Alternative 1 would change, compared to the proposed project, with a general increase in tax collections, and a general decrease in per capita costs. Detailed discussion of Alternative 1 potential economic impacts are provided in Section 4.6.6. Comparisons of levels of impact are presented throughout this FEIS.

While this analysis might indicate that the 25-acre marina in Alternative 1 would be the more prudent choice, the DLNR agreement establishes the minimum size and slip capacity of the marina at 45 acres and 800 slips, respectively. Amendments to the DLNR agreement would be required in order to allow Alternative 1 to proceed as the preferred alternative. Hence, selection of the preferred alternative is an unresolved issue at the writing of this FEIS.

Alternative 2, the golf course alternative, was not previously considered to be the preferred alternative primarily because market conditions at the time of project development might not likely support another golf course. Further, DHHL has a strategy goal to have more revenue-generating activities on the commercial lease lands within the project area. In addition, concerns have been expressed as to environmental impacts of coastal golf courses, including the potential adverse impact on Kona's water supply if potable water is used for golf course irrigation.

While Alternative 3, the no-project alternative, would not generate adverse impacts related to development of these lands associated with the construction and long-term operations, it would also not allow for an expanded public marina that would meet public need and generate income for the public sector. Further, the no-project alternative would foreclose the opportunity to create a master-planned State-initiated development that would result in increased tax revenue, recreation options and community facilities. Crucial privately-funded improvements, such as the marina, regional roadway and circulation improvements, and improvements to the existing wastewater treatment plant, would not be implemented. Private funds toward the development of community-oriented facilities such as parks, other recreational facilities, and public access would not be contributed.

~~Hence, the only valid alternative to the proposed project is the no-action alternative. In this alternative, the project site would be left vacant, and the proposed marina, hotel and time-share facilities, commercial and marina industrial complexes, and community-oriented uses would not be realized.~~

~~The no-project alternative would therefore not generate adverse impacts associated with the construction and long-term operations would not occur.~~

~~Likewise, the creation of a master-planned state-initiated development, resulting in increased employment, tax revenue, recreation options and community facilities, would not be created. Privately-funded improvements, such as the marina, regional roadway and circulation improvements, and improvements to the existing wastewater treatment plant, would not be implemented. Private funds toward the development of community-oriented facilities such as parks, other recreational facilities and public access would not be contributed.~~

Further, the creation of revenue-producing businesses on the DHHL property to fund homestead programs would not occur, resulting in fewer potential benefits for Hawaiians.

Hence, the agreements and leases between the State and JDI indicate that the no-action alternative is not in the public interest~~has been rejected at this time~~.

2.2.1 Impact Comparison

Grading and Excavation

The proposed project requires grading and excavation. Both actions may impact groundwater due to rainfall runoff during construction. Alternative 1 would require a significantly smaller excavation for the marina basin and would therefore carry a lesser risk of potential adverse effects on water quality. Alternative 2 would require the same basin excavation as the proposed project, and would also include extensive grading and filling to build the golf course, the latter of which would generate additional impacts. Alternative 3 would result in no change to the geography, topography and geology.

Further discussion on grading and excavation is contained in Section 3.3.

Natural Drainage

Most precipitation infiltrates into the porous ground at the site, and no significant sheet flow is likely. Alternative 1 would generate similar levels of impacts on natural drainage as those of the proposed project and thus require similar mitigation measures. The golf course in Alternative 2 would not be as porous since the site would be graded, soil would be placed, and grass and other landscaping would be grown. Sheet flow and runoff can occur on a golf course, and drainage patterns might change. Alternative 3 would result in no change to the existing natural drainage pattern. Further discussion on natural drainage is contained in Section 3.4.

Air Quality

Air quality will be affected by construction activities, as well as pollutants from vehicular, industrial, natural, and agricultural sources. Alternative 1 would generate less construction air quality impacts than the proposed project due to the reduced amount of intensive groundwork associated with the smaller marina basin and fewer long-term impacts by reducing traffic 35 and 40 percent during, respectively, AM and PM peak traffic times. Construction of Alternative 2 would result in fugitive dust and exhaust from equipment and is expected to generate the same level of air quality impact as the proposed project. Alternative 3 would result in no change to existing air quality. Further discussion on air quality is contained in Section 3.5.

Terrestrial Environment

To provide additional habitat for shorebirds and some visiting seabirds, the project proposes to construct a brackishwater pond area suitable for avian fauna, including stilts, coots and ducks. While habitat expansion is beneficial, there is also a possibility that these species may be exposed to activity that may harm them. Alternative 1 would not include a brackish water pond, but will include 5 acres of seawater features, which is 74 percent less than the 19 acres of seawater features in the proposed project. While this would reduce beneficial impacts, it would also decrease exposure to potentially harmful activity. Alternative 2 does not include the brackish water pond features, but would include drainage retention basins that would attract avian fauna and expose them to chemicals used to maintain golf course landscaping. While Alternative 3 would result in no increase in potentially harmful activity, it would also not provide additional habitat for avian fauna. Further discussion on the terrestrial environment is contained in Section 3.7.

Groundwater

Groundwater at the project site occurs as a thin basal brackish water lens. It is influenced by tides and varies in flow direction and salt content. The existing Honokōhau Harbor acts as a drainage point for local groundwater. Any impact to groundwater flow from the proposed harbor is likely to be localized. The proposed marina basin will not result in any significant increase in groundwater flow to the coastline, but rather a concentration and redirection of the existing flows to the harbor entrance.

There will be differences in the flow to the marina entrance between the proposed project and Alternative 1. Alternative 1, being smaller in size, will have less impact on groundwater flow than the proposed marina. Alternative 2 will have a similar impact to groundwater quality as the proposed project. Alternative 2 may also impact water quality by contributing nutrients and biocides to the groundwater from the golf course. Alternative 3 would result in no change in existing groundwater conditions. Further discussion on groundwater is contained in Section 3.8.1.

Surface Water

There are no significant natural freshwater streams or ponds at the site, but there are brackish anchialine pools. Surface water at the project site will be influenced by rainfall. Runoff typically percolates rapidly through the permeable ground. The proposed project will include some impermeable surfaces, which together with building roofs, will change runoff and seepage patterns.

Alternative 1 is a lower density project that is expected to have proportionally less impact on surface water and runoff patterns and less potential impact on water quality than the proposed project. Alternative 2 would have more impact on surface water quality than the proposed project due to fertilizers and biocides carried by runoff from the golf course. Alternative 3 would result in no change to surface water conditions. Further discussion on surface water is contained in Section 3.8.2.

Nearshore Environment and Coastal Waters

The potential adverse impacts to the marine environment from the proposed project are due to the construction of an 800-slip marina and the resulting inflow of higher salinity seawater and inadequate water circulation, both of which are anticipated to impair water quality to the extent of falling below applicable standards. One possible mitigation measure is to significantly reduce the size of the marina expansion.

The reduced marina size (from 45 to 25 acres) and reduced lagoon acreage in Alternative 1 are expected to result in a proportionate reduction in seawater discharging into the new harbor and increased water circulation. Alternative 2 includes the same marina basin size and is therefore subject to the same factors that are expected to adversely affect water quality.

In the existing Honokōhau Harbor, water quality issues focus on the potential for pollutants, sediments, mixing and discharge into the nearshore marine waters. Before the harbor was constructed, any pollutants entrained within the groundwater were believed to have been diffused over a broad coastline.

The water quality in the proposed harbor depends on several components. These include salinity, nutrients, and sediments that come from the ocean, rainfall runoff, water features with marine animals, and dust. The smaller project offered as Alternative 1 is expected to produce a reduced amount of pollutants and reduce the risk of adverse impact upon water quality.

It is notable that the 45-acre marina basin planned in the proposed project and Alternative 2 only becomes viable from a water quality impact standpoint if the additional brackish groundwater inflow into the new marina exceeds 60 mgd. The resulting flushing from such inflow would be expected to better maintain water quality. However, it is unclear whether 60 mgd of brackish groundwater would be available. As proposed in Alternative 1, reduction of the volume of the new marina basin by 45 percent will significantly improve the flushing and water quality because the lower volume can be flushed by the available groundwater flow.

In addition, there could be higher rainfall runoff from the Alternative 2 golf course into the harbor, because the grassed golf course will be less porous than the natural surface. The golf course will also require relatively high levels of fertilizer, biocides, and irrigation, all of which could contribute to adverse water quality impacts.

Further discussion on nearshore environment and coastal waters is contained in Section 3.9.1.

Anchialine Pools

Anchialine pools are located north of Honokōhau Harbor, and south of the harbor on the project site. The marine life in these pools is sensitive to groundwater quality, and changes due to construction and operation of the project could degrade the viability of the pool ecosystem. In the southern complex, 3 anchialine pools with a combined surface area of $20m^2$ would be eliminated due to the harbor construction in the proposed project and Alternatives 1 and 2.

Predicting the extent of change in groundwater flow is difficult if not impossible even with numerous boreholes and intense sampling. The actual flow of groundwater towards the sea is minimal today, and tidal measurements show that tide fluctuations represent more than 90 percent in actual harbor tides. The fluctuations occur simultaneous with the ocean/harbor tide, which indicate a vertical and horizontal pressure regime between bore hole 6 and the ocean and harbor. Hence, the tides alone create a mixing system that increases salinity, as the flow approaches the point of discharge which will be either the channel or the shore. Another factor that could influence groundwater quality is the increased local recharge from irrigation between the channel and shore. This will add fresh water to the lens locally but is not quantified at this time.

Quantification of these impacts, including the flow of groundwater through each pond, is therefore extremely difficult. The shallow lavas are of the pahoehoe type and have a relatively high horizontal permeability. In surface depressions or undulations, the pahoehoe lavas have a tendency to lose vertical permeability from sedimentation thus restricting water exchange within the individual pools. This is normally reflected in both the salinity and temperature and this information has been adequately studied in the pools.

Changes in groundwater quality may or may not impact biological communities in the anchialine and estuarine environment. In either case, it is important to understand these relationships to effectively manage the resource. If there is significant deviation from the baseline especially in regard to nutrients, pathogens, and toxins, a mitigation plan to determine the cause and take decisive appropriate action will be implemented.

Due to the uncertainty of changes in groundwater flow and quality due to marina construction, the variability in impacts between the proposed project and Alternatives 1 and 2 is unknown at this time. Alternative 3 would result in no change in groundwater flow. While this would eliminate the potential for adverse impacts, Alternative 3 would also continue the pattern of existing degradation related to human activity and the introduction of alien species. Further discussion on anchialine pools is contained in Section 3.9.2.

Marine Fishing Impacts

The proposed marina will increase the number of boats in the area and it is reasonable to assume that a portion of these new boats will engage in fishing activities. The increase in boats in the area would be primarily related to the marlin and tuna / pelagic fishery, coral reefs due to extractive fisheries, and SCUBA activities. The pressure on fish and invertebrate stocks is expected to increase with or without the marina. Harbor expansion provides the opportunity to address existing conditions to consolidate, focus, and fund management and enforcement activities at one location.

Compared to the proposed project, Alternative 1 would result in a 21 percent decrease in boat traffic, thereby lessening the potential for marine fishing impacts. The level of impacts in Alternative 2 would be similar to that of the proposed project. Alternative 3 would result in no change in existing marine fishing conditions, and no opportunity to address already existing pressure on fish and invertebrate stocks. Further discussion on marine fishing impacts is contained in Section 3.9.3.

Cultural and Archaeological Resources

The proposed project will integrate cultural and archaeological resources in the overall development. Archaeological sites recommended for preservation will be preserved, and cultural practices will be encouraged. Kona Kai Ola includes a canoe park, and a cultural park with a focus on Hawaiian maritime cultural heritage of the voyaging canoe. Proposed is a 400-foot shoreline setback that would serve as a buffer between the ocean and developed areas. This coastal area would be protected with a shoreline park with trails and public access parking for walking and shoreline fishing, and a cultural park surrounding the heiau, the cultural sites and ʻAlula for community use.

Alternative 1 would contain all of the cultural archaeological features and the shoreline setback area would be 400 feet in the northern portion of the site and increase to 600 feet in the southern portion. Alternative 2 would preserve cultural and archaeological resources, but does not include a 400-foot shoreline setback. Alternative 3 would result in no change to existing cultural and archaeological resources and no addition of cultural and community facilities and activities. Further discussion on cultural and archaeological resources is contained in, respectively, Sections 4.1 and 4.2.

Noise

Project-generated noise is due to construction equipment and blasting, boats, marina activities, vehicle traffic, and the Kealakehe Wastewater Treatment Plant operations. Alternative 1 would generate less noise impacts due to reduced construction activities, fewer boats, less traffic and less on-site activity. Alternative 2 would also generate less noise due to reduced traffic and less on-site activity, but noise related to the excavation of the marina basin and an increase in the number of boats would be similar to that of the proposed project. Further discussion on noise impacts is presented in Section 4.4.

Socioeconomic Impacts

The proposed project will generate an increase in de facto population of an estimated 5,321 persons due to the increase in hotel and time-share units. The estimated de facto population increase in Alternative 1 is 37 percent less, at 3,363 persons, than the proposed project. The de facto population increase in Alternative 2 is similar to Alternative 1.

Employment in the commercial components will nearly double in Alternative 1, from a stabilized level of 1,429 full-time equivalent (FTE) positions in the proposed project to 2,740 in the Alternative 1.

Under Alternative 1, the total operating economic activity at Kona Kai Ola will increase due to the added commercial space more than off-setting the fewer visitor units, moving upward from $557.6 million per year to circa $814.3 million annually. The total base economic impact resulting from development and operation of Alternative 1 will similarly be higher by between 35 and 45 percent than that of the proposed project.

Alternative 1, which has a reduced marina size of 25 acres, and fewer hotel and time-share units, would have a meaningful market standing, create significant economic opportunities, and provide a net benefit to State and County revenues. From a market perspective, a smaller Kona Kai Ola would still be the only mixed use community in the Keahole to Kailua-Kona Corridor offering competitive hotel and time-share product.

The estimated absorption periods for marketable components of Alternative 1 are generally shorter than those for the same components in the proposed project. Marina slips under Alternative 1 are estimated to be absorbed within 2 years after groundbreaking, as compared with 9 years for absorption of slips in the proposed project. Hotel rooms under Alternative 1 are estimated to be absorbed within 4 years after groundbreaking, as compared with 7 years under the proposed project. Time-share units would be absorbed within 10 years under Alternative 1, while 15 years are projected under the proposed project. Due to the planned increase in commercial facilities under Alternative 1, the absorption period of commercial space is estimated at 14 years, as compared with 8 years for absorption of such facilities under the proposed project.

The State and County will still both receive a net benefit (tax receipts relative to public expenditures) annually on a stabilized basis under the Alternative 1. The County net benefits will be some $12.2 million per year under the Alternative 1 versus $14.9 million under the proposed project. The State net benefits will increase under the Alternative 1 to about $37.5 million annually, up substantially from the $11.4 million in the proposed project.

Due to the lower de facto population at build-out, the effective stabilized public costs for both the State and County will decline meaningfully under the Alternative 1, dropping from $7.7 million annually for the County and $36.5 million for the State, to $4.9 million and $23 million per year, respectively.

Alternative 3 would result in no increase in de facto population and improvement to economic conditions. Further discussion on social and economic impacts are contained in, respectively, Sections 4.5 and 4.6.

Vehicular Traffic

The proposed project will impact the nearby road network that currently is congested during peak traffic times. The proposed project includes roadway improvements that would reduce the impact and improve roadway conditions for the regional community.

Alternative 1 includes the same roadway system improvements as the proposed project, yet would reduce vehicular traffic by 35 percent when compared to the proposed project. Alternative 2 would have similar traffic conditions and roadway improvements as Alternative 1. Alternative 3 would result in no increase in traffic and no roadway improvements.

Marina Traffic Study

The increase in boat traffic due to the proposed 800-slip marina would cause entrance channel congestion during varying combinations of existing and new marina peak traffic flow. Worst case conditions of active sport fishing weekend and summer holiday recreational traffic result in traffic volumes exceeding capacity over a short afternoon period. Mitigation to address boat traffic in the proposed project include widening the entrance channel, traffic control, implementation of a permanent traffic control tower, or limiting vessel size.

Alternative 1 would result in a 21 percent reduction in boat traffic congestion under average existing conditions and ten percent reduction during peak existing conditions. The reduction to 400 slips also reduces the impacts of congestion at the entrance channel, thereby reducing the need for any modifications to the entrance channel.

Alternative 2 would have the same level of boat traffic as the proposed project. Alternative 3 would not meet the demand for additional boat slips and would not generate additional boat traffic. Further discussion on marina traffic is contained in Section 4.8.

Police, Fire and Medical Services

The proposed project will impact police, fire and medical services due to an increase in de facto population and increased on-site activity. Alternatives 1 and 2 would have similar levels of impact as the proposed project due to increased on-site activity. Further discussion on police, fire and medical services are contained, respectively, in Sections 4.10.1, 4.10.2 and 4.10.3.

Drainage and Storm Water Facilities

The proposed project will increase drainage flows, quantities, velocities, erosion, and sediment runoff.

Alternative 1 involves a reduction of the project density that would reduce storm runoff from the various land uses due to a reduction in impervious surfaces associated with hotel and time-share development and to the creation of more open space. However, roadway areas will increase by about 30 percent in Alternative 1. Storm runoff from proposed streets would therefore increase; thus requiring additional drainage facilities and possibly resulting in no net savings. The golf course in Alternative 2 may also change drainage characteristics from those of the proposed project and may not reduce impacts. Alternative 3 would result in no change in existing conditions and no improvements to drainage infrastructure. Further discussion on drainage and storm water facilities is contained in Section 4.10.5

Wastewater Facilities

The proposed development is located within the service area of the Kealakehe WWTP and a sewer system will be installed that connects to the WWTP. The sewer system will be comprised of a network of gravity sewers, force mains, and pumping stations which collect and convey wastewater to the existing Kealakehe WWTP. Project improvements will incorporate the usage of recycled / R1 water. Improvements implemented by the proposed project will also accommodate the needs of the regional service population.

Alternative 1 would generate approximately 10 percent less wastewater flow than the proposed project. Wastewater flow in Alternative 2 is undetermined. Alternative 3 would result in no additional flow, as well as no improvements that will benefit the regional community. Further discussion on wastewater facilities is contained in Section 4.10.6.

Potable Water Facilities

The proposed project average daily water demand is estimated at 1.76 million gallons per day. Existing County sources are not adequate to meet this demand and source development is required. The developer is working with DLNR and two wells have been identified that will produce a sustainable yield that will serve the project. These wells will also serve water needs beyond the project.

Alternative 1 would result in net decrease of about five percent of potable water demand. Alternative 2 may have a lower water demand than the proposed project as long as potable water is not used for irrigation. Alternative 3 would result in no additional flow, as well as no source development that will benefit the regional community. Further discussion on potable water facilities is contained in Section 4.10.8.

Energy and Communications

Regarding Alternative 1, preliminary estimates for electrical, telecommunications, and cable resulted in a net demand load that remains similar to the proposed project. Further discussion on energy and communications is contained in Section 4.10.9.1.

The proposed project will increase the demand for electrical energy and telecommunications. The demand would be reduced in Alternative 1 because the number of boat slips and units would decrease. Similarly, Alternative 2 would have fewer units than the proposed project and therefore reduce energy demands. Further reduction in energy demand for either alternative could be achieved by using seawater air conditioning (SWAC) and other energy reduction measures, as planned by the developer. Further discussion on energy and telecommunications is contained in Section 4.10.9.2.

Water Features and Lagoons

The proposed project includes a brackishwater pond, lagoons, and marine life exhibits supplied by clean seawater. The water features in Alternative 1 would significantly decrease by 74 percent from 19 acres in the proposed project to five acres in Alternative 1. This decrease in water features would result in a corresponding decrease in water source requirements and seawater discharge. Alternative 2 does not include the seawater features. Alternative 3 would result in no additional demand for water source requirements and seawater discharge.

2.2.2 Conformance with Public Plans and Policies

State of Hawai'i

Chapter 343, Hawai'i Revised Statutes

Compliance with this chapter is effected, as described in Section 5.1.1 in regard to the proposed project and the alternatives discussed.

- State Land Use Law, Chapter 205, Hawai'i Revised Statutes

  The discussion in Section 5.1.2 is directly applicable to Alternative 1, the proposed project. Alternative 1 will involve a setback of 400 feet that increases to 600 feet along the southern portion of the project site's shoreline area. Alternative 2 does not provide for such a setback, but may still require approvals from DLNR for cultural, recreational, and community uses and structures within the Conservation district.

- Coastal Zone Management Program, Chapter 205A, Hawai'i Revised Statutes

  Recreational Resources:

  In addition to the discussion of consistency with the associated objective and policies, as described in Section 5.1.3, the reduction from the proposed project's 800-slip marina to a 400-slip marina under Alternative 1 will still expand the region's boating opportunities and support facilities. The existing harbor entrance will still be utilized under this alternative; however, potential risks relating to boat traffic and congestion in the marina entrance area will be reduced significantly. The 400-600 foot shoreline setback, public parks, trails, cultural areas, community facilities, and marine science center remain important recreational components under Alternative 1.

Alternative 2 includes a golf course component, which would add a more passive recreation to the active and social components, such as boating, fishing, swimming, trails, walkways, parks, marine life, educational and interactive areas that are also part of the project. The golf course would enhance the range of leisure and recreational opportunities offered at Kona Kai Ola.

Alternative 2, like the proposed project, will expand the region's boating opportunities and support facilities through its 800-slip marina. However, the potential adverse impacts of increased boat traffic from the size of the marina are significant enough to offset the benefits of increased boating opportunities.

Coastal Ecosystems:

The discussion in Section 5.1.3 is directly applicable to Alternative 1.

Alternative 1 not only reduces the number of slips proposed by 50 percent, but it also reduces the size of the marina from 45 acres to 25 acres. The 25-acre marina will increase the body of water within the existing harbor, but to a significantly lesser extent than the proposed project's estimated increase, which is also applicable to the 45-acre size that is proposed for the marina under Alternative 2.

The findings of the Harbor Water Quality Modeling Study conclude that a reduction in the size of the harbor expansion is an alternative that will mitigate the risk of significant impacts upon water quality within the marina and existing harbor. Accordingly, the reduction in both the number of slips and the size of the marina basin under Alternative 1, in combination with proper facilities design, public education, and enforcement of harbor rules and regulations, would result in fewer long-term impacts to water quality and coastal ecosystems. Short-term (construction-related) impacts would likely remain the same although the reduction in the total acreage of excavation is expected to result in a shorter duration of such impacts.

In addition to its 800-slip marina and potential adverse impacts upon water quality and the marine environment, Alternative 2 includes a golf course component, which has the potential to impact coastal ecosystems by increasing the nutrient loading in surface runoff and groundwater and also by introducing pesticides, herbicides, and other chemicals common in golf course use and management into the nearshore waters surrounding the project site.

Economic Uses

Although reduced in the number of slips, the smaller marina under Alternative 1 will nevertheless serve public demand for more boating facilities in West Hawai'i and is consistent with the objective and policies and discussion set forth in Section 5.1.3. The economic impacts of Alternative 2, while comparable to those of the proposed project's marina development, are notably marginal as to the golf course component, based on the marketability analysis that indicates a condition of saturation within the region.

Coastal Hazards

The discussion and considerations set forth in Section 5.1.3 are also applicable to Alternatives 1 and 2 and indicate compliance with the objective and policies addressed. Tsunami risks mainly affect the large shoreline setback area that is proposed for the project and Alternative 1. Alternative 2 projects a transient accommodation site that is partially within the tsunami hazard zone and thus carries a higher hazard risk. However, the essential requirement for these alternatives, as well as the proposed project, is a well-prepared and properly implemented evacuation plan.

Beach Protection

Discussion and considerations set forth in Section 5.1.3 are also applicable to Alternatives 1 and 2 and indicate compliance with the objective and policies addressed. Alternative 1 and, to a lesser extent, Alternative 2, will retain the shoreline area in its natural condition.

Similar to the proposed project, Alternative 1 provides for a shoreline setback of considerable width within which no structure, except for possible culturally-related structures, would be allowed. Alternatives 1 and 2 will thus be designed to avoid erosion of structures and minimize interference with natural shoreline processes.

Marine Resources

The discussion in Section 5.1.3 is also applicable to Alternative 1 which is described to be an alternative that is specifically projected to mitigate anticipated adverse impacts on water quality and the marine environment that might otherwise result from the original harbor design and scale, which is also incorporated in Alternative 2 . The reduced marina size under Alternative 1 is projected to meet water quality standards and enable greater compliance with the objective and policies addressed in this section.

Alternative 2 includes a golf course component and thus the potential to adversely impact marine resources by increasing the nutrient loading in surface runoff and groundwater and also by introducing pesticides, herbicides, and other chemicals common in golf course use and management into the nearshore waters surrounding the project site.

Hawai'i State Plans, Chapter 226, Hawai'i Revised Statutes

Section 226-4 (State goals), 5 (Objectives and policies for population, and 6 (Objective and policies for economy in general):

The discussion in Section 5.1.4 is applicable to Alternatives 1 and 2, in addition to the proposed project. These development concepts generally conform to the goals, objectives, and policies set forth in these sections because they will provide some degree of economic viability, stability, and sustainability for future generations. Kona Kai Ola will convert essentially vacant land into a mixed-use development with a distinctive marina and boating element, providing a wide range of recreational, business, and employment opportunities to the community.

Section 226-8 Objective and policies for the economy – the visitor industry:

Alternatives 1 and 2 will be consistent with the State's economic objective and policies relating to the tourism industry for the same reasons that are discussed in regard to the proposed project in Section 5.1.4. They will incorporate JDI's commitment to sustainability principles in the planning and design of the development concepts in Alternatives 1 and 2. Although the total hotel and time-share unit count is reduced to approximately 1,500 in Alternatives 1 and 2, the transient accommodations component of these alternatives will still further the State's objective and policies for increased visitor industry employment opportunities and training, foster better visitor understanding of Hawai'i's cultural values, and contribute to the synergism of this mixed-use project concept that addresses the needs of the neighboring community, as well as the visitor industry.

Section 226-11 Objectives and policies for the physical environment: land-based, shoreline and marine resources:

Alternative 1 is expected to involve less potential adverse impacts upon these environmental resources than the proposed project. Likewise, and Alternative 2 would have less adverse impact because of its reduction in the size of the marina and in the total hotel and time-share unit count. Alternative 1 carries less potential risk to water quality and related impacts upon the marine environment and anchialine pool ecosystems. Although approximately three anchialine pools are expected to be destroyed, the great majority of pools will be preserved within and outside of the proposed 400-foot shoreline setback.

The golf course component in Alternative 2 has the potential to impact marine resources by increasing the nutrient loading in surface runoff and groundwater and also by introducing pesticides, herbicides, and other chemicals common in golf course use and management into the marina basin and nearshore waters surrounding the project site. It also has the potential to adversely affect the anchialine pools by introducing the chemicals into the pond systems.

Section 226-12 Objective and policies for the physical environment: scenic, natural beauty, and historic resources:

The discussion in Section 5.1.4 is directly applicable to Alternative 1 and describes the compliance with the objective and policies addressed.

The golf course component of Alternative 2 would create a park-like view that would potentially enhance the beauty of the project site and surrounding areas when considered in combination with the existing rugged natural beauty of the area.

Just as with the proposed project, Alternatives 1 and 2 would also be designed to blend with the natural terrain and to honor and protect the cultural history, resources, and practices of these lands.

Section 226-13 Objectives and policies for the physical environment: land, air and water quality:

As stated above, because of the reduction in both the number of slips and the size of the marina basin, with proper facilities design, public education and enforcement of harbor rules and regulations, Alternative 1 is anticipated to cause fewer long-term impacts to water quality than either the proposed project or Alternative 2. Based on the findings of the Harbor Water Quality Modeling Study, water quality resulting from a reduced marina basin size as proposed under Alternative 1 is expected to be similar to existing conditions.

As previously noted, Alternative 2 has the potential to adversely impact water quality by increasing the nutrient loading in surface runoff and groundwater by introducing pesticides, herbicides and other chemicals common in golf course development and maintenance into the marina basin and nearshore waters surrounding the project site.

Section 226-14 Objectives and policies for facility systems - general:

Alternatives 1 and 2 will conform to the objective and policies of this section on the grounds that are discussed in regard to the proposed project in Section 5.1.4. The master-planning and phasing of the project concepts under these alternatives will be coordinated with associated public and private infrastructural planning and related private and public infrastructural financing. The cost of the marina construction and project-related infrastructure is to be borne by the developer, resulting in considerable savings for the public. In addition, the projected lease revenue from these public lands will provide additional public benefits by establishing a revenue stream for capital improvements and maintenance of a range of State facilities.

Section 226-15 Objectives and policies for facility systems - solid and liquid wastes:

In addition to the developer's commitment to sustainable development design, the project will involve upgrades to the County of Hawai'i's Kealakehe Wastewater Treatment Plant to meet current needs, as well as the project's future needs. This commitment is applicable to Alternatives 1 and 2, as well as the proposed project that is discussed in Section 5.1.4.

Section 226-16 Objectives and policies for facility systems – water:

The discussion of water conservation methods and the need to secure additional potable water sources in Section 5.1.4 is also applicable to Alternative 1 and demonstrates conformity to the objective and policies for water facilities. Alternative 2 involves greater irrigation demands in regard to its golf course component and greater potable water demands for human consumption than those for Alternative 1. Alternative 2 is expected to face more serious challenges in securing adequate and reliable sources of water.

Section 229-17 Objectives and policies for facility systems – transportation:

Alternatives 1 and 2 will conform to this objective and policies because they will present water transportation opportunities, including the possible use of transit water shuttles to Kailua-Kona, as described in regard to the proposed project in Section 5.1.4.

Section 226-18 Objectives and policies for facility systems – energy:

Alternatives 1 and 2 conform to these objective and policies through the use of energy efficient design and technology and commitment to the use and production of renewable energy to serve the project's needs. Solar energy production, solar hot water heating, and the use of deep cold seawater for cooling systems are currently identified as means of saving substantial electrical energy costs for the community and the developer.

Section 226-23 Objectives and policies for socio-cultural advancement – leisure:

Alternative 1 conforms to this objective and related policies for the reasons offered in Section 5.1.4 in regard to the proposed project. Alternative 1 will be of greater conformity with the policy regarding access to significant natural and cultural resources in light of the 400-600 foot shoreline setback that has been designed for this alternative.

Although it does not propose the considerable shoreline setback that is planned for Alternative 1, Alternative 2 is consistent with this objective and related policies in incorporating opportunities for shoreline-oriented activities, such as the walking trails. In addition, the golf course component adds a more passive recreation alternative to the active and social components, such as boating, fishing, swimming, trails, walkways, parks, marine life educational and interactive areas that are also part of the project. The golf course would enhance the range of leisure and recreational opportunities offered at Kona Kai Ola.

Section 226-25 Objectives and policies for socio-cultural advancement-culture:

The discussion in Section 5.1.4 is relevant to Alternatives 1 and 2 and demonstrate their conformity the objective and policies of this section.

Both alternatives involve the preservation and protection of cultural features that have been identified by the Cultural Impact Assessment and archaeological studies for the project area. Both provide for public shoreline access, and both will continue the policy of close consultation with the local Hawaiian community and cultural and lineal descendants in the planning of cultural resource preservation and protection.

Section 226-103 Economic priority guidelines:

Alternatives 1 and 2 conform to these guidelines for the same reasons that are set forth in Section 5.1.4. They involve private investment in a public project that will create economic diversification through a mix of marina, industrial, commercial, visitor, and cultural facilities. This presents a wide range of entrepreneurial opportunities, long-term employment opportunities, and job training opportunities.

Section 226-104 Population growth and land resources priority guidelines:

As described in Section 5.1.4, the policy support for the proposed project also extends to the similar development concepts considered in Alternatives 1 and 2. Those alternatives conform to the guidelines of this section because they involve an urban development under parameters and within geographical bounds that are supported by the County's General Plan, a preliminary form of the Kona Community Development Plan, the County's Keahole to Kailua Regional Development Plan, and the reality of being located along the primary commercial/industrial corridor between Keahole Airport and Kailua-Kona. As with the proposed project, the development concepts of Alternatives 1 and 2 are essentially alternatives for the implementation and "in-filling" of the urban expansion area in North Kona.

DHHL Hawai'i Island Plan

This 2002 plan projects DHHL's Honokōhau makai lands for commercial use. As compared to the proposed project and Alternative 2, Alternative 1 presents an expanded commercial component that provides greater compliance with the plan, while addressing certain beneficiaries' concerns about the scale of the marina originally required in the Project. Alternative 2 also conforms to the recommended commercial uses in the makai lands but to a lesser degree than Alternative 1 because of its more limited commercial component. Like the proposed project, its marina size and number of slips raise environmental issues, as more specifically discussed in Part 3, and community concerns.

County of Hawai'i General Plan

HCGP Section 4 – Environmental Quality Goals, Policies and Courses of Action:

Alternative 1 is consistent with this section. It presents a reduction in both the number of slips and the size of the marina basin that, in combination with proper facilities design, public education and enforcement of harbor rules and regulations, would result in very few long term impacts to water quality. Based on the findings of the Harbor Water Quality Modeling Study, water quality would remain similar to existing conditions.

Alternative 2 is the least consistent with this section. In addition to the potential significant impacts of its 800 slip marina basin, its golf course component has the potential to adversely impact marine resources by increasing the nutrient loading in surface runoff and groundwater and also by introducing pesticides, herbicides and other chemicals common in golf course use and management into the nearshore waters surrounding the project site. It also has the potential to adversely affect the anchialine pools beyond their current conditions by introducing such substances into the pool systems.

HCGP Section 7 – Natural Beauty Goals and Policies:

Alternative 2 conforms to some degree with this section. Its golf course component would create a park-like view that would potentially enhance the beauty of the project site and surrounding areas when considered in combination with the existing rugged natural beauty of the area, as demonstrated in other makai golf courses within the region.

HCGP Section 8 – Natural Resources and Shoreline:

Alternative 1 is most consistent with the goals and policies of this section. It would require considerably less marina excavation than the proposed project and Alternative 2 and would reduce the potential risk of long-term adverse impacts to water quality. Based on the findings of the Harbor Water Quality Modeling Study, water quality would remain similar to existing conditions with the degree of reduction in marina basin size that is proposed under Alternative 1. This reduction is also expected to reduce potential impacts upon anchialine pools and their ecosytems, as well as shoreline and marine resources that are affected by water quality. Alternative 1 also retains the shoreline preservation and protection concepts that are proposed in and described for the Project.

HCGP Section 10 – Public Facilities Goals and Policies:

The discussion in Section 5.2.1. in relation to the proposed project is applicable to Alternatives 1 and 2. Improvements to public facilities are are integral to the Kona Kai Ola development. The provision of additional boat slips and numerous road improvements, including a makai extension of Kuakini Highway south to Kailua-Kona are incorporated into plans for the project's development. In light of these elements, Alternatives 1 and 2 are consistent with the goals and policies of this section.

HCGP Section 11 – Public Utility Goals, Policies:

As with the proposed project, Alternatives 1 and 2 are consistent with the goals and policies of this section, based on the relevant grounds set forth in Section 5.2.1. The developer is committed to design, fund, and develop environmentally sensitive and energy efficient utility systems to the extent possible, as described previously in Part 5. Its master planning provides for the coordinated development of such systems with the objective of achieving significant savings for the public. As previously-mentioned example, the project development involves the upgrading of the Kealakehe Wastewater Treatment Plant.

HCGP Section 12 – Recreation:

Alternative 1 is consistent with the goals, policies, and courses of action for North Kona in this section.

Although the number of slips is reduced under Alternative 1, the region's boating opportunities and support facilities will still be expanded. The existing marina entrance would still be utilized under this alternative. However, concerns relating to increased activity leading to increased congestion in the marina entrance area would be mitigated to a certain extent. The 400-600 foot shoreline setback, public parks, trails, cultural areas, community facilities and marine science center remain important components of Alternative 1.

The golf course component of Alternative 2 would add a more passive recreation to the active and social components, such as boating, fishing, swimming, trails, walkways, parks, marine life, educational and interactive areas that are also part of the project. The golf course would enhance the range of leisure and recreational opportunities offered at Kona Kai Ola. Alternative 2 is also considered to be consistent with this section.

HCGP Section 13 and 13.2 – Transportation:

The reduced marina component under Alternative 1 will still provide transportation opportunities and provide for possible use of transit water shuttles to Kailua-Kona, although to a lesser degree than under the proposed project and Alternative 2 . However, in each scenario, internal people-movers are planned, and numerous roadway improvements are planned for coordination with public agencies, including but not limited to the construction of the Kuakini Highway extension between Honokōhau and Kailua-Kona. Accordingly, both Alternatives 1 and 2 are consistent with the goals, policies, and courses of action for North Kona under these sections of the General Plan.

HCGP Section 14.3 – Commercial Development:

For the reasons presented in the discussion under Section 226-104 of the State Plan, the planned commercial component under Alternatives 1 and 2 are consistent with this section.

HCGP Section 14.8 – Open Space:

Alternatives 1 and 2 are consistent with the goals and policies of this section. Alternative 1 provides a considerable (400-600 foot) shoreline setback along the entire ocean frontage of the project site as a means of protecting the area's scenic and open space resources, as well as natural and cultural resources. Although it does not incorporate the shoreline setback planned in Alternative 1, Alternative 2 provides a golf course component would contribute to the amount of open space that is currently proposed and allow additional view corridors to be created.

Community Development Plans

Community development plans are being formulated for different regions in the County in order to supplement the County's General Plan. The Kona Kai Ola project is located in the Kona Community Development Plan (CDP) area. Maps associated with the preliminary work phases

of the Kona CDP include the Kona Kai Ola project site within the "Preferred Urban Growth" boundary of the North Kona district. The Kona CDP process is guided by a Steering Committee composed of a broad cross-section of the community. The Steering Committee will eventually complete its work and recommend the CDP's adoption.

After the DEIS was published, the Kona CDP has progressed to the development of plans for the major urban growth corridor north of Kailua-Kona. The Kona CDP has produced a draft plan showing a transit oriented development that includes a midlevel public transit corridor along the mauka residential elevation, and a makai transit corridor that runs along a proposed new frontage road just makai and parallel to Queen Kaahumanu Highway. The development plan for Alternative 1 includes the Kuakini Highway as part of this proposed frontage road and transit line from Kailua Kona to the Kealakehe area, along with a transit stop at Kona Kai Ola. The Alternative 1 plan also includes a road that could be extended to be part of the proposed frontage road should it be approved and implemented. In addition, the Kona CDP has continued to emphasize the principles of smart growth planning with mixed use urban areas where people can live, work, play and learn in the same region. Kona Kai Ola has been specifically designed to be consistent with this policy in order to provide a stable employment base close to where people live in the mauka residential areas already planned for DHHL and HHFDC lands.

It should be noted that currently and over the years, the 1990 Keāhole to Kailua Development Plan (K-to-K Plan) guides land use actions by the public and private sectors. It is intended to carry out the General Plan goals and policies related to the development of the portion of North Kona area, including the Kona Kai Ola site. The "Preferred Growth Plan" of the Keāhole to Kailua Development Plan identifies the project site as a new regional urban center to include commercial, civic, and financial business related uses, an expanded "Harbor Complex," a shoreline road, and a shoreline park. The proposed project and the development concepts in Alternatives 1 and 2 are therefore consistent with the recommendations in the Keāhole to Kailua Development Plan.

Hawai'i County Zoning

As shown on Figure AA, the project site is zoned "Open". Under Section 25-5-160 of the Hawai'i County Code, "The O (Open) district applies to areas that contribute to the general welfare, the full enjoyment, or the economic well-being of open land type use which has been established, or is proposed. The object of this district is to encourage development around it such as a golf course and park, and to protect investments which have been or shall be made in reliance upon the retention of such open type use, to buffer an otherwise incompatible land use or district, to preserve a valuable scenic vista or an area of special historical significance, or to protect and preserve submerged land, fishing ponds, and lakes (natural or artificial tide lands)".

Some of the proposed uses at Kona Kai Ola are permitted uses in the Open zone such as:

- Heiau, historical areas, structures, and monuments;
- Natural features, phenomena, and vistas as tourist attractions;
- Private recreational uses involving no aboveground structure except dressing rooms and comfort stations;

- Public parks;
- Public uses and structures, as permitted under Section 25-4-11.

In addition to those uses permitted outright, the following uses are permitted after issuance of a use permit:

- Yacht harbors and boating facilities; provided that the use, in its entirety, is compatible with the stated purpose of the O district.
- Uses considered directly accessory to the uses permitted in this section shall also be permitted in the O district.

The proposed time-share and hotel units and commercial uses would not be consistent with the zoning designation of "Open". Project implementation therefore requires rezoning of portions of the project to the appropriate zoning category or use permits for certain uses.

Special Management Area

As shown in Figure AB, the entire project area up to the highway is within the coastal zone management zone known as the Special Management Area ("SMA"). At the County level, implementation of the CZM Program is through the review and administering of the SMA permit regulations. Kona Kai Ola complies with and implements the objectives and policies of the Coastal Zone Management (CZM) Program, and a full discussion is provided in Section 5.1.3. The development concepts in the proposed project and Alternatives 1 and 2 will be subject to applicable SMA rules and regulations.

February 1, 2007

Oceanit
Attention Dayan Vithanage
Oceanit Center
828 Forth Street Mall, 6th Floor
Honolulu, Hawaii 96813

Department of Hawaiian Homelands
Attention: Linda Chinn
1099 Alakea Street, Suite 2000
Honolulu, Hawai'i 96813

Jacoby Development, Inc.
Attention: Scott Condra, Senior Vice President
171 17th Street NW, Suite 1550
Atlanta, Georgia, 30363

Re: Title of Project: Kona Kai Ola - EIS Comments

Aloha,

After considerable time spent reviewing the EIS prepared by Oceanit, we are making our comments in writing. Our concerns for Kona Kai Ola are as follows:

1.
The 800 slips designated for the Honokohau Small Boat Harbor is entirely excessive for several reasons. We,at present DNLR is having difficulty managing all the given number of slips. The impact of this number of slips will impact our oceans resources, such as game fishing, the coral fish, coral, and all marine life in the harbor.
An alarming number of boats will also impact pollution to the coastal waters. This plan is not well planned as there are statements that blasting may occur to allow for these slips, and this is unacceptable and not allowable within the SMA coastal shores. Denigration of natural resources is inevitable in regards to ponds, coral beds and marine life from the blasting.

2.
.The planning of this development must take serious consideration for roads and roadways to alleviate traffic. Currently, we are at least 10 years behind for adequate roads for Kailua Kona. There are no confirmed agreements in place for the Queen Lili'uokalani Trust to allow a road to be built on their property. To make an assumption that this road will be built is presumed only a guess. We can not allow a development plan without agreements in place and actual purchase agreements for this road. The EIS does not go further with its discussions with Queen Lili'uokalani Trust. The traffic is so impacted today, that it has turned away prospective return visitors to this area. We must

act responsibly for traffic concerns. Traffic will be increased by this project with the allowance of Time share condos and a Hotel. The number of vehicles would increase dramatically. A shuttle bus system would not give additional relief, as those with rental cars and employees will continue their practice to drive cars to and from this area daily and hourly. Secondly, the size of the retail commercial area will also increase the traffic to and from this area.

3.

The Commercial plan for this project is too expansive for the area. The area is a seasonal retail area and at present has difficulty maintaining employees. There is a shortage of employees to main the retail community today, and with the high cost of living and high cost of rentals, the future is not good. The population will not increase for the need of this amount of retail. The location of this project is in the middle of the worst traffic gridlock and even with the widening of Queen Kahumanau Highway, it will remain too congested. County Planning Director Chris Yuen has not given his approval of this project and he feels that this project should not impose more traffic woes for this community.

4.

The General Plan of Hawai' i County does not allow for Resort. This project can not move forward without it as quoted by Mr. David Tarnas, a Jacoby representative. The community does not foresee a change in the zoning.

5.

The Kona Kai Ola does not satisfy our concerns for the Cultural Sites on this property. It is apparent that there is concern from the Kaloko-Honokohau National Park. This area is rich in history and with cultural environmental sites. We can not allow any disturbances to these sites. The project does not go far enough to protect the our concerns.

There are alternative uses for this property, which have not been reviewed. We welcome a Ocean Marine Center, and a Marine Museum not just a small building for a center. We do not want a huge commercial shopping mall, visitors can find those stores on the mainland.

Thank you for your time, we appreciate having the opportunity to write to you with our concerns.

Sincerely

Marie Aguilar

Philip Mosher

P.S. We have written to Oceanit previously and we want our concerns addressed for the future.

cc: Hawaiian Homelands
Jacoby Development, Inc.

Marie Aguilar
Philip Mosher
P.O Box 1874
Kailua Kona Hawai'i 96745

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oceanit
innovation through engineering & scientific excellence

July 23, 2007

Marie Aguilar
Philip Mosher
P.O. Box 1874
Kailua-Kona, Hawai‘i 96745

Dear Ms. Aguilar and Mr. Mosher:

Subject: Kona Kai Ola Draft Environmental Impact Statement
Response to Your Comments Dated February 1, 2007

Thank you for your comments on the Kona Kai Ola Draft Environmental Impact Statement. Our responses are provided in the numerical order of your comments.

1. Proposed Marina Size and Related Impacts on Ocean Resources

We acknowledge your concern regarding the addition of 800 slips to Honokōhau Harbor and the impacts of this addition on ocean resource and water quality. The EIS has explored alternative developments based on comments received by you and other individuals, organizations and public agencies and an alternatives analysis has been conducted as hereby discussed.

As explained in the DEIS, the agreement between JDI and the State of Hawai‘i established a required scope and scale of the project for which the impact analysis was provided. Several comments have addressed the fact that alternatives other than the No Project Alternative were not addressed in the DEIS Section 2, Alternatives Analysis.

While Kona Kai Ola is of the position that alternative actions other than a No Project alternative are not currently feasible absent an amendment to the agreement with the State, the agency and public comments and additional information generated as a result of inquiry into issues raised by the comments have been helpful in identifying alternative actions that will serve the State’s goal of providing additional marina slips for the Kona area and that will serve to reduce or mitigate anticipated effects of the proposed development.

Thus, agencies such as the Land Division of the Department of Land and Natural Resources, the U.S. Department of the Interior Fish and Wildlife Service, the Planning Department of the County of Hawai‘i, and the Office of Environmental

Quality Control (OEQC), as well as community organizations and individuals, have commented that a reduced scale marina and related facilities should be considered. The OEQC has also asked that the alternative of a reduced scale project be evaluated under the assumption that DHHL may determine that a downsized project would be preferred.

In response to these comments on the DEIS and in consideration of measures to mitigate anticipated impacts, the EIS Section 2, Alternatives Analysis, has been revised to describe the following alternatives, which are discussed in more detail in the EIS:

- Alternative 1 is a project involving a 400-slip marina, 400 hotel units, 1,100 time-share units, and commercial and support facilities. This alternative would enhance water quality and avoid the need to widen the existing harbor entrance channel, as well as reduce traffic and socioeconomic impacts.
- Alternative 2 is an alternative that had been previously discussed, but not included in the proposed project that includes an 800-slip harbor and a golf course, and
- Alternative 3 is the no-action alternative.

A comparison between impacts related to the proposed project concept and impacts related to Alternative 1 indicates that a reduction in the acreage and number of slips in the marina, as well as the reduction in hotel and time-share units, would generate less environmental, social and economic impacts. Regarding your comment regarding the impacts of more boats using the same harbor entrance, the sensitivity of boat traffic to size of marina expansion was analyzed for Alternative 1, which features a 400-slip marina. The reduction of the marina from 800 to 400 slips results in a 21 percent reduction in boat traffic congestion under average existing conditions and ten percent during peak existing conditions.

Attachment 1 contains the EIS text regarding Alternatives Analysis.

Regarding impacts on ocean resources, the EIS has been revised to expand discussion on impacts related fisheries and coral reef habitats, as follows:

> ***Impacts on Marlin and Tuna / Pelagic Fishery***
>
> *The impact on the marlin and tuna fisheries from increased harbor capacity will be a function of the number of new boats in the harbor targeting these fisheries and the ability of these new boats to attract paying customers. Both marlin and large tuna fisheries have been shown to be in general decline according to private, state, and national fisheries statistics. There are several hypothesized causes for these declines relating primarily to international fisheries. The ability of the State to manage these pelagic marine fish stocks is limited by the national and international fishing policies.*
>
> *Fisheries management typically attempts to reduce fishing pressure by limiting access to the fishery either through licensing, gear (boat) restrictions, catch limits, season or area limits. Limiting the number of boat slips available would not by itself provide effective control over fisheries pressure because these pressures are market driven, as well as for*

recreational and subsistence purposes, and there are other methods, such as boat launch ramps, to access the fishery.

Impacts on Coral Reef From Extractive Fisheries

It is possible that a large number of boat slips in the expanded harbor will be occupied by resident-owned motor boats for personal use. Private boats in Hawai'i are used for a variety of activities that have historically proven difficult to regulate. These may include extractive activities such as bottom fishing, trolling, spear fishing, tropical fish and invertebrate collecting, as well as non-extractive activities including sport diving, skiing, paragliding, racing, or shoreline transportation. Each of these activities has individual existing impacts upon marine resources and these impacts are expected to increase with the new harbor unless appropriate management is initiated.

There is a general perception that the increased access to nearshore resources will result in a decline in these fish stocks similar to that seen historically on O'ahu. This perception is not without merit and deserves serious attention from resource managers. However, the increased access to the shoreline has already occurred, and will continue as the coastline is developed regardless of harbor development. As most fisheries are market driven, as well as for recreational and subsistence purposes, there will be increased pressure on these resources in the future regardless of harbor development. Fisheries managers need to take a serious look at management strategies for the future. Attempting to preserve fisheries resources only by limiting the size of the harbor is not likely to have any positive long term effect on the nearshore living marine resources because there are increasingly other avenues to access the shorelines.

SCUBA

An increase in the number of boat slips is likely to cause an increase in both the number and size of commercial moored vessels offering dive tours as well as private boats used for diving. Although all of the dive sites in Kona are relatively near shore, the lack of shoreline access and ease of entry by boat makes boat diving the preferred option. As more of the Kona coast becomes developed however, this shoreline limitation to dive sites is likely to decrease. Attempting to limit dive pressure on the reef by limiting the number of available slips is not by itself an effective long-range management tool. As the number of divers on the reef increases, the pressure on the reef from anchor damage, extractive fisheries, and unintentional diver induced coral damage will likely increase. The increased pressure on dive sites from SCUBA divers must be met with commensurate changes in management to limit adverse impacts.

Proposed Mitigation

An increase in the harbor size offers the opportunity to consolidate, focus, and fund management and enforcement activities at one centralized location. The pressure on fish and invertebrate stocks, as well as upon populations of marine mammals and turtles can be expected to increase as the Kona population increases, regardless of whether the harbor is improved. The following changes could be made by DLNR, paid for at least in part by the additional revenues to DLNR from the Kona Kai Ola project. These changes are in the management authority of the DLNR Division of Aquatic Resources and the DLNR Division of Boating and Ocean Recreation.

- *Increase in the number of fisheries enforcement and management personnel in Kona at one centralized harbor location*
- *Allocation of slip and office space for fisheries personnel and equipment*

- *Increased numbers of submerged mooring buoys (presently approaching 100) at all dive sites,*
- *Increased education materials for recreational divers and fishermen*
- *Initiate restrictions on the quantity and size of boats in each commercial sector*

For inshore species, initiate catch restrictions in line with Division of Aquatic Resources guidelines that prioritize recreational fishing above commercial fishing, and subsistence fishing above recreational fishing.

Regarding your comments on blasting due to construction activities related to the marina, blasting for marina development is not restricted due to location within the SMA and the developer will apply for all applicable permits under Federal, State and County jurisdictions.

We disagree with your statement that "Denigration of natural resources is inevitable in regards to ponds, coral beds and marine life from blasting." The project will use construction techniques to minimize or avoid impacts and the EIS has been expanded to include specific mitigation measures. The following is additional text included in Section 3.9.4.2 that states:

It should be recognized that several mitigation measures are already built into the proposed project. For example, the proposed practice to maintain a rock "dam" separating the construction site from the existing harbor reduces acoustic energy propagating to the area potentially containing marine mammals or sea turtles. Also, this dam precludes animals from entering the construction area. This dam or land-bridge will be in place for all drilling and dredging activities, except for the removal of the land bridge itself.

Several other possible methods of mitigation are available to the Kona Kai Ola project, and feasibility, practicality, and benefit will be discussed with the National Marine Fisheries Service (NMFS) during consultation, and may be implemented subsequent to that consultation. The first possible mitigation technique is to acoustically monitor the potentially impacted areas during construction to: a) assess the accuracy of the modeling and b) to interact proactively with construction personnel to ensure that the identified threshold levels are not exceeded. Although the best available science and data was used to model the acoustics of the area, numerous conservative assumptions needed to be built into the modeling. By monitoring the actual levels received, in-situ corrections/updates to modeled parameters could potentially reduce the built-in conservativeness and reduce the potentially impacted areas. For example, the modeling assumes that all of the small voids in the bedrock are water-filled and therefore impart minimum attenuation on the acoustic signal as it propagates through. If even a small percentage of the voids are gas-filled, this attenuation would increase greatly and the impacted area would be reduced.

Another possible mitigation technique would be to augment the land-based visual observer, who it is assumed would verify that the area was clear the animals, with boat-based observers. This would increase the effectiveness of recognizing the presence of marine mammals and sea turtles in the potentially affected areas.

Additionally, interactions with the construction teams to alter the blasting methods modeled could potentially mitigate and reduce acoustic impacts to marine animals. A blasting expert will be consulted to develop a discontinuous non-linear blasting plan that will optimize cancellation of the explosion pressure wave into the marine environment. Examples of possible changes include: reducing charge size, reducing the depth drilled

and blasted during any blast, reducing the number of blast holes or the volume of each blast, etc. The combination of these techniques with acoustic monitoring could potentially allow a large portion of the northern third of the harbor to be excavated with little or no potential impact to marine animals.

2. Traffic impacts and the need for timely agreements so that roadway improvements can proceed.

To mitigate traffic impacts, Kona Kai Ola will include various signalization improvements and roadway improvements that will be implemented and these measures need to be considered collectively to understand a full mitigation program. To connect Kona Kai Ola with the neighboring communities, Kona International Airport, and Kailua-Kona Village, the project proposes to sponsor a regularly scheduled shuttle service, so that people could utilize Kona Kai Ola without having to use a car for access. Further, the project includes the construction and realignment of Kealakehe Parkway makai of Queen Ka‘ahumanu Highway and through the lands of Queen Lili‘uokalani Trust connecting with Kuakini Highway in Kailua-Kona. Another measure to enhance road connectivity in the ahupua‘a is the improvement of the intersection of Kealakehe Parkway and Queen Ka‘ahumanu Highway. These improvements will serve the project as well as the regional community. Further, with development of Kona Kai Ola, the Kuakini Highway extension road is anticipated to be built on a more accelerated schedule than would occur without the Kona Kai Ola project.

Alternative 1, which was previously described, includes the same roadway system improvements as the proposed project, yet would generate less vehicular traffic than the proposed project. Alternative 1 would decrease the number of trips generated in the AM peak period 35 percent, from 1,511 trips in the proposed plan to 977 trips, and would decrease the PM peak period by 40 percent, from 3,277 trips in the proposed plan to 1,972 trips.

3. Commercial Area Too Expansive

The market study, as contained in Appendix C-1, finds that the commercial component will be a viable product. Currently, there is a limited supply of tourist-oriented commercial / retail sites. The proposed commercial component will be the thematic and shopping / dining center at Kona Kai Ola and will attract large number of non-subject visitors and regional residents. Further, the commercial component will have the necessary characteristics to be highly competitive in the greater Kailua – Kona general and resident sectors. The commercial areas will have superior frontage / exposure and access traits.

Regarding your concerns on commercial-related traffic, this was factored into project traffic impact analysis, and mitigation measures to address impacts were previously described above.

4. General Plan Does Not Allow For Resort

Kona Kai Ola is consistent with the Hawai‘i County General Plan. In December 2005, the County Planning Director proposed that the DLNR portion of the Kona Kai Ola project that was designated “Open” in the 2005 General Plan, be amended to “Urban Expansion Area.” On November 29, 2006, the Hawai‘i County Council approved this amendment.

Kona Kai Ola is consistent with the Urban Expansion Area designation. The agreement between the developer and the State identifies hotel and time-share uses as possible development at Kona Kai Ola. The project is not a resort. A resort is a concept in which visitors are attracted to spend most, if not all, of their stay within the resort area through the design of amenities that fulfill the needs of a particular visitor market segment. This self-containment is achieved to varying degrees in resort development, depending on the natural, historic/cultural, and recreational resources within a resort site and the intended scale of the resort.

State and County laws recognize this distinction between a “resort” and a “hotel” or “time-share unit.” Section 514E-5, Hawai‘i Revised Statutes, authorizes time-share units to be located in a resort area or any other area in which a county may by ordinance allow a hotel unit. The Hawai‘i County Code correspondingly permits hotels and time-share units in non-resort zoning districts. The proposed project may include up to 700 hotel units and 1,803 time-share units, and depending on the eventual location of these project components, rezoning may be required for implementation.

4. Cultural Concerns

You note concerns for cultural sites on the property and project impacts as they related to the Kaloko-Honokōkau National Historical Park. Specific discussion on cultural impacts is contained in Appendices L-1 and L-2 of the EIS.

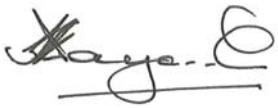
On a general note, the developer is sensitive to the beauty, cultural value and environmental importance of the Kaloko-Honokōhau National Historical Park. Initial steps taken by Jacoby Development, Inc. (JDI) were to modify the initial conceptual master development plan which had a 40-foot setback from the shoreline, and move the developed area back over 400-foot’ from the shoreline to protect the 15 acres of National Park designated lands. Further, any work that would be done in the area within the National Park legislative boundaries would be done in close consultation with all the necessary regulatory bodies, and include the Kaloko- Honokōhau National Historical Park.

As previously discussed in this letter, the EIS has been expanded to include an alternatives analysis.

We acknowledge your appreciation for the proposed Ocean Marine Center. Regarding your comment that there will be a “huge commercial mall, [in which] visitors can find those stores on the mainland,” as discussed in our response to your comment #2, the commercial component will provide a unique retail product that is tailored to regional characteristics.

Your comment letter and this response are included in the Final Environmental Impact Statement. We appreciate your participation in the environmental review process. Please submit a request to our office if you would like to receive a printed or electronic copy of the Final Environmental Impact Statement, or portions thereof.

Sincerely,



Dayan Vithanage, P.E., PhD.
Director of Engineering

cc: Office of Environmental Quality Control
State Department of Hawaiian Home Lands
Jacoby Development, Inc.

Attachment 1

2 Alternatives Analysis

~~In typical land development projects, the initial planning process includes the exploration of alternatives to development objectives. In the EIS process, these alternatives are presented with a disclosure of reasons for the dismissal of non-preferred alternatives.~~

~~Kona Kai Ola does not follow this same pattern of alternatives evaluation.~~ As discussed in Section 1.4, the proposed Kona Kai Ola project is the result of agreements between JDI and the State DLNR and DHHL. The agreements and leases between the State and JDI stipulate the parameters of development for this site in terms of uses, quantities and size of many features, resulting in a limited range of land uses. Unlike a private property project, JDI is required to meet the criteria outlined in the agreements, thereby affording less flexibility in options and uses. From the developer's perspective, the agreements must also provide sufficient flexibility to allow for a development product that responds to market needs and provides a reasonable rate of return on the private investment.

The agreements between JDI and DLNR specify that the proposed harbor basin is to be 45 acres and accommodate 800 slips. This development proposal is the subject of this EIS. In response to DEIS comments, additional water quality studies and modeling were conducted. These studies determined that the water circulation in a 45-acre 800-slip marina would be insufficient to maintain the required standard of water quality. The models of water circulation suggest that a new 25-acre harbor basin could successfully maintain required water quality in the new harbor. Comments on the DEIS from DLNR, from other government agencies, the neighbors and the general community also called for the consideration of alternatives in the EIS, including a project with a smaller harbor basin and less density of hotel and time-share units.

In response to these comments on the DEIS, three alternatives are evaluated in this Final EIS and include Alternative 1, which is a plan with a 25-acre 400-slip harbor basin including a decrease in hotel and time-share units; Alternative 2, which is an alternative that had been previously discussed but not included in the proposed project, that includes an 800-slip harbor and a golf course; and Alternative 3, the no-project alternative. Each alternative is included in the EIS with an evaluation of their potential impacts. These project alternatives are presented to compare the levels of impacts and mitigation measures of the proposed project and alternative development schemes pursuant to requirements set forth in Chapter 343, HRS.

~~JDI is required to provide a new marina basin not less than 45 acres and a minimum of 800 new boat slips. Further, the agreements provide the following options for land uses at the project site:~~

- ~~Golf Course~~
- ~~Retail Commercial Facilities~~
- ~~Hotel Development Parcels~~
- ~~Marina Development Parcels~~
- ~~Community Benefit Development Parcels~~

~~JDI is not pursuing the golf course option and is proposing instead to create various water features throughout the project site. All other optional uses have been incorporated in Kona Kai Ola.~~

2.1 Project Alternatives

2.1.1 Alternative 1: 400-Slip Marina

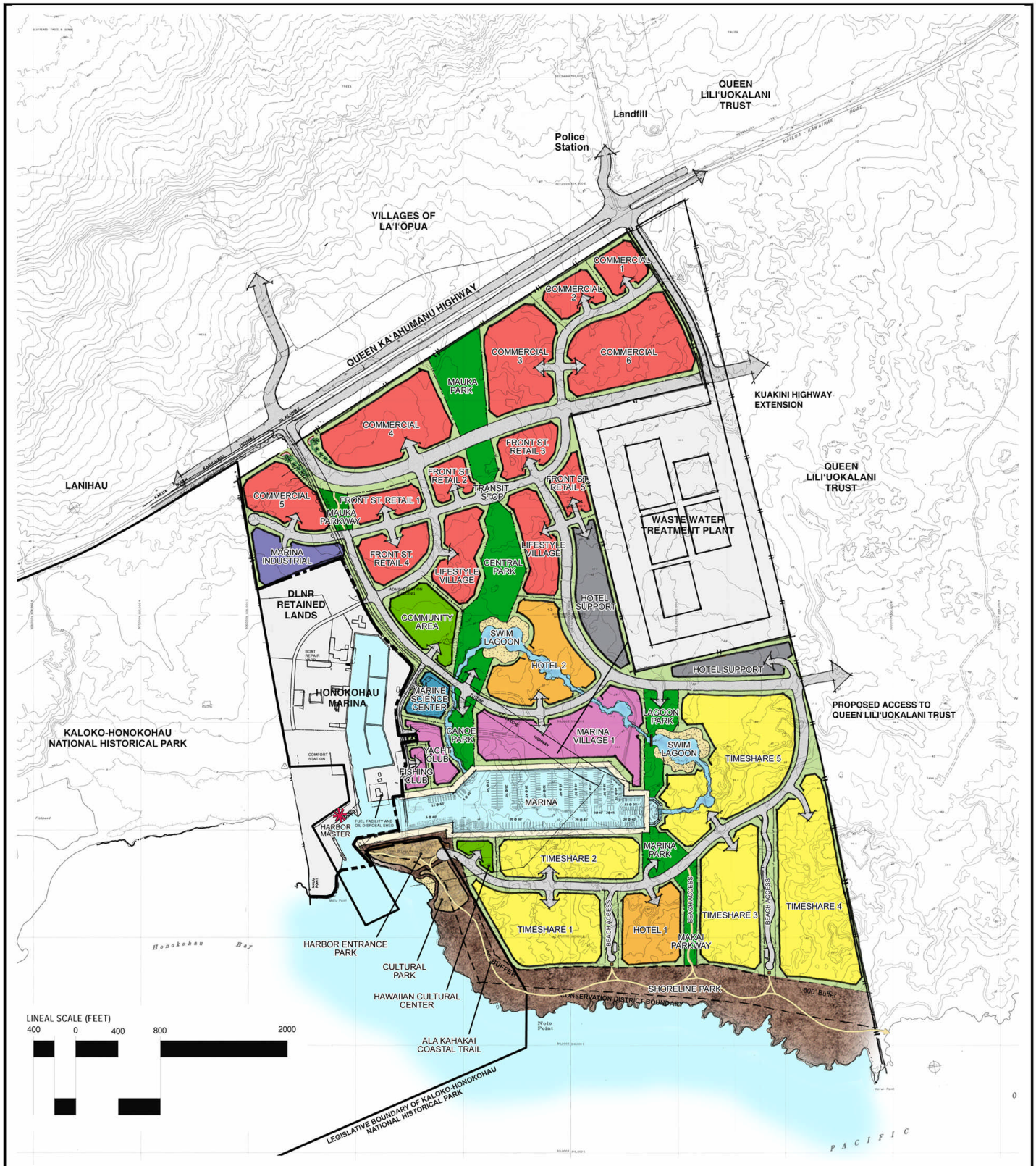
Studies conducted in response to DEIS comments found the construction and operation of an 800-slip marina may significantly impact the water quality within the marina and along the shoreline. Specifically, the Harbor Water Quality Modeling Study, as contained in Appendix U, found that the water circulation in a 45-acre 800-slip harbor was insufficient to maintain an acceptable level of water quality. Further, the existing harbor channel, which would serve both the existing and new harbors, could not adequately serve the increased boat traffic generated by an 800-slip marina during peak traffic. Mitigation measures to accommodate peak boat traffic included the widening of the existing channel, an action that would entail a complex process of Federal and State approvals and encounter significant environmental concern.

Concerns related to the proposed density of hotel and time-share units were also expressed in comments to the DEIS from members of the public, neighbors to the project site, especially the Kaniohale Community Association, and government agencies. Common themes in DEIS comments were related to impacts regarding traffic, project requirements of potable water and infrastructure systems, including sewer, drainage, utility and solid waste systems, and socioeconomic impacts.

In response to the water quality study results, and to the DEIS comments, an alternative plan was developed with a smaller marina with less boat slips, and a related decrease in hotel and time share units. Illustrated in Figure G, Alternative 1 reflects this lesser density project, and features a 400-slip marina encompassing 25 acres. For the purposes of the Alternative 1 analysis, JDI assumed 1,100 time-share units and 400 hotel rooms. Project components include:

- 400 hotel units on 34 acres
- 1,100 time-share units on 106 acres
- 143 acres of commercial uses
- 11 acres of marina support facilities
- 214 acres of parks, roads, open spaces, swim lagoons and community use areas

In addition, Alternative 1 would include the construction of a new intersection of Kealakehe Parkway with Queen Ka'ahumanu Highway, and the extension of Kealakehe Parkway to join Kuakini Highway to cross the lands of Queen Lili'uokalani Trust, and connecting with Kuakini Highway in Kailua-Kona. This is a significant off-site infrastructure improvement and is included in the agreements between the State and JDI.



Source: PBR HAWAII

Plan is conceptual only and subject to change

Figure G: Alternative 1: 400-Slip Marina

LEGEND

- TIME SHARE
- HOTEL
- RETAIL / COMMERCIAL
- MARINA RETAIL
- MARINA SUPPORT / COMMERCIAL
- MARINE SCIENCE CENTER
- COMMUNITY AREA / CULTURAL CENTER
- SWIM LAGOON
- MARINA
- UTILITIES
- PARKS & GREEN SPACE
- SHORELINE
- HARBOR ENTRANCE PARK / CULTURAL PARK

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Like the proposed project, Alternative 1 would have a strong ocean orientation, and project components that support this theme would include various water features including seawater lagoons and a marine science center. The new Alternative 1 harbor would include a yacht club, fishing club, a canoe park, and a cultural park with a focus on Hawaiian maritime cultural heritage of the voyaging canoe. The coastal area would be protected with a shoreline park with trails and public access parking for walking and shoreline fishing, and a cultural park surrounding the heiau, the cultural sites and 'Alula for community use. Additional Alternative 1 community areas would include facilities and space for community use, including programs of the Kona Kai Ola Community Foundation, which supports community programs in health care, culture, education, and employment training for the local community, especially to native Hawaiians. Like the original proposed plan, Alternative 1 includes 40 percent of the land in parks, roads, open spaces, swim lagoons and community use areas.

2.1.2 Alternative 2: Golf Course Feature

Alternative 2 was among the alternatives discussed at a community charrette in September 2003. It includes a golf course, which is a permitted use in the DLNR agreement and DHHL lease. As Figure H illustrates, an 18-hole championship golf course would occupy 222 acres on the southern portion of the project site. As with the proposed project, Alternative 2 includes an 800-slip marina on a minimum of 45 acres.

To support the economic viability of the project, other Alternative 2 uses include:

- Golf course clubhouse on three acres
- 1,570 visitor units on 88 acres fronting the marina
- 118 acres of commercial uses
- 23 acres of community uses

Community uses in Alternative 2 include an amphitheater, a canoe facilities park, a community health center, a Hawaiian cultural center and fishing village, a marine science center and employment training center. The sea water lagoon features contained in the proposed project and Alternative 1 are not included in this alternative.

2.1.3 Alternative 3: No Action

In Alternative 3, the project site would be left vacant, and the proposed marina, hotel and time-share facilities, commercial and marina industrial complexes, and community-oriented uses would not be realized.

~~The economic viability and sustainability of the project is determined by the density and uses proposed. Because JDI is obligated to develop an 800-slip marina for the State, complete road improvements, and provide various public enhancement features at its own expense, the density proposed for the income generating features of the development must be sufficient to provide an acceptable level of economic return for JDI. The market study, which is discussed in Section 4.6, reviewed various development schemes and determined that the currently proposed density and mix is the optimum to meet the anticipated financing and development cost obligations for the public features associated with the development.~~

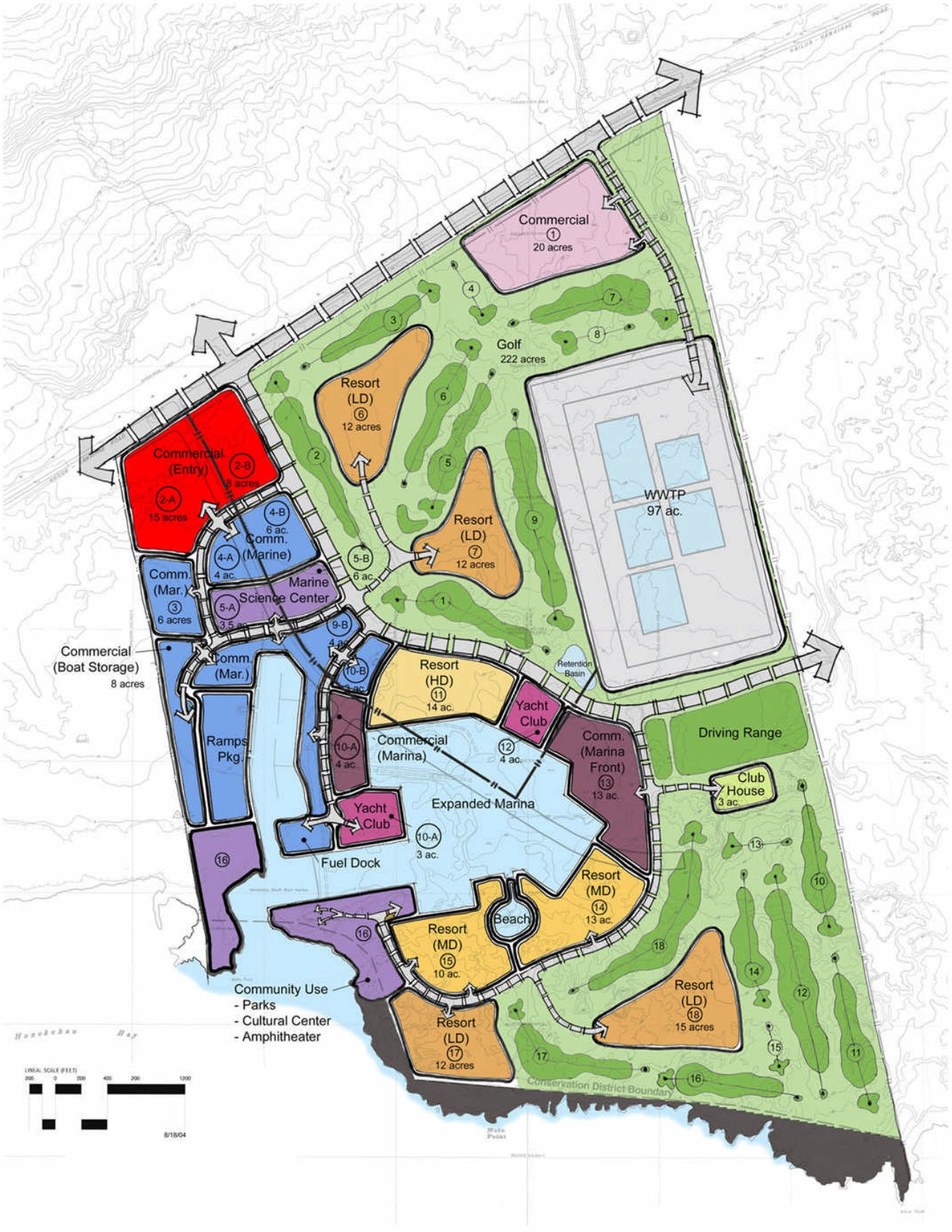

Figure H. Alternative 2: Golf Course Alternative

Legend

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2.2 Alternatives Analysis

As discussed in Section 2.1, the proposed Kona Kai Ola project (also referred to as "proposed project") is defined by development requirements related for a marina and the related uses that would be needed to generate a reasonable rate of return that covers development costs.

Beginning with Section 2.2.1, the alternative development concepts are comparatively assessed for potential impacts that may reasonably be expected to result from each alternative. Following is an overview of the primary observations of such assessment.

Alternative 1 includes half of the State-required boat slips and 60 percent of the proposed hotel and time-share units and, due to the decreased density, this alternative would generate significantly less environmental and socio-economic impacts. A harbor water quality model found the reduction of the volume of the new marina basin by about half (approximately 25 acres) significantly improved the water circulation and quality. Further, the reduced number of boat slips would generate less boat traffic, thereby reducing congestion and the need to mitigate impacts further by the widening of the existing harbor channel.

A project with fewer hotel and time-share units and increased commercial space with a longer (14 years) absorption period would change the mix of employment offered by the project, and slightly increase the overall employment count. The public costs/benefits associated with Alternative 1 would change, compared to the proposed project, with a general increase in tax collections, and a general decrease in per capita costs. Detailed discussion of Alternative 1 potential economic impacts are provided in Section 4.6.6. Comparisons of levels of impact are presented throughout this FEIS.

While this analysis might indicate that the 25-acre marina in Alternative 1 would be the more prudent choice, the DLNR agreement establishes the minimum size and slip capacity of the marina at 45 acres and 800 slips, respectively. Amendments to the DLNR agreement would be required in order to allow Alternative 1 to proceed as the preferred alternative. Hence, selection of the preferred alternative is an unresolved issue at the writing of this FEIS.

Alternative 2, the golf course alternative, was not previously considered to be the preferred alternative primarily because market conditions at the time of project development might not likely support another golf course. Further, DHHL has a strategy goal to have more revenue-generating activities on the commercial lease lands within the project area. In addition, concerns have been expressed as to environmental impacts of coastal golf courses, including the potential adverse impact on Kona's water supply if potable water is used for golf course irrigation.

While Alternative 3, the no-project alternative, would not generate adverse impacts related to development of these lands associated with the construction and long-term operations, it would also not allow for an expanded public marina that would meet public need and generate income for the public sector. Further, the no-project alternative would foreclose the opportunity to create a master-planned State-initiated development that would result in increased tax revenue, recreation options and community facilities. Crucial privately-funded improvements, such as the marina, regional roadway and circulation improvements, and improvements to the existing wastewater treatment plant, would not be implemented. Private funds toward the development of community-oriented facilities such as parks, other recreational facilities, and public access would not be contributed.

~~Hence, the only valid alternative to the proposed project is the no-action alternative. In this alternative, the project site would be left vacant, and the proposed marina, hotel and time-share facilities, commercial and marina industrial complexes, and community-oriented uses would not be realized.~~

~~The no-project alternative would therefore not generate adverse impacts associated with the construction and long-term operations would not occur.~~

~~Likewise, the creation of a master-planned state-initiated development, resulting in increased employment, tax revenue, recreation options and community facilities, would not be created. Privately-funded improvements, such as the marina, regional roadway and circulation improvements, and improvements to the existing wastewater treatment plant, would not be implemented. Private funds toward the development of community-oriented facilities such as parks, other recreational facilities and public access would not be contributed.~~

Further, the creation of revenue-producing businesses on the DHHL property to fund homestead programs would not occur, resulting in fewer potential benefits for Hawaiians.

Hence, the agreements and leases between the State and JDI indicate that the no-action alternative is not in the public interest~~has been rejected at this time~~.

2.2.1 Impact Comparison

Grading and Excavation

The proposed project requires grading and excavation. Both actions may impact groundwater due to rainfall runoff during construction. Alternative 1 would require a significantly smaller excavation for the marina basin and would therefore carry a lesser risk of potential adverse effects on water quality. Alternative 2 would require the same basin excavation as the proposed project, and would also include extensive grading and filling to build the golf course, the latter of which would generate additional impacts. Alternative 3 would result in no change to the geography, topography and geology.

Further discussion on grading and excavation is contained in Section 3.3.

Natural Drainage

Most precipitation infiltrates into the porous ground at the site, and no significant sheet flow is likely. Alternative 1 would generate similar levels of impacts on natural drainage as those of the proposed project and thus require similar mitigation measures. The golf course in Alternative 2 would not be as porous since the site would be graded, soil would be placed, and grass and other landscaping would be grown. Sheet flow and runoff can occur on a golf course, and drainage patterns might change. Alternative 3 would result in no change to the existing natural drainage pattern. Further discussion on natural drainage is contained in Section 3.4.

Air Quality

Air quality will be affected by construction activities, as well as pollutants from vehicular, industrial, natural, and agricultural sources. Alternative 1 would generate less construction air quality impacts than the proposed project due to the reduced amount of intensive groundwork associated with the smaller marina basin and fewer long-term impacts by reducing traffic 35 and 40 percent during, respectively, AM and PM peak traffic times. Construction of Alternative 2 would result in fugitive dust and exhaust from equipment and is expected to generate the same level of air quality impact as the proposed project. Alternative 3 would result in no change to existing air quality. Further discussion on air quality is contained in Section 3.5.

Terrestrial Environment

To provide additional habitat for shorebirds and some visiting seabirds, the project proposes to construct a brackishwater pond area suitable for avian fauna, including stilts, coots and ducks. While habitat expansion is beneficial, there is also a possibility that these species may be exposed to activity that may harm them. Alternative 1 would not include a brackish water pond, but will include 5 acres of seawater features, which is 74 percent less than the 19 acres of seawater features in the proposed project. While this would reduce beneficial impacts, it would also decrease exposure to potentially harmful activity. Alternative 2 does not include the brackish water pond features, but would include drainage retention basins that would attract avian fauna and expose them to chemicals used to maintain golf course landscaping. While Alternative 3 would result in no increase in potentially harmful activity, it would also not provide additional habitat for avian fauna. Further discussion on the terrestrial environment is contained in Section 3.7.

Groundwater

Groundwater at the project site occurs as a thin basal brackish water lens. It is influenced by tides and varies in flow direction and salt content. The existing Honokōhau Harbor acts as a drainage point for local groundwater. Any impact to groundwater flow from the proposed harbor is likely to be localized. The proposed marina basin will not result in any significant increase in groundwater flow to the coastline, but rather a concentration and redirection of the existing flows to the harbor entrance.

There will be differences in the flow to the marina entrance between the proposed project and Alternative 1. Alternative 1, being smaller in size, will have less impact on groundwater flow than the proposed marina. Alternative 2 will have a similar impact to groundwater quality as the proposed project. Alternative 2 may also impact water quality by contributing nutrients and biocides to the groundwater from the golf course. Alternative 3 would result in no change in existing groundwater conditions. Further discussion on groundwater is contained in Section 3.8.1.

Surface Water

There are no significant natural freshwater streams or ponds at the site, but there are brackish anchialine pools. Surface water at the project site will be influenced by rainfall. Runoff typically percolates rapidly through the permeable ground. The proposed project will include some impermeable surfaces, which together with building roofs, will change runoff and seepage patterns.

Alternative 1 is a lower density project that is expected to have proportionally less impact on surface water and runoff patterns and less potential impact on water quality than the proposed project. Alternative 2 would have more impact on surface water quality than the proposed project due to fertilizers and biocides carried by runoff from the golf course. Alternative 3 would result in no change to surface water conditions. Further discussion on surface water is contained in Section 3.8.2.

Nearshore Environment and Coastal Waters

The potential adverse impacts to the marine environment from the proposed project are due to the construction of an 800-slip marina and the resulting inflow of higher salinity seawater and inadequate water circulation, both of which are anticipated to impair water quality to the extent of falling below applicable standards. One possible mitigation measure is to significantly reduce the size of the marina expansion.

The reduced marina size (from 45 to 25 acres) and reduced lagoon acreage in Alternative 1 are expected to result in a proportionate reduction in seawater discharging into the new harbor and increased water circulation. Alternative 2 includes the same marina basin size and is therefore subject to the same factors that are expected to adversely affect water quality.

In the existing Honokōhau Harbor, water quality issues focus on the potential for pollutants, sediments, mixing and discharge into the nearshore marine waters. Before the harbor was constructed, any pollutants entrained within the groundwater were believed to have been diffused over a broad coastline.

The water quality in the proposed harbor depends on several components. These include salinity, nutrients, and sediments that come from the ocean, rainfall runoff, water features with marine animals, and dust. The smaller project offered as Alternative 1 is expected to produce a reduced amount of pollutants and reduce the risk of adverse impact upon water quality.

It is notable that the 45-acre marina basin planned in the proposed project and Alternative 2 only becomes viable from a water quality impact standpoint if the additional brackish groundwater inflow into the new marina exceeds 60 mgd. The resulting flushing from such inflow would be expected to better maintain water quality. However, it is unclear whether 60 mgd of brackish groundwater would be available. As proposed in Alternative 1, reduction of the volume of the new marina basin by 45 percent will significantly improve the flushing and water quality because the lower volume can be flushed by the available groundwater flow.

In addition, there could be higher rainfall runoff from the Alternative 2 golf course into the harbor, because the grassed golf course will be less porous than the natural surface. The golf course will also require relatively high levels of fertilizer, biocides, and irrigation, all of which could contribute to adverse water quality impacts.

Further discussion on nearshore environment and coastal waters is contained in Section 3.9.1.

Anchialine Pools

Anchialine pools are located north of Honokōhau Harbor, and south of the harbor on the project site. The marine life in these pools is sensitive to groundwater quality, and changes due to construction and operation of the project could degrade the viability of the pool ecosystem. In the southern complex, 3 anchialine pools with a combined surface area of $20m^2$ would be eliminated due to the harbor construction in the proposed project and Alternatives 1 and 2.

Predicting the extent of change in groundwater flow is difficult if not impossible even with numerous boreholes and intense sampling. The actual flow of groundwater towards the sea is minimal today, and tidal measurements show that tide fluctuations represent more than 90 percent in actual harbor tides. The fluctuations occur simultaneous with the ocean/harbor tide, which indicate a vertical and horizontal pressure regime between bore hole 6 and the ocean and harbor. Hence, the tides alone create a mixing system that increases salinity, as the flow approaches the point of discharge which will be either the channel or the shore. Another factor that could influence groundwater quality is the increased local recharge from irrigation between the channel and shore. This will add fresh water to the lens locally but is not quantified at this time.

Quantification of these impacts, including the flow of groundwater through each pond, is therefore extremely difficult. The shallow lavas are of the pahoehoe type and have a relatively high horizontal permeability. In surface depressions or undulations, the pahoehoe lavas have a tendency to lose vertical permeability from sedimentation thus restricting water exchange within the individual pools. This is normally reflected in both the salinity and temperature and this information has been adequately studied in the pools.

Changes in groundwater quality may or may not impact biological communities in the anchialine and estuarine environment. In either case, it is important to understand these relationships to effectively manage the resource. If there is significant deviation from the baseline especially in regard to nutrients, pathogens, and toxins, a mitigation plan to determine the cause and take decisive appropriate action will be implemented.

Due to the uncertainty of changes in groundwater flow and quality due to marina construction, the variability in impacts between the proposed project and Alternatives 1 and 2 is unknown at this time. Alternative 3 would result in no change in groundwater flow. While this would eliminate the potential for adverse impacts, Alternative 3 would also continue the pattern of existing degradation related to human activity and the introduction of alien species. Further discussion on anchialine pools is contained in Section 3.9.2.

Marine Fishing Impacts

The proposed marina will increase the number of boats in the area and it is reasonable to assume that a portion of these new boats will engage in fishing activities. The increase in boats in the area would be primarily related to the marlin and tuna / pelagic fishery, coral reefs due to extractive fisheries, and SCUBA activities. The pressure on fish and invertebrate stocks is expected to increase with or without the marina. Harbor expansion provides the opportunity to address existing conditions to consolidate, focus, and fund management and enforcement activities at one location.

Compared to the proposed project, Alternative 1 would result in a 21 percent decrease in boat traffic, thereby lessening the potential for marine fishing impacts. The level of impacts in Alternative 2 would be similar to that of the proposed project. Alternative 3 would result in no change in existing marine fishing conditions, and no opportunity to address already existing pressure on fish and invertebrate stocks. Further discussion on marine fishing impacts is contained in Section 3.9.3.

Cultural and Archaeological Resources

The proposed project will integrate cultural and archaeological resources in the overall development. Archaeological sites recommended for preservation will be preserved, and cultural practices will be encouraged. Kona Kai Ola includes a canoe park, and a cultural park with a focus on Hawaiian maritime cultural heritage of the voyaging canoe. Proposed is a 400-foot shoreline setback that would serve as a buffer between the ocean and developed areas. This coastal area would be protected with a shoreline park with trails and public access parking for walking and shoreline fishing, and a cultural park surrounding the heiau, the cultural sites and ʻAlula for community use.

Alternative 1 would contain all of the cultural archaeological features and the shoreline setback area would be 400 feet in the northern portion of the site and increase to 600 feet in the southern portion. Alternative 2 would preserve cultural and archaeological resources, but does not include a 400-foot shoreline setback. Alternative 3 would result in no change to existing cultural and archaeological resources and no addition of cultural and community facilities and activities. Further discussion on cultural and archaeological resources is contained in, respectively, Sections 4.1 and 4.2.

Noise

Project-generated noise is due to construction equipment and blasting, boats, marina activities, vehicle traffic, and the Kealakehe Wastewater Treatment Plant operations. Alternative 1 would generate less noise impacts due to reduced construction activities, fewer boats, less traffic and less on-site activity. Alternative 2 would also generate less noise due to reduced traffic and less on-site activity, but noise related to the excavation of the marina basin and an increase in the number of boats would be similar to that of the proposed project. Further discussion on noise impacts is presented in Section 4.4.

Socioeconomic Impacts

The proposed project will generate an increase in de facto population of an estimated 5,321 persons due to the increase in hotel and time-share units. The estimated de facto population increase in Alternative 1 is 37 percent less, at 3,363 persons, than the proposed project. The de facto population increase in Alternative 2 is similar to Alternative 1.

Employment in the commercial components will nearly double in Alternative 1, from a stabilized level of 1,429 full-time equivalent (FTE) positions in the proposed project to 2,740 in the Alternative 1.

Under Alternative 1, the total operating economic activity at Kona Kai Ola will increase due to the added commercial space more than off-setting the fewer visitor units, moving upward from $557.6 million per year to circa $814.3 million annually. The total base economic impact resulting from development and operation of Alternative 1 will similarly be higher by between 35 and 45 percent than that of the proposed project.

Alternative 1, which has a reduced marina size of 25 acres, and fewer hotel and time-share units, would have a meaningful market standing, create significant economic opportunities, and provide a net benefit to State and County revenues. From a market perspective, a smaller Kona Kai Ola would still be the only mixed use community in the Keahole to Kailua-Kona Corridor offering competitive hotel and time-share product.

The estimated absorption periods for marketable components of Alternative 1 are generally shorter than those for the same components in the proposed project. Marina slips under Alternative 1 are estimated to be absorbed within 2 years after groundbreaking, as compared with 9 years for absorption of slips in the proposed project. Hotel rooms under Alternative 1 are estimated to be absorbed within 4 years after groundbreaking, as compared with 7 years under the proposed project. Time-share units would be absorbed within 10 years under Alternative 1, while 15 years are projected under the proposed project. Due to the planned increase in commercial facilities under Alternative 1, the absorption period of commercial space is estimated at 14 years, as compared with 8 years for absorption of such facilities under the proposed project.

The State and County will still both receive a net benefit (tax receipts relative to public expenditures) annually on a stabilized basis under the Alternative 1. The County net benefits will be some $12.2 million per year under the Alternative 1 versus $14.9 million under the proposed project. The State net benefits will increase under the Alternative 1 to about $37.5 million annually, up substantially from the $11.4 million in the proposed project.

Due to the lower de facto population at build-out, the effective stabilized public costs for both the State and County will decline meaningfully under the Alternative 1, dropping from $7.7 million annually for the County and $36.5 million for the State, to $4.9 million and $23 million per year, respectively.

Alternative 3 would result in no increase in de facto population and improvement to economic conditions. Further discussion on social and economic impacts are contained in, respectively, Sections 4.5 and 4.6.

Vehicular Traffic

The proposed project will impact the nearby road network that currently is congested during peak traffic times. The proposed project includes roadway improvements that would reduce the impact and improve roadway conditions for the regional community.

Alternative 1 includes the same roadway system improvements as the proposed project, yet would reduce vehicular traffic by 35 percent when compared to the proposed project. Alternative 2 would have similar traffic conditions and roadway improvements as Alternative 1. Alternative 3 would result in no increase in traffic and no roadway improvements.

Marina Traffic Study

The increase in boat traffic due to the proposed 800-slip marina would cause entrance channel congestion during varying combinations of existing and new marina peak traffic flow. Worst case conditions of active sport fishing weekend and summer holiday recreational traffic result in traffic volumes exceeding capacity over a short afternoon period. Mitigation to address boat traffic in the proposed project include widening the entrance channel, traffic control, implementation of a permanent traffic control tower, or limiting vessel size.

Alternative 1 would result in a 21 percent reduction in boat traffic congestion under average existing conditions and ten percent reduction during peak existing conditions. The reduction to 400 slips also reduces the impacts of congestion at the entrance channel, thereby reducing the need for any modifications to the entrance channel.

Alternative 2 would have the same level of boat traffic as the proposed project. Alternative 3 would not meet the demand for additional boat slips and would not generate additional boat traffic. Further discussion on marina traffic is contained in Section 4.8.

Police, Fire and Medical Services

The proposed project will impact police, fire and medical services due to an increase in de facto population and increased on-site activity. Alternatives 1 and 2 would have similar levels of impact as the proposed project due to increased on-site activity. Further discussion on police, fire and medical services are contained, respectively, in Sections 4.10.1, 4.10.2 and 4.10.3.

Drainage and Storm Water Facilities

The proposed project will increase drainage flows, quantities, velocities, erosion, and sediment runoff.

Alternative 1 involves a reduction of the project density that would reduce storm runoff from the various land uses due to a reduction in impervious surfaces associated with hotel and time-share development and to the creation of more open space. However, roadway areas will increase by about 30 percent in Alternative 1. Storm runoff from proposed streets would therefore increase; thus requiring additional drainage facilities and possibly resulting in no net savings. The golf course in Alternative 2 may also change drainage characteristics from those of the proposed project and may not reduce impacts. Alternative 3 would result in no change in existing conditions and no improvements to drainage infrastructure. Further discussion on drainage and storm water facilities is contained in Section 4.10.5

Wastewater Facilities

The proposed development is located within the service area of the Kealakehe WWTP and a sewer system will be installed that connects to the WWTP. The sewer system will be comprised of a network of gravity sewers, force mains, and pumping stations which collect and convey wastewater to the existing Kealakehe WWTP. Project improvements will incorporate the usage of recycled / R1 water. Improvements implemented by the proposed project will also accommodate the needs of the regional service population.

Alternative 1 would generate approximately 10 percent less wastewater flow than the proposed project. Wastewater flow in Alternative 2 is undetermined. Alternative 3 would result in no additional flow, as well as no improvements that will benefit the regional community. Further discussion on wastewater facilities is contained in Section 4.10.6.

Potable Water Facilities

The proposed project average daily water demand is estimated at 1.76 million gallons per day. Existing County sources are not adequate to meet this demand and source development is required. The developer is working with DLNR and two wells have been identified that will produce a sustainable yield that will serve the project. These wells will also serve water needs beyond the project.

Alternative 1 would result in net decrease of about five percent of potable water demand. Alternative 2 may have a lower water demand than the proposed project as long as potable water is not used for irrigation. Alternative 3 would result in no additional flow, as well as no source development that will benefit the regional community. Further discussion on potable water facilities is contained in Section 4.10.8.

Energy and Communications

Regarding Alternative 1, preliminary estimates for electrical, telecommunications, and cable resulted in a net demand load that remains similar to the proposed project. Further discussion on energy and communications is contained in Section 4.10.9.1.

The proposed project will increase the demand for electrical energy and telecommunications. The demand would be reduced in Alternative 1 because the number of boat slips and units would decrease. Similarly, Alternative 2 would have fewer units than the proposed project and therefore reduce energy demands. Further reduction in energy demand for either alternative could be achieved by using seawater air conditioning (SWAC) and other energy reduction measures, as planned by the developer. Further discussion on energy and telecommunications is contained in Section 4.10.9.2.

Water Features and Lagoons

The proposed project includes a brackishwater pond, lagoons, and marine life exhibits supplied by clean seawater. The water features in Alternative 1 would significantly decrease by 74 percent from 19 acres in the proposed project to five acres in Alternative 1. This decrease in water features would result in a corresponding decrease in water source requirements and seawater discharge. Alternative 2 does not include the seawater features. Alternative 3 would result in no additional demand for water source requirements and seawater discharge.

2.2.2 Conformance with Public Plans and Policies

State of Hawai'i

Chapter 343, Hawai'i Revised Statutes

Compliance with this chapter is effected, as described in Section 5.1.1 in regard to the proposed project and the alternatives discussed.

- State Land Use Law, Chapter 205, Hawai'i Revised Statutes

  The discussion in Section 5.1.2 is directly applicable to Alternative 1, the proposed project. Alternative 1 will involve a setback of 400 feet that increases to 600 feet along the southern portion of the project site's shoreline area. Alternative 2 does not provide for such a setback, but may still require approvals from DLNR for cultural, recreational, and community uses and structures within the Conservation district.

- Coastal Zone Management Program, Chapter 205A, Hawai'i Revised Statutes

  Recreational Resources:

  In addition to the discussion of consistency with the associated objective and policies, as described in Section 5.1.3, the reduction from the proposed project's 800-slip marina to a 400-slip marina under Alternative 1 will still expand the region's boating opportunities and support facilities. The existing harbor entrance will still be utilized under this alternative; however, potential risks relating to boat traffic and congestion in the marina entrance area will be reduced significantly. The 400-600 foot shoreline setback, public parks, trails, cultural areas, community facilities, and marine science center remain important recreational components under Alternative 1.

Alternative 2 includes a golf course component, which would add a more passive recreation to the active and social components, such as boating, fishing, swimming, trails, walkways, parks, marine life, educational and interactive areas that are also part of the project. The golf course would enhance the range of leisure and recreational opportunities offered at Kona Kai Ola.

Alternative 2, like the proposed project, will expand the region's boating opportunities and support facilities through its 800-slip marina. However, the potential adverse impacts of increased boat traffic from the size of the marina are significant enough to offset the benefits of increased boating opportunities.

Coastal Ecosystems:

The discussion in Section 5.1.3 is directly applicable to Alternative 1.

Alternative 1 not only reduces the number of slips proposed by 50 percent, but it also reduces the size of the marina from 45 acres to 25 acres. The 25-acre marina will increase the body of water within the existing harbor, but to a significantly lesser extent than the proposed project's estimated increase, which is also applicable to the 45-acre size that is proposed for the marina under Alternative 2.

The findings of the Harbor Water Quality Modeling Study conclude that a reduction in the size of the harbor expansion is an alternative that will mitigate the risk of significant impacts upon water quality within the marina and existing harbor. Accordingly, the reduction in both the number of slips and the size of the marina basin under Alternative 1, in combination with proper facilities design, public education, and enforcement of harbor rules and regulations, would result in fewer long-term impacts to water quality and coastal ecosystems. Short-term (construction-related) impacts would likely remain the same although the reduction in the total acreage of excavation is expected to result in a shorter duration of such impacts.

In addition to its 800-slip marina and potential adverse impacts upon water quality and the marine environment, Alternative 2 includes a golf course component, which has the potential to impact coastal ecosystems by increasing the nutrient loading in surface runoff and groundwater and also by introducing pesticides, herbicides, and other chemicals common in golf course use and management into the nearshore waters surrounding the project site.

Economic Uses

Although reduced in the number of slips, the smaller marina under Alternative 1 will nevertheless serve public demand for more boating facilities in West Hawai'i and is consistent with the objective and policies and discussion set forth in Section 5.1.3. The economic impacts of Alternative 2, while comparable to those of the proposed project's marina development, are notably marginal as to the golf course component, based on the marketability analysis that indicates a condition of saturation within the region.

Coastal Hazards

The discussion and considerations set forth in Section 5.1.3 are also applicable to Alternatives 1 and 2 and indicate compliance with the objective and policies addressed. Tsunami risks mainly affect the large shoreline setback area that is proposed for the project and Alternative 1. Alternative 2 projects a transient accommodation site that is partially within the tsunami hazard zone and thus carries a higher hazard risk. However, the essential requirement for these alternatives, as well as the proposed project, is a well-prepared and properly implemented evacuation plan.

Beach Protection

Discussion and considerations set forth in Section 5.1.3 are also applicable to Alternatives 1 and 2 and indicate compliance with the objective and policies addressed. Alternative 1 and, to a lesser extent, Alternative 2, will retain the shoreline area in its natural condition.

Similar to the proposed project, Alternative 1 provides for a shoreline setback of considerable width within which no structure, except for possible culturally-related structures, would be allowed. Alternatives 1 and 2 will thus be designed to avoid erosion of structures and minimize interference with natural shoreline processes.

Marine Resources

The discussion in Section 5.1.3 is also applicable to Alternative 1 which is described to be an alternative that is specifically projected to mitigate anticipated adverse impacts on water quality and the marine environment that might otherwise result from the original harbor design and scale, which is also incorporated in Alternative 2 . The reduced marina size under Alternative 1 is projected to meet water quality standards and enable greater compliance with the objective and policies addressed in this section.

Alternative 2 includes a golf course component and thus the potential to adversely impact marine resources by increasing the nutrient loading in surface runoff and groundwater and also by introducing pesticides, herbicides, and other chemicals common in golf course use and management into the nearshore waters surrounding the project site.

Hawai'i State Plans, Chapter 226, Hawai'i Revised Statutes

Section 226-4 (State goals), 5 (Objectives and policies for population, and 6 (Objective and policies for economy in general):

The discussion in Section 5.1.4 is applicable to Alternatives 1 and 2, in addition to the proposed project. These development concepts generally conform to the goals, objectives, and policies set forth in these sections because they will provide some degree of economic viability, stability, and sustainability for future generations. Kona Kai Ola will convert essentially vacant land into a mixed-use development with a distinctive marina and boating element, providing a wide range of recreational, business, and employment opportunities to the community.

Section 226-8 Objective and policies for the economy – the visitor industry:

Alternatives 1 and 2 will be consistent with the State's economic objective and policies relating to the tourism industry for the same reasons that are discussed in regard to the proposed project in Section 5.1.4. They will incorporate JDI's commitment to sustainability principles in the planning and design of the development concepts in Alternatives 1 and 2. Although the total hotel and time-share unit count is reduced to approximately 1,500 in Alternatives 1 and 2, the transient accommodations component of these alternatives will still further the State's objective and policies for increased visitor industry employment opportunities and training, foster better visitor understanding of Hawai'i's cultural values, and contribute to the synergism of this mixed-use project concept that addresses the needs of the neighboring community, as well as the visitor industry.

Section 226-11 Objectives and policies for the physical environment: land-based, shoreline and marine resources:

Alternative 1 is expected to involve less potential adverse impacts upon these environmental resources than the proposed project. Likewise, and Alternative 2 would have less adverse impact because of its reduction in the size of the marina and in the total hotel and time-share unit count. Alternative 1 carries less potential risk to water quality and related impacts upon the marine environment and anchialine pool ecosystems. Although approximately three anchialine pools are expected to be destroyed, the great majority of pools will be preserved within and outside of the proposed 400-foot shoreline setback.

The golf course component in Alternative 2 has the potential to impact marine resources by increasing the nutrient loading in surface runoff and groundwater and also by introducing pesticides, herbicides, and other chemicals common in golf course use and management into the marina basin and nearshore waters surrounding the project site. It also has the potential to adversely affect the anchialine pools by introducing the chemicals into the pond systems.

Section 226-12 Objective and policies for the physical environment: scenic, natural beauty, and historic resources:

The discussion in Section 5.1.4 is directly applicable to Alternative 1 and describes the compliance with the objective and policies addressed.

The golf course component of Alternative 2 would create a park-like view that would potentially enhance the beauty of the project site and surrounding areas when considered in combination with the existing rugged natural beauty of the area.

Just as with the proposed project, Alternatives 1 and 2 would also be designed to blend with the natural terrain and to honor and protect the cultural history, resources, and practices of these lands.

Section 226-13 Objectives and policies for the physical environment: land, air and water quality:

As stated above, because of the reduction in both the number of slips and the size of the marina basin, with proper facilities design, public education and enforcement of harbor rules and regulations, Alternative 1 is anticipated to cause fewer long-term impacts to water quality than either the proposed project or Alternative 2. Based on the findings of the Harbor Water Quality Modeling Study, water quality resulting from a reduced marina basin size as proposed under Alternative 1 is expected to be similar to existing conditions.

As previously noted, Alternative 2 has the potential to adversely impact water quality by increasing the nutrient loading in surface runoff and groundwater by introducing pesticides, herbicides and other chemicals common in golf course development and maintenance into the marina basin and nearshore waters surrounding the project site.

Section 226-14 Objectives and policies for facility systems - general:

Alternatives 1 and 2 will conform to the objective and policies of this section on the grounds that are discussed in regard to the proposed project in Section 5.1.4. The master-planning and phasing of the project concepts under these alternatives will be coordinated with associated public and private infrastructural planning and related private and public infrastructural financing. The cost of the marina construction and project-related infrastructure is to be borne by the developer, resulting in considerable savings for the public. In addition, the projected lease revenue from these public lands will provide additional public benefits by establishing a revenue stream for capital improvements and maintenance of a range of State facilities.

Section 226-15 Objectives and policies for facility systems - solid and liquid wastes:

In addition to the developer's commitment to sustainable development design, the project will involve upgrades to the County of Hawai'i's Kealakehe Wastewater Treatment Plant to meet current needs, as well as the project's future needs. This commitment is applicable to Alternatives 1 and 2, as well as the proposed project that is discussed in Section 5.1.4.

Section 226-16 Objectives and policies for facility systems – water:

The discussion of water conservation methods and the need to secure additional potable water sources in Section 5.1.4 is also applicable to Alternative 1 and demonstrates conformity to the objective and policies for water facilities. Alternative 2 involves greater irrigation demands in regard to its golf course component and greater potable water demands for human consumption than those for Alternative 1. Alternative 2 is expected to face more serious challenges in securing adequate and reliable sources of water.

Section 229-17 Objectives and policies for facility systems – transportation:

Alternatives 1 and 2 will conform to this objective and policies because they will present water transportation opportunities, including the possible use of transit water shuttles to Kailua-Kona, as described in regard to the proposed project in Section 5.1.4.

Section 226-18 Objectives and policies for facility systems – energy:

Alternatives 1 and 2 conform to these objective and policies through the use of energy efficient design and technology and commitment to the use and production of renewable energy to serve the project's needs. Solar energy production, solar hot water heating, and the use of deep cold seawater for cooling systems are currently identified as means of saving substantial electrical energy costs for the community and the developer.

Section 226-23 Objectives and policies for socio-cultural advancement – leisure:

Alternative 1 conforms to this objective and related policies for the reasons offered in Section 5.1.4 in regard to the proposed project. Alternative 1 will be of greater conformity with the policy regarding access to significant natural and cultural resources in light of the 400-600 foot shoreline setback that has been designed for this alternative.

Although it does not propose the considerable shoreline setback that is planned for Alternative 1, Alternative 2 is consistent with this objective and related policies in incorporating opportunities for shoreline-oriented activities, such as the walking trails. In addition, the golf course component adds a more passive recreation alternative to the active and social components, such as boating, fishing, swimming, trails, walkways, parks, marine life educational and interactive areas that are also part of the project. The golf course would enhance the range of leisure and recreational opportunities offered at Kona Kai Ola.

Section 226-25 Objectives and policies for socio-cultural advancement-culture:

The discussion in Section 5.1.4 is relevant to Alternatives 1 and 2 and demonstrate their conformity the objective and policies of this section.

Both alternatives involve the preservation and protection of cultural features that have been identified by the Cultural Impact Assessment and archaeological studies for the project area. Both provide for public shoreline access, and both will continue the policy of close consultation with the local Hawaiian community and cultural and lineal descendants in the planning of cultural resource preservation and protection.

Section 226-103 Economic priority guidelines:

Alternatives 1 and 2 conform to these guidelines for the same reasons that are set forth in Section 5.1.4. They involve private investment in a public project that will create economic diversification through a mix of marina, industrial, commercial, visitor, and cultural facilities. This presents a wide range of entrepreneurial opportunities, long-term employment opportunities, and job training opportunities.

Section 226-104 Population growth and land resources priority guidelines:

As described in Section 5.1.4, the policy support for the proposed project also extends to the similar development concepts considered in Alternatives 1 and 2. Those alternatives conform to the guidelines of this section because they involve an urban development under parameters and within geographical bounds that are supported by the County's General Plan, a preliminary form of the Kona Community Development Plan, the County's Keahole to Kailua Regional Development Plan, and the reality of being located along the primary commercial/industrial corridor between Keahole Airport and Kailua-Kona. As with the proposed project, the development concepts of Alternatives 1 and 2 are essentially alternatives for the implementation and "in-filling" of the urban expansion area in North Kona.

DHHL Hawai'i Island Plan

This 2002 plan projects DHHL's Honokōhau makai lands for commercial use. As compared to the proposed project and Alternative 2, Alternative 1 presents an expanded commercial component that provides greater compliance with the plan, while addressing certain beneficiaries' concerns about the scale of the marina originally required in the Project. Alternative 2 also conforms to the recommended commercial uses in the makai lands but to a lesser degree than Alternative 1 because of its more limited commercial component. Like the proposed project, its marina size and number of slips raise environmental issues, as more specifically discussed in Part 3, and community concerns.

County of Hawai'i General Plan

HCGP Section 4 – Environmental Quality Goals, Policies and Courses of Action:

Alternative 1 is consistent with this section. It presents a reduction in both the number of slips and the size of the marina basin that, in combination with proper facilities design, public education and enforcement of harbor rules and regulations, would result in very few long term impacts to water quality. Based on the findings of the Harbor Water Quality Modeling Study, water quality would remain similar to existing conditions.

Alternative 2 is the least consistent with this section. In addition to the potential significant impacts of its 800 slip marina basin, its golf course component has the potential to adversely impact marine resources by increasing the nutrient loading in surface runoff and groundwater and also by introducing pesticides, herbicides and other chemicals common in golf course use and management into the nearshore waters surrounding the project site. It also has the potential to adversely affect the anchialine pools beyond their current conditions by introducing such substances into the pool systems.

HCGP Section 7 – Natural Beauty Goals and Policies:

Alternative 2 conforms to some degree with this section. Its golf course component would create a park-like view that would potentially enhance the beauty of the project site and surrounding areas when considered in combination with the existing rugged natural beauty of the area, as demonstrated in other makai golf courses within the region.

HCGP Section 8 – Natural Resources and Shoreline:

Alternative 1 is most consistent with the goals and policies of this section. It would require considerably less marina excavation than the proposed project and Alternative 2 and would reduce the potential risk of long-term adverse impacts to water quality. Based on the findings of the Harbor Water Quality Modeling Study, water quality would remain similar to existing conditions with the degree of reduction in marina basin size that is proposed under Alternative 1. This reduction is also expected to reduce potential impacts upon anchialine pools and their ecosytems, as well as shoreline and marine resources that are affected by water quality. Alternative 1 also retains the shoreline preservation and protection concepts that are proposed in and described for the Project.

HCGP Section 10 – Public Facilities Goals and Policies:

The discussion in Section 5.2.1. in relation to the proposed project is applicable to Alternatives 1 and 2. Improvements to public facilities are are integral to the Kona Kai Ola development. The provision of additional boat slips and numerous road improvements, including a makai extension of Kuakini Highway south to Kailua-Kona are incorporated into plans for the project's development. In light of these elements, Alternatives 1 and 2 are consistent with the goals and policies of this section.

HCGP Section 11 – Public Utility Goals, Policies:

As with the proposed project, Alternatives 1 and 2 are consistent with the goals and policies of this section, based on the relevant grounds set forth in Section 5.2.1. The developer is committed to design, fund, and develop environmentally sensitive and energy efficient utility systems to the extent possible, as described previously in Part 5. Its master planning provides for the coordinated development of such systems with the objective of achieving significant savings for the public. As previously-mentioned example, the project development involves the upgrading of the Kealakehe Wastewater Treatment Plant.

HCGP Section 12 – Recreation:

Alternative 1 is consistent with the goals, policies, and courses of action for North Kona in this section.

Although the number of slips is reduced under Alternative 1, the region's boating opportunities and support facilities will still be expanded. The existing marina entrance would still be utilized under this alternative. However, concerns relating to increased activity leading to increased congestion in the marina entrance area would be mitigated to a certain extent. The 400-600 foot shoreline setback, public parks, trails, cultural areas, community facilities and marine science center remain important components of Alternative 1.

The golf course component of Alternative 2 would add a more passive recreation to the active and social components, such as boating, fishing, swimming, trails, walkways, parks, marine life, educational and interactive areas that are also part of the project. The golf course would enhance the range of leisure and recreational opportunities offered at Kona Kai Ola. Alternative 2 is also considered to be consistent with this section.

HCGP Section 13 and 13.2 – Transportation:

The reduced marina component under Alternative 1 will still provide transportation opportunities and provide for possible use of transit water shuttles to Kailua-Kona, although to a lesser degree than under the proposed project and Alternative 2 . However, in each scenario, internal people-movers are planned, and numerous roadway improvements are planned for coordination with public agencies, including but not limited to the construction of the Kuakini Highway extension between Honokōhau and Kailua-Kona. Accordingly, both Alternatives 1 and 2 are consistent with the goals, policies, and courses of action for North Kona under these sections of the General Plan.

HCGP Section 14.3 – Commercial Development:

For the reasons presented in the discussion under Section 226-104 of the State Plan, the planned commercial component under Alternatives 1 and 2 are consistent with this section.

HCGP Section 14.8 – Open Space:

Alternatives 1 and 2 are consistent with the goals and policies of this section. Alternative 1 provides a considerable (400-600 foot) shoreline setback along the entire ocean frontage of the project site as a means of protecting the area's scenic and open space resources, as well as natural and cultural resources. Although it does not incorporate the shoreline setback planned in Alternative 1, Alternative 2 provides a golf course component would contribute to the amount of open space that is currently proposed and allow additional view corridors to be created.

Community Development Plans

Community development plans are being formulated for different regions in the County in order to supplement the County's General Plan. The Kona Kai Ola project is located in the Kona Community Development Plan (CDP) area. Maps associated with the preliminary work phases

of the Kona CDP include the Kona Kai Ola project site within the "Preferred Urban Growth" boundary of the North Kona district. The Kona CDP process is guided by a Steering Committee composed of a broad cross-section of the community. The Steering Committee will eventually complete its work and recommend the CDP's adoption.

After the DEIS was published, the Kona CDP has progressed to the development of plans for the major urban growth corridor north of Kailua-Kona. The Kona CDP has produced a draft plan showing a transit oriented development that includes a midlevel public transit corridor along the mauka residential elevation, and a makai transit corridor that runs along a proposed new frontage road just makai and parallel to Queen Kaahumanu Highway. The development plan for Alternative 1 includes the Kuakini Highway as part of this proposed frontage road and transit line from Kailua Kona to the Kealakehe area, along with a transit stop at Kona Kai Ola. The Alternative 1 plan also includes a road that could be extended to be part of the proposed frontage road should it be approved and implemented. In addition, the Kona CDP has continued to emphasize the principles of smart growth planning with mixed use urban areas where people can live, work, play and learn in the same region. Kona Kai Ola has been specifically designed to be consistent with this policy in order to provide a stable employment base close to where people live in the mauka residential areas already planned for DHHL and HHFDC lands.

It should be noted that currently and over the years, the 1990 Keāhole to Kailua Development Plan (K-to-K Plan) guides land use actions by the public and private sectors. It is intended to carry out the General Plan goals and policies related to the development of the portion of North Kona area, including the Kona Kai Ola site. The "Preferred Growth Plan" of the Keāhole to Kailua Development Plan identifies the project site as a new regional urban center to include commercial, civic, and financial business related uses, an expanded "Harbor Complex," a shoreline road, and a shoreline park. The proposed project and the development concepts in Alternatives 1 and 2 are therefore consistent with the recommendations in the Keāhole to Kailua Development Plan.

Hawai'i County Zoning

As shown on Figure AA, the project site is zoned "Open". Under Section 25-5-160 of the Hawai'i County Code, "The O (Open) district applies to areas that contribute to the general welfare, the full enjoyment, or the economic well-being of open land type use which has been established, or is proposed. The object of this district is to encourage development around it such as a golf course and park, and to protect investments which have been or shall be made in reliance upon the retention of such open type use, to buffer an otherwise incompatible land use or district, to preserve a valuable scenic vista or an area of special historical significance, or to protect and preserve submerged land, fishing ponds, and lakes (natural or artificial tide lands)".

Some of the proposed uses at Kona Kai Ola are permitted uses in the Open zone such as:

- Heiau, historical areas, structures, and monuments;
- Natural features, phenomena, and vistas as tourist attractions;
- Private recreational uses involving no aboveground structure except dressing rooms and comfort stations;

- Public parks;
- Public uses and structures, as permitted under Section 25-4-11.

In addition to those uses permitted outright, the following uses are permitted after issuance of a use permit:

- Yacht harbors and boating facilities; provided that the use, in its entirety, is compatible with the stated purpose of the O district.
- Uses considered directly accessory to the uses permitted in this section shall also be permitted in the O district.

The proposed time-share and hotel units and commercial uses would not be consistent with the zoning designation of "Open". Project implementation therefore requires rezoning of portions of the project to the appropriate zoning category or use permits for certain uses.

Special Management Area

As shown in Figure AB, the entire project area up to the highway is within the coastal zone management zone known as the Special Management Area ("SMA"). At the County level, implementation of the CZM Program is through the review and administering of the SMA permit regulations. Kona Kai Ola complies with and implements the objectives and policies of the Coastal Zone Management (CZM) Program, and a full discussion is provided in Section 5.1.3. The development concepts in the proposed project and Alternatives 1 and 2 will be subject to applicable SMA rules and regulations.

Envelope Postmarked 13Feb'07

To: Dayan Vithanage, OCEANIT
828 Fort Street Mall, 6th Floor
Honolulu HI 96813

From: Marni Herkes marnih@hawaiiantel.net
808 987 2171
PO Box 571 Holualoa HI 96725

RE: Comment on the DEIS for Kona Kai Ola
This is a favorable comment for the Kona Kai Ola project. This harbor-front commercial village is in agreement with Hawaii County plans, conforms to the smart growth plans of the community development plan, enhances the historic fishing and marine focus of the Kona community and is environmentally planned.

This area is near new county and state buildings, near educational institutions, both public and private, and near affordable housing as well as planned affordable communities. It is in a major urban area – in fact the land is zoned urban – and it is planned to be an expansion (much needed) of the present commercial and village enterprises (many in the community plan meetings mentioned this expansion). The concentration of business and housing will make transportation systems more attractive as will the planned roadways, some of which are contingent on this project.

We applaud the past efforts of this developer and look forward to the same standard of environmentally sound practices for this project that they have followed in the past. We have already seen a more extensive than usual effort to involve the Kona community in the planning from well-attended charettes in 2003, conversations throughout 2005 and 2006, and involvement in the Kona Community Plan planning processes to hear more of the community wishes and now this DEIS which brings all the comments together in a cohesive planning and environmental document.

The evident aspects of the plan that come from the community are the 40 per cent of open space; the LEED certification (one of the few developers who has actually done this); reductions of energy use; use of potable water; reduction of the need for potable water; and especially important to the Kona community is the improvement of the water quality related to marinas. The diversion of waste is very important on an island; and the improvement of transportation with walkable communities and transportation systems is in line with all the plans for Kona.

We applaud the state for the use of their/our lands for revenue generation for the protection of our natural resources. This project will generate revenue while minimizing the impacts on the environment by reducing water consumption, waste disposal, and energy use. We applaud the developer for proposing a plan on a grand scale, which will have an approximately 15-year build out and be a focal point for the Kailua area, expand the village, and fit with the wishes of the Kona community as expressed in the Kona Community Plans meetings.

Ms. Maralyn Herkes
P.O. Box 571
Holualoa, HI 96725

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Dayan Vithanage
Oceanit
828 Fort Street Mall, 6th floor
Honolulu HI 96813

oceanit
innovation through engineering & scientific excellence

July 23, 2007

Marni Herkes
P.O. Box 571
Hōlualoa, Hawai‘i 96725

Dear Ms. Herkes:

Subject: Kona Kai Ola Draft Environmental Impact Statement
Response to Your Comments Dated February 13, 2007

Thank you for your comments on the Kona Kai Ola Draft Environmental Impact Statement.

We concur with your statements regarding Kona Kai Ola's consistency with Hawai‘i County plans and the smart growth elements of the community development plan. The project's location in a major urban area, proximity to existing and planned public facilities, and proximity to existing and planned affordable housing units will enhance and support the existing community.

We also concur with your acknowledgement of the incorporation of environmentally sound practices, and EIS Section 1.5.2, Project Sustainable Design, provides sustainability goals in the areas of design, energy, water, waste and transportation. These goals are consistent with the principles you outline in your comments.

As you note, the project has incorporated a wide range of community input, as discussed in EIS Section 1.8, Proactive Communication Outreach Program. Community outreach efforts have continued since the DEIS publication, and EIS Section 11.2 summarizes these efforts.

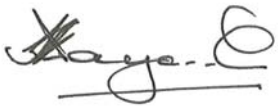
The additional EIS text that includes the added EIS Section 11.2, Ongoing Public Participation Process Continues After DEIS Publication, is contained in Attachment 1 of this letter.

Further, we concur with your comments regarding the economic benefits of the project. In addition to creating revenue on State-owned lands, this project will help to improve the region's economic environment, while minimizing environmental impacts.

Oceanit Center 828 Fort Street Mall, Suite 600 Honolulu, Hawaii 96813 Phone: 808.531.3017 Fax: 808.531.3177
www.oceanit.com

Your comment letter and this response are included in the Final Environmental Impact Statement. We appreciate your participation in the environmental review process. Please submit a request to our office if you would like to receive a printed or electronic copy of the Final Environmental Impact Statement, or portions thereof.

Sincerely,



Dayan Vithanage, P.E., PhD.
Director of Engineering

cc: Office of Environmental Quality Control
State Department of Hawaiian Home Lands
Jacoby Development, Inc.

Attachment 1

Organization	Participation
Rotary Club of Kona*	Approximately 45 Rotary members, guests and visiting Rotarians present
West Hawai'i Fisheries Council*	17 Members present Approximately 23 Guests present

11.2 Ongoing Public Participation Process Continues After DEIS Publication

The Kona Kai Ola team continued its effort to meet with community members after the Draft EIS was released in September 2006. From October 2006 through June 2007, an additional 81 project presentations were delivered to an additional 361 community members. These presentations included individual meetings, small group presentations and larger gatherings. All of the meetings allowed for in-depth question and answer periods.

These presentations were productive and the project plan revisions reflect community input gathered throughout the communication process.

In addition to responding to formal comments generated from the draft EIS, the Kona Kai Ola team has worked with its ahupua'a neighbors regarding additional environmental studies and EIS alternatives.

Puwalu - Advocating for the Ahupua'a of Kealakehe: Live, Work, Play and Learn

Kona Kai Ola recently participated in the first of a series of Puwalu (or gatherings) *Advocating for the Ahupua'a of Kealakehe: Live, Work, Play and Learn,* initiated by the Kaniohale Community Association and its board president Bo Kahui.

Key ahupua'a stakeholders including kupuna and representatives from Kaloko-Honokōhau National Historical Park, County of Hawai'i, Kaniohale Community Association, Kealakehe Community Association, Department of Hawaiian Home Lands and Kona Kai Ola along with cultural descendants came together to:

1. collectively establish basic cultural values for the Kealakehe ahupua'a and
2. discuss external forces pressuring the ahupua'a.

Stakeholders identified immediate and future needs of Kealakehe ahupua'a and agreed to guiding principles for the Puwalu. These principles include looking at the Kealakehe ahupua'a from mauka to makai and in context with neighbors, and to strengthen the collective vision to include future generations.

The initial Puwalu established that the ahupua'a strive to be akamai (smart)—one that connects neighbors and neighborhoods with good roads, trails and paths, recognizes the importance of growing in balance, being lokahi (in balance) with nature, man and spirituality, and honor its Hawaiian culture and sense of place.

Kaniohale Community Association Support

Kona Kai Ola's community outreach has emphasized the importance of its closest neighbors, the Kaniohale at the Villages of La'i 'Ōpua Community Association (Kaniohale Community Association).

Kona Kai Ola engaged the Kaniohale Community Association's Board of Directors through presentations and ensuing discussions focusing on an alternative development plan to be presented in the FEIS with a smaller marina basin and less number of hotel and time share units (Alternative 1).

As a result of this ongoing dialog, the Kaniohale Community Association at the Villages of La`i`Ōpua Board of Directors unanimously approved a resolution supporting Kona Kai Ola's plan for a smaller marina and less number of hotel and time share units at their regular meeting on June 6, 2007, which is excerpted below and included in the comment letters on the DEIS.

> *"As this process to plan Kona Kai Ola proceeds, the Kaniohale Community Association Board of Directors expresses its support for Kona Kai Ola project in its reduced density version...*
>
> *As neighbors in the Kealakehe ahupua`a, the Kaniohale Community Association welcomes the involvement of this partnership of Jacoby Development, Inc., Department of Hawaiian Home Lands, and Department of Land and Natural Resources, in cooperative efforts to plan and implement steps to achieve a sustainable ahupua`a and a healthy community."*
>
> *Kaniohale at the Villages of La'i'Ōpua Community Association. approved June 6, 2007*

Over the entire time of project design, preparation of the Draft EIS and preparation of the Final EIS, Jacoby Development has received input on Kona Kai Ola from over 920 Big Island community members, has adjusted and revised project plans, and is committed to build a sustainable development.

Community participation will continue to help guide and shape this project to protect the region's natural and cultural resources and better the West Hawai'i community's well being with recreational, educational and employment opportunities.

Table 7: Kona Kai Ola Community Contacts Completed Since DEIS; October 2006 through June 2007

•Denotes an individual or small group meeting

**Denotes a group meeting*

Name	Affiliation and Participation
Rudy Ai	Board member, Kaniohale Community Association at the Villages of La`i`opua Attended Kaniohale Community Association at the Villages of La`i`opua Board of Directors presentation*
Dora Aio	Board member, Kaniohale Community Association at the Villages of La`i`opua Attended Kaniohale Community Association at the Villages of La`i`opua Board of Directors presentation*
Danny Akaka	Cultural Resources Director, Mauna Lani Resort Individual project meeting•
Jim Anderson	Keauhou Punahele Home Owners Association Attended Keauhou Outreach Group presentation*
Billie Baclig	Commissioner, Hawaiian Homes Commission Individual project meeting•
Sallie Beavers	Marine Biologist, Kaloko-Honokōhau National Historical Park Attended Na Hoapili o Kaloko-Honokōhau Advisory Commission presentation* Individual project meeting•
Billie Baclig	Commissioner, Hawaiians Homes Commission Individual project meeting•
Casey Ballao	General Manager, Roberts Hawai'i; cultural advocate Individual project meeting•
Scott Bell	Kona Realtor; former President, Kona Kohala Chamber of Commerce Individual project meeting•
Sarah Bello	President, Holualoa Village Association Attended Holualoa Village Association presentation*
Jane Bockus	Keauhou Canoe Club Attended Keauhou Outreach Group*

Name	Affiliation and Participation
Randi Botti	President, Hawai'i Island Paddlesport Association Individual project meeting•
Carla Brown	Attended Kailua Kona Lions Club presentation
Maggie Brown	President, Body Glove Cruises Individual project meeting•
Bo Campos	President, Kai 'Opua Canoe Club Individual project meeting•
Geri Cardoza	Keauhou Villas Attended Keauhou Outreach Group presentation*
David Chai	Director of Natural Resources, Hualālai Resort Individual project meeting•
Serena Chamberlain	President, PATH Attended PATH Board of Directors presentation*
Keala Ching	Founder, Na Wai Iwi Ola Foundation; Kumu hula Attended Na Wai Iwi Ola Foundation small group meeting
Linda Chinn	Land Management Division Administrator, Department of Hawaiian Home Lands Attended Ahupua'a o Kealakehe puwalu*
Dick Choy	Executive Director, Kids for Kona Individual project meeting•
Boyd Coffman	Attended Kailua Kona Lions Club presentation
Bobby Command	Contributing Editor, West Hawai'i Today Individual project meeting•
Skip Cowell	Vice President & co-founder; TREE Hawai'i Individual project meeting•
Chuck Crowe	Keauhou Estates Attended Keauhou Outreach Group presentation*
Nani Demasco	School clerk; Kealakehe Elementary School Community Council Attended Kealakehe Elementary School Community Council presentation*
Kevin Dayton	Big Island news bureau, Honolulu Advertiser Individual project meeting•

Name	Affiliation and Participation
Charlene David	Kaulana At Kona Attended Keauhou Outreach Group presentation*
James Dean	Owner, Blue Hawai'i Sportfishing Individual project meeting•
Laura Diernfield	Attended PATH Board of Directors presentation
Fred Duerr	President, Hawaiian International Billfish Association Individual project meeting•
Kelly Duff-DePoyo	Parent; Kealakehe Elementary School Community Council Attended Kealakehe Elementary School Community Council presentation*
Charmaine Duvouchelle	Vice President, Kaniohale Community Association at the Villages of La`i`opua Attended Kaniohale Community Association at the Villages of La`i`opua Board of Directors presentation*
Cindy Evans	State Representative, 7th District Individual project meeting•
Billy Fields	Cultural mason in Kona Individual project meeting•
Peter Fithian	Founder, Hawaiian International Billfish Tournament Individual project meeting•
Reed Flickinger	Editor, West Hawai'i Today Individual project meeting•
Alfreida Fujita	Board member, Kona Coffee Cultural Festival; member, Holualoa Business Association; member, Professional Business Women's Association Attended Professional Business Women's Association & Holualoa Business Association presentations*
Scott Fuller	Captain and co-owner of TARA II Individual project meeting•
Danny Garcia	Administration Attended Kealakehe High School Community Council presentation*
Michael Gardner	Keauhou Kona Surf &Racquet Club Homeowners Association Attended Keauhou Outreach Group presentation*

Name	Affiliation and Participation
Josh Green	M.D., State Representative, 6th District Individual project meeting•
James Greenwell	Owner and General Manager, Lanihau Inc. and Palani Ranch Attended Hawai'i Leeward Planning Conference presentation* Individual project meeting•
Kelly Greenwell	President, Kealakehe Community Association; member, Kealakehe Elementary School Community Council Attended Destination Kona Coast & Kealakehe Elementary School Community Council presentations* Individual project meeting•
Bob Goodwin	Attended Kailua Kona Lions Club presentation*
Jerry Halverson	President, Moku o Hawai'i Canoe Association Individual project meeting•
Lunakanawai Hauanio	Member, West Hawai'i Fisheries Council; member, Laiopua 2020 Attended West Hawai'i Fisheries Council & Kaniohale Community Association at the Villages of La`i`opua Board of Directors presentations*
Marlin Harris	Attended Kealakehe High School Community Council presentation*
Debbie Hecht	Aide, Councilperson Ford Attended Na Wai Iwi Ola Foundation small group meeting*
Marrisa Hendrickson	Parent; Kealakehe Elementary School Community Council Attended Kealakehe Elementary School Community Council presentation*
Tommy Hickcox	Retired police officer; member, Kona Community Development Plan Steering Committee; member, Concerned Citizens of Kona Individual project meeting•
Stephen Hicks	Director of Operations, Red Sail Sports Individual project meeting•
Janet Higa-Miller	Attended PATH Board of Directors presentation
Pete Hoffman	Chair, Hawai'i County Council Individual project meeting•
Mel Hoomana-wanui	Board member, Kaniohale Community Association at the Villages of La`i`opua Attended Kaniohale Community Association at the Villages of La`i`opua Board of Directors presentation*

Name	Affiliation and Participation
Roberta Jaques	Member, Professional Business Women's Association Attended Professional Business Women's Association presentation*
Linda Jeffery	Secretary, Kealakehe High School Community Council Attended Kealakehe High School Community Council presentation
Kathy Jensen	Clark Realty Attended Keauhou Outreach Group presentation*
Lona Johnson	Attended Kailua Kona Lions Club presentation*
Terry Jones	Keauhou Akahi Homeowners Association Attended Keauhou Outreach Group presentation*
Patrick Jones	Member, Kealakehe Community Association Attended Ahupua'a o Kealakehe puwalu
Gretchen Watson-Kabei	Secretary, Rotary Club of Kona; Legal Administrator/Principal Broker SVC-Hawai'i, L.P. Attended Rotary Club of Kona presentation* Individual project meeting•
Dixie Kaetsu	Hawai'i County Managing Director Individual project meeting•
Bo Kahui	President, Kaniohale Community Association at the Villages of La`i`opua Attended Kaniohale Community Assoc at Villages of La`i`opua Board of Directors* Attended Ahupua'a o Kealakehe puwalu* Individual project meeting•
Edith Kahoalii	Board member, Kaniohale Community Association at the Villages of La`i`opua; member, Na Wai Puna O Kona Kupuna Group Attended Kaniohale Community Assoc at Villages of La`i`opua Board of Directors & Na Wai Puna O Kona Kupuna presentations*
Malia Kamaka	Commissioner; Hawaiian Homes Commission Individual project meeting•
Marion Bush Keliikipi	Board member, Kaniohale Community Association at the Villages of La`i`opua Attended Kaniohale Community Association at the Villages of La`i`opua Board of Directors presentation*
Kathy Kirk	Attended West Hawai'i Explorations Academy presentation*

Name	Affiliation and Participation
Harry Kim	County of Hawai‘i Mayor Individual project meeting•
Greg Knapp	Board member, Hawai‘i Island Paddlers Association Individual project meeting•
Russell Kokubun	Hawai‘i State Senator Individual project meeting•
Barbara Kossow	County of Hawai‘i Deputy Managing Director Attended West Hawai‘i Fisheries Council & Kona Traffic Safety Committee presentations* Attended Ahupua'a o Kealakehe puwalu* Individual project meeting•
Walter Kunitake	Former chancellor, UH-West Hawai‘i Individual project meeting•
Nani Kupihe	Attended Kailua Kona Lions Club presentation*
Brad Kurokawa	County of Hawai‘i Deputy Planning Director Individual project meeting•
Wally Lau	Executive Director, Neighborhood Place of Kona; Chair, Hui Laulima Attended Ahupua'a o Kealakehe puwalu* Individual project meeting•
Elizabeth Lee	Kupuna Attended Ahupua'a o Kealakehe puwalu* Individual project meeting•
Jamielynn Leialoha	Attended Kealakehe High School Community Council presentation*
Gene Leslie	President, Kuakini Hawaiian Civic Club: former President, Kaniohale Community Association at the Villages of La`i`opua Attended Kuakini Hawaiian Civic Club presentation* Individual project meeting•
Flash Libero	Attended Kailua Kona Lions Club presentation
Robert Lindsey	Trustee, Office of Hawaiian Affairs Individual project meeting•

Name	Affiliation and Participation
Mark Lossing	Business Agent, Hawai'i Carpenters Union Individual project meeting•
Mary Lovein	Member, Holualoa Village Association Attended Holualoa Village Association*
Stuart Lowry	Bayview Estates Homeowner Association Attended Keauhou Outreach Group presentation*
Paul Maddox	Member, Holualoa Village Association Attended Holualoa Village Association presentation
Margaret Masunaga	Attorney, County Family Support Division Individual project meeting•
Nancy Matsukawa	Principal, Kealakehe Elementary School; member, Kealakehe Elementary School Community Council Attended Kealakehe Elementary School Community Council presentation* Individual project meeting•
Herb Maunu	Board member, Kaniohale Community Association at the Villages of La`i`opua Attended Kaniohale Community Association at the Villages of La`i`opua Board of Directors presentation*
Janet McClure	Attended Kealakehe High School Community Council presentation*
Lil McGuire	Attended Kailua Kona Lions Club presentation*
Chuck McGuire	Attended Kailua Kona Lions Club presentation*
Tom Metz	Triad Management, Inc. Attended Keauhou Outreach Group presentation*
Robert Mierdicks	Hawai'i Carpenters Union Individual project meeting •
Ron Mitchell	Rainbow Asset Regulator and Physical Maintenance Individual project meeting•
Tomoe Nimori	Member, Holualoa Village Association Attended Holualoa Village Association presentation

Name	Affiliation and Participation
Dickie Nelson	West Hawai‘i Liaison, U.S. Representative Mazie Hirono; Former Department of Hawaiian Homes Commissioner; former Governor's Liaison Attended Destination Kona Coast presentation* Individual project meeting•
Revel Newton	Sheraton Keauhou Bay Resort & Spa Attended Keauhou Outreach Group presentation*
Tad Nottage	President, Aloha Insurance Services, Inc. Individual project meeting•
Gay Okada	Member, Professional Business Women's Association Attended Professional Business Women's Association presentation*
Chuck Okazaki	Kanaloa at Kona Homeowners Association Attended Keauhou Outreach Group presentation*
Mahealani Pai	Lineal descendant from family of the Honokōhau ahupua`a; cultural consultant Attended Ahupua'a o Kealakehe puwalu* Individual project meeting•
Greg Paulson	Teacher; Kealakehe Elementary School Community Council Attended Kealakehe Elementary School Community Council presentation*
Maggie Penrose	Member, Professional Business Women's Association Attended Professional Business Women's Association presentation*
Kathy Penwell	West Hawai‘i Explorations Academy School Services Coordinator Attended West Hawai‘i Explorations Academy Leadership presentation*
Rowena Pike	Parent; Kealakehe Elementary School Community Council Attended Kealakehe Elementary School Community Council presentation*
Nitta Pilago	Member, Na Wai Iwi Ola Foundation Attended Na Wai Iwi Ola Foundation small group meeting*
Stephanie Place	Secretary, Kaniohale Community Association at the Villages of La`i`opua Board of Directors Attended Kaniohale Community Association at the Villages of La`i`opua Board of Directors presentation*
Janis Prinslow	Parent, Kealakehe High School Community Council Attended Kealakehe High School Community Council presentation*

Name	Affiliation and Participation
Cindi Punihaole	Cultural committee member, Kukio Resort; youth related cultural & natural resource activity coordinator, Kealakehe HS Attended Na Hoapili o Kaloko-Honokōhau Advisory Commission presentation* Individual project meeting•
Larry Rice	Teacher Kealakehe High School Attended Kealakehe High School Community Council presentation*
Bob Rhee	Attended Kailua Kona Lions Club presentation*
Jim Riley	Member, Big Island Sailing Foundation Attended Big Island Sailing Foundation small group meeting•
Debbie Riley	Member, Big Island Sailing Foundation Attended Big Island Sailing Foundation small group meeting •
Tom Roberts	Treasurer, Kaniohale Community Association at the Villages of La`i`opua Attended Kaniohale Community Association at the Villages of La`i`opua Board of Directors presentation*
John Rocha	Kamehameha Investment Company Attended Keauhou Outreach Group presentation*
Bob Roesler	Attended Kailua Kona Lions Club presentation*
Gerry Rott	Attended PATH Board of Directors presentation*
Linda Sanborn	Parent, Kealakehe High School Community Council Attended Kealakehe High School Community Council presentation*
Conrad Sanborn	Student, Kealakehe High School Community Council Attended Kealakehe High School Community Council presentation*
Frank Sayer	Attended PATH Board of Directors presentation*
Barbara Scott	Chair, Kona Traffic Safety Committee Attended Kona Traffic Safety Committee presentation* Individual project meeting•
Dick Scritchfield	Attended Kailua Kona Lions Club presentation*
Jean Sellers	Keauhou Kai Condominiums Homeowners Association Attended Keauhou Outreach Group presentation*
John Sevick	Member, Holualoa Village Association Attended Holualoa Village Association presentation*

Name	Affiliation and Participation
Randy Shelor	Teacher, Kealakehe High School Community Council Attended Kealakehe High School Community Council presentation*
Sonny Shimaoka	Member, Concerned Citizens for Kona Individual project meeting•
Carol Simson	Hale Kehau Homeowners Association Attended Keauhou Outreach Group presentation*
Andy Smith	Governor's West Hawai‘i Liaison Individual project meeting•
Annabelle Smith	Outrigger Keauhou Beach Resort Attended Keauhou Outreach Group presentation*
Hannah Springer Tomich	Former member, County of Hawai‘i Planning Commission; member, Hui Laulima O Kekaha Kai, Hualālai Resort, Kukio, Kohanaiki Advisory Group Individual project meeting•
Alicia Starsong	Board member, Big Island Sailing Foundation; member, Hilo Sailing Club Attended Big Island Sailing Foundation small group meeting *
Daniel Starsong	Board member, Big Island Sailing Foundation Attended Big Island Sailing Foundation small group meeting*
JoAnne Kahanamoku-Sterling	Member, Na Hoapili o Kaloko-Honokōhau Advisory Commission; member, Polynesian Voyaging Society; curator, Kealakowaa Heiau Preservation Council; member, Kona Outdoor Circle Attended Na Hoapili o Kaloko-Honokōhau Advisory Commission presentation* Individual project meeting•
Roy Takemoto	Executive Assistant, County of Hawai‘i Individual project meeting•
Verna Takemoto	Vice Principal; Kealakehe Elementary School Community Council Attended Kealakehe Elementary School Community Council presentation*
Roni Teshima	Member, Professional Business Women's Association Attended Professional Business Women's Association presentation*
Rod Thompson	Big Island news bureau, Honolulu Star Bulletin Individual project meeting•
Carol Trowbridge	Keauhou Kai Homeowners Association Attended Keauhou Outreach Group presentation*

Name	Affiliation and Participation
Terry Varney	Keauhou Akahi Homeowners Association Attended Keauhou Outreach Group presentation*
Jan War	Ocean sports enthusiast; employed by NELHA Individual project meeting•
Elaine Watai	Founding member Kealakehe Homeowners Assoc; member, Governor's West Hawai'i Adv Council; community member, Kealakehe Elementary School Community Council Attended Kealakehe Elementary School Community Council presentation* Individual project meeting•
Dan Woolley	Bayview Estates Homeowners Association Attended Keauhou Outreach Group presentation*
Gene Vanderhoek	Captain, Sea Genie II Sportfishing Individual project meeting•
David Vaughn	Chairman, Friends of Natural Energy Laboratory of Hawai'i Authority Individual project meeting•
Sue Vermillion	Producer and Event Director, G350 Productions Individual project meeting •
Ron Yamashita	Pacific Pest Management Individual project meeting•

Table 8: Kona Kai Ola Presentations to Community Organizations, October 2006 through June 2007

Organization	Participation
Ahupuaa O Kealakehe puwalu	10 people attended
Big Island Sailing Foundation	6 members were present
Holualoa Village Association	9 members were present
Hui Laulima	25 people in attendance
Ka Wai Iwi Ola Foundation	10 members in attendance
Kailua Kona Lions Club	13 members in attendance
Kaniohale Community Association at the Villages of La`i`opua BOD	10 members in attendance (x2 mtgs)
Kealakehe Elementary School Community Council	10 council members were present
Kealakehe High School Community Council	10 council members were present
Keauhou Outreach Group	20 people were in attendance

Organization	Participation
Kona Executive Association	40 people attended
Kona Outdoor Circle Board of Directors presentation	9 board members attended
Kuakini Hawaiian Civic Club Presentation	20 members attended
North Hawai‘i Rotary Club	40 people attended
PATH Board of Directors	8 board members in attendance
Professional Business Women’s Association meeting	20 members present
West Hawai‘i Explorations Academy	25 students and teachers were present

Oceanit
Oceanit Center
828 Fort Street Mall, 6th Floor
Honolulu, HI 96813
ATTN: Dayan Vithanage

February 1, 2007

To All It May Concern:

This is a request for a 60-day extension period on public comment for The Jacoby Project (Honokohau Harbor/Alula on Hawai'i Island). I do not believe that the public has been allowed adequate research/response periods for this project.

These are my reasons:

1) The Jacoby DEIS was issued on December 19, 2006, and publicly noticed by the Office of Environmental Quality on December 23, 2006, just prior to the Christmas and New Year holiday season.

2) The document was not available online until January 2, 2007, only two weeks into the six-weeks public comment period.

3) There have been difficulties with downloading and opening the DEIS appendixes.

4) Therefore: Reasonable knowledge and opinions on such a substantial document as the Jacoby Project cannot be obtained and presented by the general public within 45 days.

Your consideration in this matter is appreciated.

Thank you,

Michelle R. Disque
PO Box 196
Holualoa, HI 96725

Email: mdisque@hotmail.com

Oceanit
Oceanit Center
828 Fort Street Mall, 6th Floor
Honolulu, HI 96813
ATTN: Dayan Vithanage

February 1, 2007

To All It May Concern:

These are some comments/concerns about the Jacoby Project (Honokohau Harbor/Alula) on Hawai'i Island:

If the Jacoby project is approved, Alula will be impacted as follows:

A new 800-boat marina will be blasted south from Honokohau Harbor mauka (mountain side) of Alula while a 40+ acres lagoon will be blasted further mauka (toward the mountain). The depth of rock to be blasted ranges from 10 to 30 feet.

The second largest freshwater outflow from the West Hawai'i coast occurs at Alula (Umi's Well in Kealakekua Bay is the largest). Once the new marina and lagoon have been blasted and excavated, the freshwater outflow from Alula will cease, as it will be captured by the new marina and will be redirected into the existing Honokohau Harbor channel.

The coastal anchialine ponds south from the harbor entrance will be converted from a brackish water eco-system to a marine eco-system. The coral reef offshore from Alula will no longer have the freshwater outflow necessary for its nourishment.
These reefs will degrade.

The freshwater outflow into the ocean will contain increased amounts of nitrates and phosphates from fertilization and pesticide use on new soilsand landscaping. There will be an increase in marine boating chemicals, fuel, and oil in the water. The prevailing current will carry this plume north over the coral reefs fronting the Kaloko-Honokohau National Historical Park, causing coral reef degradation.

Thank you,

Michelle R. Disque

Michelle R. Disque
POB 196
Holualoa, HI 96725

Email: mdisque@hotmail.com

RECEIVED
FEB 05 2007

Disque
PO Box 196
Holualoa, HI 96725

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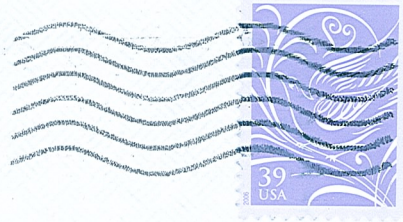

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Honolulu, HI 96813

Attn: Dayan Vithanage

96813+4321

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February 7, 2007

Michelle R. Disque
P. O. Box 196
Holualoa, Hawaii 96725

Dear Ms. Disque:

Subject: Kona Kai Ola Draft Environmental Impact Statement (DEIS)

This letter responds to your written request to extend the comment period for the Kona Kai Ola DEIS. I received your letter on February 5, 2007.

The DEIS was published in the Office of Environmental Quality Control Bulletin on December 23, 2006. The 45-day comment period ends on February 6, 2007.

Regarding your request, we will include your comments and our response in the Final EIS if your transmittal is postmarked by February 13, 2007. Please contact me if you would like hard copies or electronic files of the DEIS.

Thank you for your interest in the Kona Kai Ola project, and we look forward to receiving your comments.

Sincerely,

Dayan Vithanage, P.E., PhD.
Director of Engineering

cc: Office of Environmental Quality Control
State Department of Hawaiian Homelands
Jacoby Development, Inc.

Oceanit Center 828 Fort Street Mall, Suite 600 Honolulu, Hawaii 96813 Phone: 808.531.3017 Fax: 808.531.3177
www.oceanit.com

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July 23, 2007

Michelle R. Disque
P.O. Box 196
Holualoa, Hawai'i 96725

Dear Ms. Disque:

Subject: Kona Kai Ola Draft Environmental Impact Statement
Response to Your Comments Dated February 1, 2007

Thank you for your comments on the Kona Kai Ola Draft Environmental Impact Statement. We are responding to your comment by topic.

Freshwater outflow:

The estimated fresh groundwater flow rate per mile of coastline is 3 to 4 million gallons per day (mgd). However, studies conducted by Oceanic Institute (1980) and Gallagher (1980) on water quality changes in the Honokohau Harbor showed that the water flow into the harbor is in the range of 25 to 30 mgd. This water has an average salinity of 22 to 25 parts per thousand (ppt). Gallagher also found that the inflow from springs at the bottom of the harbor exceeds the tidal exchange in the harbor.

The regional groundwater system ina and around the Kaloko-Honokohau National Historical Park is described in detail by Oki et al (USGS 1999). The study also indicates that the groundwater flow system is part of the larger scale regional brackish water transition zone. According to Oki's Hypothesis brackish groundwater body overlies salt water and extends to an estimated depth of about 50 - 100 feet at the inland boundary of the park where the groundwater is freshest. Salinity profile measurements conducted in existing wells also show that brackish water extends down to these depths. Available information on the groundwater flow and studies conducted for the Kona Kai Ola Project show that brackish groundwater flow towards the ocean occurs over a relatively thick layer.

The depth of the proposed marine will be 6 to 10 feet. The maximum depth of the existing outer basin is 13 feet. Because of the large thickness of the brackish groundwater flow in this area and the shallowness of the marina excavation relative to the brackish water flow thickness, the amount of fresh water trapped by the newly excavated marina will be a small fraction of the flow. In addition, the small fraction of water trapped by the marina will be discharged into the nearshore area at the harbor entrance. Therefore, changes to the groundwater flow in the area are anticipated to be localized and not significant.

Anchialine pools:

The DEIS presented information stating that harbor construction would cause an increase in salinity in the anchialine pools makai of the proposed marina basin to become equivalent to the ocean at 35 parts per thousand (ppt) and that the anchialine biology would then perish.

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In response to DEIS comments and to further study the pools south of the entrance channel of Honokohau Harbor, a second study was conducted by David Chai of Aquatic Research Management and Design in June 2007. The second survey focused on intensive diurnal and nocturnal biological surveys and limited water quality analysis of the southern group of anchialine pools exclusively. In addition, further comment on the groundwater hydrology effects on anchialine pools was prepared by Waimea Water Services and is contained in Appendix G-3 of the EIS. Attachment 1 contains the FEIS Sections 3.9.2.1 and 3.9.2.2, and Attachment 2 contains the study prepared by Aquatic Research Management.

The criteria for preservation are not based on percentages of sites preserved, but rather whether a site meets criteria for such preservation. Preservation is normally considered for sites assessed as significant for more than one criterion. Most of the sites are solely significant for research potential, and this is the norm. Further, as previously discussed, these findings are consistent with recommendations from the Cultural Impact Assessment.

Mitigation measures to facilitate the long term health of the remaining anchialine pools will be based on environmental monitoring, which is vital as an early warning system to detect potential environmental degradation. A series of quantitative baseline analysis of the physio-chemical and biological components within the project site will provide a standard by which the effects of the development, anthropogenic activities, and natural phenomena on these environments can be measured.

The framework for the mitigation plan will include three measures intended to meet these objectives, including bioretention, salinity adjustment and possible new pools.

Coral Reef Degradation from Increased Nutrients and Pollutants:

Pollution from pollutants from boats and potential possibility of oil spills is a concern in all of Hawai‘i, not just for Honokohau Harbor. This issue has been addressed in the EIS in Section 3.9.1.3, including a list of mitigation actions. These include boater education, enforcement of good housekeeping practices on boats and docks, and environmentally sensitive hull cleaning practices.

Regarding runoff, as discussed in EIS Section 4.10.5, Drainage and Storm Water Facilities, the proposed project will increase the proportion of impervious surfaces on the subject property through paving and reconfigure the topography, thereby adding to total runoff. Roadways in the new developed configuration will be dedicated to the County of Hawai‘i, so the storm drainage system will be required to conform to the Department of Public Works Storm Drainage Standards. Mitigation measures to address runoff impacts include the use of drywells, which will require an Underground Injection Well Permit from the Department of Health, Safe Drinking Water Branch, and recommendations from a hydrogeologist will be sought to assist with the design of the drywell system.

Further, bioretention, which is a Best Management Practice (BMP), will be utilized in series to incorporate several storm water treatment mechanisms in a sequence to enhance the treatment of runoff. By combining structural and/or nonstructural treatment methods in series rather than singularly, the level and reliability of pollutant removal is raised. Another means to reduce the potential for groundwater contamination is to increase soil depth above the standard in landscaped areas. This will allow chemicals to be held in the soils longer for more complete plant uptake and breakdown of these chemicals by soil microbes. A specific guide for chemical application by landscape maintenance personnel will be a beneficial tool to help avoid contamination of groundwater resources.

In order to assess impacts on coral reefs and benthic habitat, a three dimensional water quality model was calibrated and run to determine the impacts of development on the water quality of the harbor and the nearshore area. The complete study report is in the EIS as Appendix U. The report shows modeled results for current profiles at peak flood, salinity distribution at flood tide, and chlorophyll a concentration distribution, for the existing harbor and future development scenarios. Also the effect of harbor expansion on flushing time, nutrient concentrations, Chlorophyll a concentrations in the harbor, proposed marina, the nearshore area immediately outside the harbor entrance, and in the surrounding nearshore waters are described in the report.

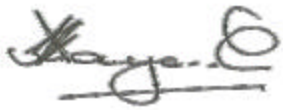
The model study revealed that construction of the (45-acre) 800-slip marina as described in the Conceptual Master Plan increases the flushing time of the harbor significantly. It also modifies the two layer flow system that currently maintains good water quality in the harbor. As an alternative a smaller (25-acre) 400-slip marina was tested in the model. The model results showed that reducing the marina size is an important factor in maintaining water quality independent of the groundwater flow increase.

Overall results of the study showed that for the 400-slip marina with brackish water inflow in the order of 30 million gallons per day or greater, the water quality conditions at both marinas, the harbor entrance and Honokohau Bay will be very similar to the existing conditions, provided that ammonia-nitrogen load from the exhibit water is reduced. All attempts will be made to reduce the ammonia–nitrogen concentration in the exhibit effluent before reaching the harbor.

Water clarity depends on productivity resulting in plankton. Productivity depends on the nutrient concentrations and the resident time. Since with the reduction in the size of the marina does not increase nutrient concentrations or resident time in the area, the water clarity is expected to remain the same.

Your comment letter and this response are included in the Final Environmental Impact Statement. We appreciate your participation in the environmental review process. Please submit a request to our office if you would like to receive a printed or electronic copy of the Final Environmental Impact Statement, or portions thereof.

Sincerely,



Dayan Vithanage, P.E., PhD.
Director of Engineering

cc: Office of Environmental Quality Control
State Department of Hawaiian Home Lands
Jacoby Development, Inc.

Attachment 1

The conditions with the project constructed were found to be phosphorous limited. Several simulations were performed including and excluding the inflow from the marine exhibits which provides an additional nitrogen load and also varying the location of this inflow. It was found that the inflow from the marine exhibits can have a beneficial effect on flushing, especially when positioned within the existing harbor basin. However, its effect is significantly less than the effect due to the brackish groundwater inflow. When the exhibit inflow is excluded or positioned at the east end of the new marina, its effect is small in terms of flushing due to its high salinity. From a water quality perspective, since the loads from the exhibit inflow consist primarily of nitrogen, it does not cause increased algae growth. However, this exhibit inflow does raise the concentrations of ammonia and nitrate in the system.

Simulation results indicate that under the conditions when the post-expansion system receives an additional brackish inflow into the new 25-acre marina on the order of 30 mgd or more, water quality within the harbor system and in the surrounding waters remained similar to existing conditions. These conditions are expected to occur based on the findings reported by Waimea Water Services (2007), which states that the proposed marina would exhibit the same or similar flushing action as the existing marina.

An additional mitigation measure proposed by Waimea Water Services (2007), if sufficient inflow is not intercepted, consists of drilling holes in the bottom of the new marina to enhance this inflow and facilitate flushing within the proposed system.

~~3.9.3~~3.9.2 Anchialine ~~Ponds~~ Pools

Two studies on anchialine pools were conducted in this EIS process. The anchialine ~~ponds~~ pools water quality studies and ~~biota surveys were conducted by David A. Ziemann, Ph.D. of the Oceanic Institute and is~~biota surveys were conducted by David A. Ziemann, Ph.D. of the Oceanic Institute in October 2006 and are included as Appendix ~~G~~H-1. That survey included pools located both north and south of Honokōhau Harbor. In response to DEIS comments and to further study the pools south of entrance channel of Honokōhau Harbor, a second study was conducted by David Chai of Aquatic Research Management and Design in June 2007. The second survey focused on intensive diurnal and nocturnal biological surveys and limited water quality analysis of the southern group of anchialine pools exclusively. The report is contained in Appendix H-2.

~~3.9.3.1~~3.9.2.1 Existing Conditions

Anchialine ~~ponds~~ pools exist in inland lava depressions near the ocean. Two anchialine ~~pond~~ pool complexes are located immediately to the north and south of the Honokōhau Harbor entrance channel. The complex to the north is located wholly within the designated boundaries of the Kaloko-Honokōhau National Historical Park as shown in Figure Q~~O~~. Many of the ~~ponds~~ pools in the southern complex are within the park administrative boundary as well. ~~Ponds~~ Pools in the northern complex show little evidence of anthropogenic impacts. Many contain typical vegetation and crustacean species in high abundance.

Figure R locates anchialine pools near the harbor entrance and pools~~Ponds~~ in the southern complex are depicted in Figure S.

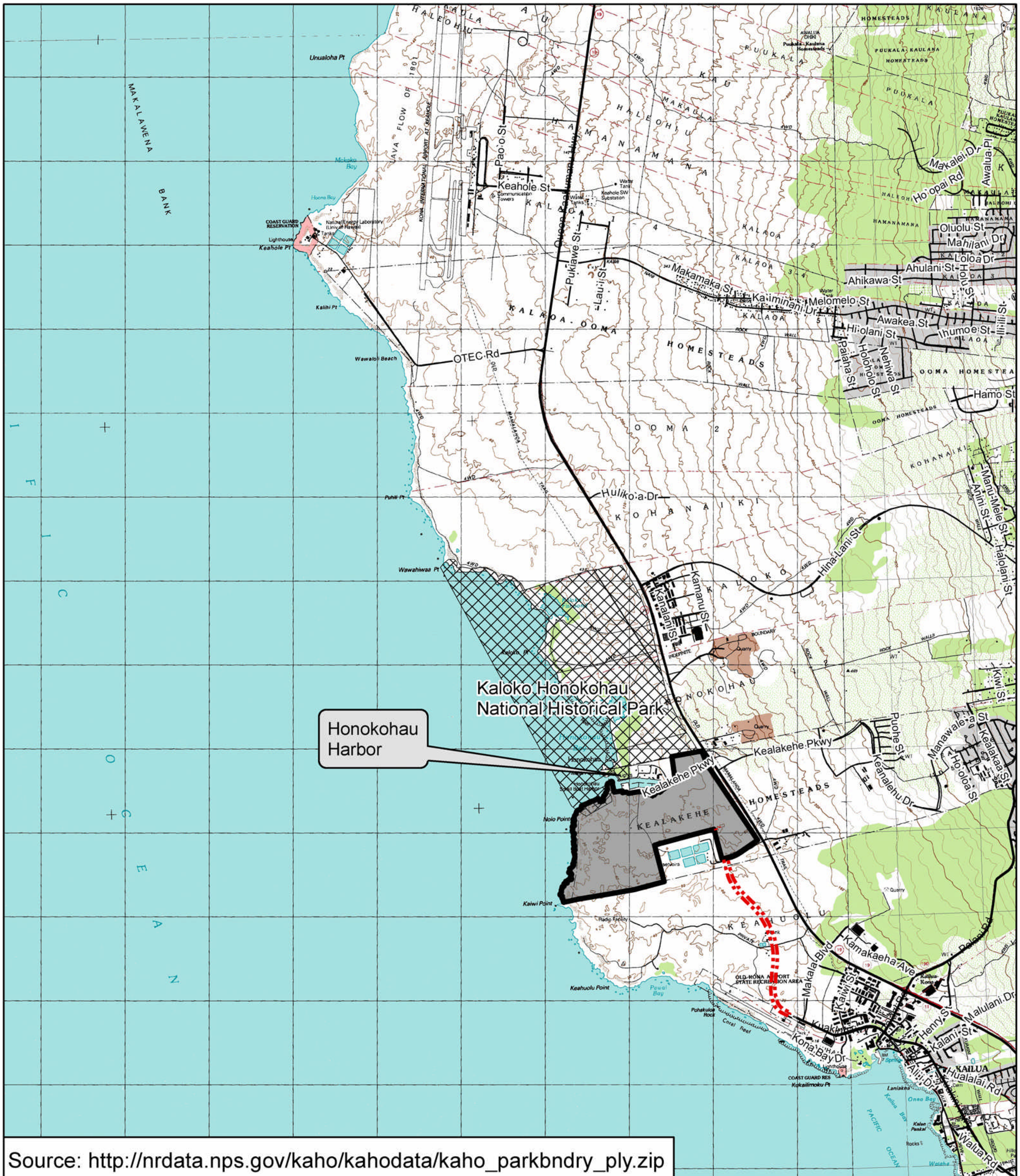


Figure Q: National Historical Park Service Legislative Boundary Map

Legend

- Project Site
- Proposed Parkway
- National Park Boundary

0 2,500 5,000 Feet

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Source: Oceanic Institute

Figure R: Anchialine Pool Locations

N
W E
S

0 2,000 4,000 Feet

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Source: Aquatic Resources Management And Design

Figure S: Anchialine Pool Locations in Southern Complex

N
W
E
S

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The 2006 study identified 22 pools in the southern complex. The 2007 study found that three of the 22 pools are part of an estuary complex with direct connection to the ocean. While there were several signs of direct human use and disturbance, such as trash receptacles and toilet facilities, the greatest degradation to the majority of the anchialine and estuarine resources was due to the presence of alien fish, including topminnows and tilapia, and introduced plants, predominantly pickleweed and mangrove. ~~are moderately to heavily impacted, with many containing exotic fish that exclude the anchialine crustaceans. The ponds also show evidence of human impact, including discarded bottles, cans, wrappers, diapers, toilet paper, etc. Water quality conditions within the ponds generally reflect the conditions of the underlying groundwater.~~

~~Figure P locates anchialine ponds near the harbor entrance. The study conducted as a part of this EIS show that the anchialine ponds south of the harbor entrance are moderately to heavily impacted by human activities and introduced fish populations. The study found that the nitrogen phosphorus concentrations in these ponds are significantly higher compared to the ponds north of the harbor entrance. The sources of these additional nutrients are not known. Continuous influx of nutrients will eventually degrade the water quality to levels that could alter the pond ecology.~~

Biota surveys in the two pond systems clearly indicate that counts of typical pond denizens show a remarkable difference between the northern and southern ~~ponds~~ pools. In the northern ~~ponds~~ pools the number of *Halocaridina rubra* ranged from a low of 20–25 to too numerous to count. The biota rich pond bottoms appeared red due to the *Halocaridina rubra* numbers. The only other species visible was the predatory shrimp *Metabetaeus lohena*. In contrast, only four out of the 22 ~~ponds~~ pools examined in the southern pond complex showed a decreased presence of *Halocaridina rubra* (6 to 200) individuals in the pond, and three ~~ponds~~ pools contained *Metabetaeus lohena*. Eight of the ~~ponds~~ pools contained numbers of introduced minnows which is an apparent predator of *Halocaridina rubra* and *Metabetaeus lohena*.

The 2007 study found three of the pools identified in the 2006 study were part of an estuary complex with direct connection to the ocean, and that the southern complex contained 19 anchialine pools. The study further found that a majority of the southern pools are degraded biologically and physically, primarily due to the effects of introduced fish and plant species. Six pools are currently devoid of alien fish, but they face a high level of threat due to the proximity of pools that have these species. Of the 19 anchialine pools, six were considered high tide pools (exposed only at medium or high tide), seven were considered pool complexes (individual pools at low tide and interconnected at high tide), and six were single isolated pools. Of the 19 anchialine pools, three pools with a combined surface area of $20m^2$ would be eliminated due to the harbor construction.

The DEIS presented information stating that harbor construction would cause an increase in salinity in the anchialine pools makai of the proposed marina basin to become equivalent to the ocean at 35 ppt. and that the anchialine biology would then perish. There is currently a level of uncertainty by professional hydrologists as to the exact movement of surface groundwater and final determination of anchialine salinity following the harbor construction. The assessment that all anchialine pools will be barren with the construction of the harbor may be premature. *Halocaridina rubra* (opae ula) are routinely drawn from high salinity wells at 30-32 ppt.

Within the 19 pools, native and non-native fauna included 14 species comprised of 5 fish, 2 mollusca, and 6 crustacea. Algae within the pools primarily consisted of a mixed assemblage of diatoms and cyanobacteria, with several pools dominated by matted filamentous *Cladophora*, sp. The darker cave/overhang pools and high tide pools had epilithic *Hildenbrandia* sp. covering the rock substrate. Riparian vegetation was dominated by introduced species consisting of Pickleweed (*Batis maritima*), Mangrove (*Rhyzophora mangle*), and Christmasberry (*Shinus terebenthifolius*). Only two species of native plants Akulikuli (*Sesuvium portulacastrum*) and Makaloa (*Cyperus laevigatus*) existed near the pools and comprised only few small patches and a single tuft (respectively).

Most of the hypogeal anchialine shrimp have adapted to the presence of minnows by foraging in the pools at night. During daylight hours, only the adult shrimp appear to coexist at low population levels with the smaller *P. reticulata*, but the larger *G. affinis* and *Oreochromis* prevent the daytime appearance of hypogeal shrimp due to predation.

The average salinity in Kealakehe pools is relatively high at 13.5 ppt compared to most other pools along the West Hawai'i coastline, having an average of approximately 7 ppt. This high salinity appears to be characteristic of this region, and is similar to the average of most pools within the adjacent ahupua'a of Honokōhau and Kaloko. The levels of nitrate-nitrogen levels are relatively high compared to other undeveloped areas, but fall in the range of some developed landscapes. Other water quality parameters, including pH and temperature, fall into normal ranges for anchialine pools.

This relatively high salinity is the likely reason aquatic insects were not found in any pools at Kealakehe. Though the rare damselfly *Megalagrion xanthomelas* has been observed and collected from Kaloko, a statewide assessment of its range has not found it to occur in water with salinity greater than 3ppt. However, there has been an unsubstantiated occurrence of the nymph in a pool of up to 8ppt (Polhemus, 1995).

Another species of concern is the hypogeal decapod shrimp *Metabetaeus lohena.* These shrimp are sometimes predatory on *H. rubra* but are more often opportunistic omnivores similar to *H. rubra.* Predusk and nocturnal sampling at high tide is clearly the optimal method to determine habitat range and population densities for this species. These shrimp were found in 13 of the 19 pools, 7 of which had *M. lohena* only at night. The occurrences of *H. rubra* were found in 16 of 19 sampled pools, 8 of which had 'Ōpae'ula observed only at night. Consequently, despite having numerous degraded anchialine resources at Kealakehe, there are opportunities for many of the pools to be restored and enhanced to a level where large populations of anchialine shrimp and other native species may return to inhabit the pools as they likely have in the past.

~~As mentioned earlier, the southern ponds also had elevated concentrations of nutrients indicating water quality degradation. These factors indicate that if no restoration or maintenance activities are instituted to reserve these ponds, these ecosystems will degrade beyond recovery.~~

~~3.9.3.2~~3.9.2.2 Anticipated Impacts and ~~Recommended~~ Proposed Mitigations

The anchialine ~~ponds~~ pools that are located north of the existing harbor are not likely to be impacted because no development activities are proposed north of the existing harbor. It is highly unlikely that existing groundwater flows to the Kaloko-Honokōhau pond system to the north of the existing harbor will be impacted by the proposed marina to the south.

Of the 19 pools in the southern complex, three would be eliminated due to harbor construction. Regarding the remaining pools, the DEIS noted that t~~T~~he change in the local groundwater flow pattern in the vicinity of the proposed marina ~~will~~ would impact the anchialine ~~ponds~~ pools that are located between the proposed marina and the shoreline south of the harbor entrance. The 2006 study (Appendix H-1) noted that t~~T~~he salinity of the anchialine ~~ponds~~ pools ~~will~~ would increase due to reduction of brackish groundwater, and that ~~. Some ponds will be excavated to make the new harbor basin. T~~those ~~ponds~~ pools that are not excavated will revert to full salinity, causing the loss of their habitat. ~~and associated aquatic flora and fauna. However, current investigations indicate that these ponds are already enriched by nutrients and the density of associated aquatic fauna is very low. In addition, trash from visitors, and introduction of minnows has already degraded the pond ecology.~~ Even without the potential impacts from the proposed marina construction, the pond ecology might change irreversibly from the nutrient input, human indifference and expansion of non native fauna species.

Further studies conducted in response to DEIS comments (Appendix H-2, and Appendix G-3) indicate that the remaining pools may not increase in salinity to levels unhealthy for *H. rubra* and *M. lohena* and other anchialine pool fauna. In addition, these studies determined that there are realistic mechanisms employed elsewhere that would mitigate changes due to groundwater changes. Waimea Water Services found that harbor construction would cut off some of the fresher ground-water flow. However, predicting the extent of change in flow is difficult if not impossible even with numerous boreholes and intense sampling. The actual flow of groundwater towards the sea is minimal today, and tidal measurements show that tide fluctuations represent more than 90 percent in actual harbor tides. The fluctuations occur simultaneous with the ocean/harbor tide, which indicate a vertical and horizontal pressure regime between bore hole 6 and the ocean and harbor. Hence, the tides alone create a mixing system that increases salinity, as the flow approaches the point of discharge which will be either the channel or the shore.

Another factor that could influence groundwater quality is the increased local recharge from irrigation between the channel and shore. This will add fresh water to the lens locally but is not quantified at this time.

Quantification of these impacts, including the flow of groundwater through each pond, is extremely difficult. The shallow lavas are of the pahoehoe type and have a relatively high horizontal permeability. In surface depressions or undulations, the pahoehoe lavas have a tendency to lose vertical permeability from sedimentation thus restricting water exchange within the individual pools. This is normally reflected in both the salinity and temperature and this information has been adequately studied in the pools.

Changes in groundwater quality may or may not impact biological communities in the anchialine and estuarine environment. In either case, it is important to understand these relationships to effectively manage the resource. If there is significant deviation from the baseline especially in regard to nutrients, pathogens, and toxins, a mitigation plan to determine the cause and take decisive appropriate action will be implemented. The mitigation plan will be based on the following objectives:

Objective 1 To preserve, maintain, and foster the long-term health and native ecological integrity of anchialine pools at Kealakehe.

Objective 2 To protect and promote cultural practices and traditions surrounding anchialine resources at Kealakehe.

Objective 3 To provide education, interpretation, and interactive opportunities for the community to learn about and appreciate the anchialine resources.

Objective 4 To acquire a pond manager to implement the program, conduct monitoring, research, and reporting, and provide education to the community about anchialine and estuarine resources.

Mitigation measures to facilitate the long-term health of the remaining anchialine pools will be based on environmental monitoring, which is vital as an early warning system to detect potential environmental degradation. A series of quantitative baseline analysis of the physio-chemical and biological components within the project site will provide a standard by which the effects of the development, anthropogenic activities, and natural phenomena on the environment can be measured. The framework for the mitigation plan will include three measures intended to meet these objectives, including bioretention, salinity adjustment and possible new pools.

As a mitigation measure, bioretention, which is a Best Management Practice (BMP) is a feasible application for the proposed development. There is a probability that nutrients and other potential pollutants will runoff landscaping and impermeable surfaces such as roadways and parking lots during medium or high rainfall events. Some of these pollutants could enter the groundwater table and into anchialine pools and ultimately the ocean. As an alternative to directing runoff into the ground through drywells, storm water should be directed into bioretention areas such as constructed surface or subsurface wetlands, vegetated filter strips, grass swales, and planted buffer areas. Storm water held and moved through these living filter systems are essentially stripped of most potential pollutants, and allowed to slowly infiltrate back to the groundwater table.

Bioretention is a Best Management Practice (BMP) that would be a highly appropriate application for the proposed development. Further, BMPs utilized in series may incorporate several storm water treatment mechanisms in a sequence to enhance the treatment of runoff. By combining structural and/or nonstructural treatment methods in series rather than singularly, raises the level and reliability of pollutant removal. Another means to reduce the potential for groundwater contamination is to increase soil depth above the standard in landscaped areas. This will allow chemicals to be held in the soils longer for more complete plant uptake and breakdown of these chemicals by soil microbes. A specific guide for chemical application by landscape maintenance personnel will be a beneficial tool to help avoid contamination of groundwater resources.

Another mitigation measure that may be included in the management plan is salinity adjustment. In the 2006 assessment regarding the impact to the southern pools from the proposed construction of the harbor, it was stated that this construction would cause the salinity in the anchialine pools to become equivalent to the ocean at 35ppt. It was then concluded that the anchialine biology would perish.

However, there is currently a level of uncertainty by professional hydrologists as to the exact movement of surface groundwater and a final determination of anchialine salinity following the harbor construction. The dynamics of groundwater movement through a porous lava medium both seaward and laterally along the coastline is an inexact science. This is compounded by the variations in water density, including stratification of salinity within the proposed harbor and capillary movement of low-density surface water through the substrata.

The assessment that all anchialine pools will be barren with the construction of the harbor may therefore be premature. *H. rubra* are routinely drawn from high salinity wells at 30 – 32 ppt and survive in this salinity for years. Further, high populations *H. rubra* and *M. lohena* have thrived and reproduced in pool salinities of 27ppt. If the pools do become full strength seawater at 35ppt, there exists uncertainty on the long-term effects to anchialine organisms, since there are no long-term studies or examples of native anchialine ecosystems at 35ppt. Native anchialine pool vegetation also has relatively high salinity tolerance.

If the salinity were expected to rise to 35 ppt, possible mitigation in the management plan will include methods to surcharge man-made anchialine pools created adjacent to or in the vicinity of natural pools with low salinity well water. If sufficient volume is used, it is theoretically possible to lower salinity in adjacent natural anchialine pools. This surcharge method has been successfully used to raise salinity in anchialine pools and cause the salinity rise in adjacent pools of at least up to 10 meters away. Surcharging with low salinity should work as well or better since the lower density water will essentially float atop the higher salinity water at the surface layer, and move throughout the complex of natural pools. Surcharging may also be a viable mitigation to dilute and more rapidly disperse any pollutants that may be detected in the pools.

Another mitigation measure includes the creation of new anchialine pools. There is significant opportunity to create new anchialine pools and greatly expand the native habitat and resource. It has been demonstrated at several projects in West Hawai'i that anchialine pools can be created and will be colonized with a full compliment of anchialine species endemic to the area. Anchialine pools are considered focal points of higher productivity relative to the subterranean groundwater habitat around them. Their productivity promotes an increase in population levels of anchialine species within the pools themselves and throughout the subterranean habitat surrounding them.

~~No realistic mechanisms are envisioned for re-injecting fresh water into these systems to maintain their ecological balance as an anchialine system. These ponds will be changed from a brackish water system to a marine system. But, those ponds in the area of the shoreline park and cultural park will be cleaned of vegetation and protected from other physical alteration. A buffer zone around these newly established marine ponds will be protected as well.~~

~~The anchialine pond shrimp (*Metabetaeus lohena)* and the orangeback damsel fly (*Megalagrion xanthomelas)* are listed as candidate endangered species in the Federal Register and were both recorded in surveys of these anchialine ponds done in 2004 by US Geological Survey Biological Resources Division and the NPS Inventory and Monitoring Program. Low numbers of *Metabetaeus lohena* were encountered in three of the 22 ponds surveyed in the southern pond complex. *Megalagrion xanthomelas* was not encountered in any of the southern pond complex ponds during the recent study. The low density of *Metabetaeus lohena* and the observed absence of *Megalagrion xanthomelas* may be due to the impacts from high nutrient input and general degradation of the ponds.~~

~~An attempt should be made to move as much of the existing population of *Metabetaeus lohena* from these anchialine ponds before they become too saline, to possible newly excavated ponds that may be developed off-site. These shrimp should not be introduced into existing populated ponds to avoid any potential pathogenic impacts to the healthy ponds.~~

~~Public education on the unique ecology of the anchialine ponds and the need for preserving their ecology will reduce future human impacts in other healthy ponds.~~

~~Further recommended mitigation includes restoration to degraded anchialine ponds off the project site, preferably those located at the adjacent Kaloko-Honokōhau National Historical Park.~~

Attachment 2

An Inventory And Assessment Of Anchialine Pools Including Management And Mitigation Recommendations For The Kona Kai Ola Project, Kealakehe, Hawaii

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June 14, 2007

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Introduction

Jacoby Development, Inc. is proposing to develop approximately 530 acres of land in lower Kealakehe, North Kona, on the Island of Hawaii. The development will consist of mixed urban, resort, and commercial facilities. Included in the plan will be an 800 slip marina and associated boating facilities, a seawater lagoon, and open space. One area planned for protected open space contains a number of anchialine pools, archaeological sites and an estuarine habitat.

1.0 Study Background and Purpose

In 1973 L.B. Holthuis originated the term anchialine pool which citation protocol dictates to be the proper term. Two anchialine pool surveys were conducted at Kealakehe to determine the existing water quality and biological conditions, probable impacts, and mitigation measures necessary to minimize potential adverse effects. The first survey was conducted in April of 2006, and included a biological survey and detailed nutrient analysis of anchialine waters. That survey, included pools located both north and south of Honokohau harbor. The second survey was conducted in May 2007, and focused on intensive diurnal and nocturnal biological surveys and limited water quality analysis of the southern group of anchialine pools exclusively. This southern group in the vicinity of Alula cove was selected for a second survey, as they are more likely to be impacted by the proposed Kona Kai Ola development project. The information and recommendations presented herein are drawn from both surveys as well as published literature on anchialine system and their management, consultation with others involved with anchialine pool research and management, and 17 years of applied anchialine pool and wetland management by this author.

This study was contracted by Oceanit Laboratories, Inc. to conduct intensive field surveys incorporating 2 diurnal and 2 nocturnal samplings during higher high tide periods. The survey will provide a current assessment of the contents and state of anchialine pools in the project area. Of particular concern is the potential for adverse ecological effects on anchialine resources due to the proposed harbor expansion and from construction activities and operations. Consequently, this paper will examine other anchialine systems that contain similar attributes, which have faced similar development situations. Based on an aggregate of existing data and information, this document will address possible management and mitigation measures.

2.0 Anchialine Pools as an Ecological Resource

2.1 Background

Anchialine pools are isolated coastal exposures of the groundwater table occupying depressions in historic or recent prehistoric lava flows and porous limestone depressions. These pools contain mixohaline water, and although lacking surface connection to the sea, their water levels exhibit damped tidal fluctuation indicating a subsurface connection to the ocean. Since these pools exist in low lying coastal depressions, in some cases shallow pools may disappear during low tide, which restricts the colonization of certain organisms. Conversely, some pools that were apparently isolated at low tide coalesce during high tide, forming larger singular pools, and are considered pool complexes with homogeneous biological and water chemistry characteristics. Many of the sampled pools at Kealakehe fall into these two categories. Anchialine pools are rare among aquatic ecosystems and geographically limited in the United States to Hawaii. It is estimated that nearly 700 pools exist in Hawaii, most of which occur along the west coast of Hawaii Island between Kawaihae and Kailua-Kona. The ecological significance of Hawaii's anchialine pools owes primarily to their role as habitat for a variety of unique flora and fauna. Their biota is distinctive in community structure and species endemism. Two classes of organisms are found in anchialine pools, epigeal and hypogeal species. The former require illuminated water and are often common to other coastal aquatic habitats, while hypogeal species spend a substantial portion of their life in the dark, which in anchialine systems corresponds to the subterranean interstices within the groundwater table.

2.2 Threats to Anchialine Resources

Anchialine pool ecosystems in West Hawaii are under increasing threat of degradation due to a number of factors. The single greatest threat is the introduction and spread of alien fish and plant species. A lesser threat is groundwater contamination. The effects of alien fish in anchialine pools is rapid senescence, both directly due to predation and competition, and indirectly through a change in the pools trophic ecology, predominantly due to the loss of primary consumers and detritivores. Combined, these changes accelerate eutrophication, sedimentation, infilling, and ultimately the demise of the pool. This altered condition is exacerbated when groundwater contamination in the form of chronic high nutrient levels is present and flushing rates are reduced, promoting rapid filamentous chrysophyte and chlorophyte production. In addition, elevated nutrients promote higher growth rates of terrestrial and riparian vegetation. Large or dense vegetation around pools add leaf litter and increase root mass within groundwater interstices around pools, which decrease water exchange, adding to the senescence process.

In anchialine systems that contain intact native biota, adequate flushing, and physically maintained riparian vegetation, elevated nutrient levels have little or no observable effect on the stability of the system. Anchialine systems are typically high in dissolved nutrients (relative to the ocean) from natural and anthropogenic sources, and inorganic nutrients in

anchialine pools vary among locations and may be as high or low in developed coastal areas as in pristine undeveloped areas. (Brock and Norris, 1988, Brock and Kam, 1997). Pools with native aquatic fauna dominated by *Halocaridina rubra*, a small red caridean shrimp most often associated with anchialine pools, usually have a compliment of lower order crustacea, mollusks, and microfauna. Most substrates in the sunlit pools are blanketed with cyanophytic crusts or epilithon, and interspersed with low-cropped filamentous chlorophytes. It is this complete diverse and rich ecology that prevents filamentous and matted algae from dominating and overwhelming a system. Consequently, healthy anchialine ecosystems in developed and undeveloped coastal areas remain intact even when faced with elevated dissolved nutrient concentrations from natural or anthropogenic sources (Brock & Kam, 1997, Chai, personal observation).

2.2.1 Salinity Levels and Effects in Anchialine Systems

In a 1974 study by Maciolek and Brock, 298 pools along the leeward coast of Hawaii Island were inventoried, and contained salinities of less than 15ppt for 93% of them. They ranged from 1ppt -30 ppt, with the average being 7ppt. Variations in salinity were seldom less than a few parts per thousand (Maciolek and Brock, 1974). However, salinity along the vertical gradient exhibits much more variation among locations along the West Hawaii coastline. For example, within the ahupua'a of Kawaihae, a salinity of 25ppt is reached at an average depth of approximately 18 meters below sea level within 100 meter of the shoreline. At Ka'upulehu, within the same distance of the shore a salinity of 25ppt is reached at approximately 6.8 meters, and Opaeula are drawn from wells over 18 meters below sea level with salinities averaging 31 ppt. Of the hundreds of anchialine pools observed and documented by this author and other anchialine pool researchers, *H. rubra* and *Metabetaeus lohena* are seldom observed in pools with salinities higher than 25 parts per thousand (ppt). These high salinity pools typically have a high level of connectivity to the ocean, and this connection often allows a variety of predatory and competitive marine and euryhaline fish and crustacea to access these anchialine pools and deplete or eliminate hypogeal shrimp.

At Hualalai Resort in Ka'upulehu, North Kona, Hawaii, moderate to high salinity fluctuation in anchialine pools has exhibited no apparent adverse changes to the anchialine ecology, even when facing salinity changes of up to 23 ppt. Two large man-made anchialine pools (1.4 million and 65,000 gallons) and a natural pool enlarged from 1,000 gallons to 40,000 gallons, were created in 1993 and all were surcharged in 1995 with high salinity well water to 27ppt in an attempt to stop the growth of a filamentous algae, *Melosira sp.* and *Cladophora sp.* These two types of algae are pioneer species in newly created or dramatically disturbed anchialine pools that lack the benefit of an adjacent healthy anchialine ecosystem to seed them. The strategy worked to eliminate filamentous algae, and during the first four years, the largest pond contained tens or hundreds of millions of *H. rubra* and millions of *M. lohena* that were especially abundant at night. The decline of these populations was gradual as marine fish were introduced to the pool, and eventually the hypogeal shrimp were observed only at night. The 65,000 gallon man-made anchialine pool located approximately 200 meters away was also surcharged to 27ppt for approximately 1 year until a stable anchialine ecosystem was

developed, allowing the surcharge system to be turned off. The pool reverted back to 6ppt and the ecosystem remained intact with dense populations of many anchialine organisms. In subsequent years, the pool was surcharged for a few weeks during the spring and fall to clarify the water during *Enteromorpha* sp. sporulation, with no apparent adverse effects. The enlarged natural pond (40,000 gal.) contained a salinity of 2-4ppt, and supported indigenous widgeon grass (*Ruppia maritime*) and an extremely dense population of *H. rubra* and *M. lohena*. It was surcharged on a periodic basis to 20ppt to eliminate alien Dragonfly larvae and Bufo tadpoles, the presence of which result in the decline and disappearance of hypogeal shrimp. This dense and stable community of native species in both pools existed for 11years until Minnows (*Poecilia sp.* and *Gambusia sp.)* were introduced to the pools in 2005, which devastated their ecology within 6 months. The anchialine pools that were untouched or enlarged, containing an intact native ecology, have remained intact since prior to the construction of the Resort.

2.2.2 Dissolved Nutrients in Anchialine Systems

Various scientists have measured groundwater nutrient concentrations from undeveloped sites in West Hawaii, over time. Brock has reported that nitrate nitrogen in these pools ranged from 280ug/l to 2800ug/l and orthophosphate ranged from 6.2ug/l to 201ug/l (Brock and Kam 1997). Kealakehe pools fall in the higher range in regard to dissolved nitrate nitrogen, having values between 1664ug/l to 2960ug/l with an average 2027ug/l. Orthophosphate ranged from 14ug/l to 32ug/l, averaging 21.6ug/l (Ziemann, 2006), which fell in the lower range compared to other undeveloped sites. Nutrient levels in man-made, modified, and natural pools at Ka'upulehu (a developed area) were recorded between 1989 prior to construction in 1994, and through to 2000. The pools contained nitrate nitrogen levels averaging 2106ug/l prior to construction and 2749ug/l during and after construction. Orthophosphate level prior to construction, averaged 154.4ug/l, while during and after construction orthophosphate levels averaged 149.7ug/l. The highest concentrations of nutrients in the pools occurred during the grow-in period of the landscape and following high rain events. Similar to the findings of Brock at Waikoloa, no apparent adverse effects were observed in healthy anchialine pools. However, disturbed or newly created pools began the process of eutrophication with heavy growths of *Cladophora sp.* until they were cleaned of all sediment and algae, surcharged with high salinity well water, and manually seeded from healthy pools and naturally recolonized with native biota.

There has been a great deal of research conducted since the 1980's by Brock on anchialine pools at Waikoloa and around the State. A good summary assessment on the effects of alien species, high nutrient concentrations, and other types of groundwater contamination on anchialine pools, can be found in Brock and Kams 1997 study entitled "Biological and Water Quality Characteristics of Anchialine Resources in Kaloko-Honokohau National Historical Park" (Brock and Kam, 1997). This study also examines a number of Management recommendations for the Parks pools that may apply to the anchialine resources at Kealakehe.

3.0 Anchialine Pools as Cultural Resource

In addition to their ecological value, anchialine pools are of significant cultural importance. Hawaiians of the past relied on anchialine resources for their livelihood and survival, and maintaining the health of these systems was of high importance. Hawaiian historians, who speak of the anchialine pools within the arid lands of West Hawaii, describe these pools as being a source for drinking and cooking water, bathing, irrigation, and aquaculture. Individual pools typically had a specific use and were well maintained.

Of particular importance were anchialine pools as habitat for Opaeula (*Halocaridina rubra*). Fishermen would gather hundreds of these shrimp into small balls which were sometimes mixed with fine red cinder to add bulk, and they would set out in their canoes to specific areas in the ocean where Opelu (Mackerel Scad, *Decapterus macarellus*) would gather in schools called a Ko'a Opelu. The balls of shrimp would then be released among the Opelu and nets would be set to harvest the fish as they fed upon the shrimp. During the Kapu seasons when Opelu fishing was not allowed, the Ko'a Opelu would continue to be fed and maintained as an early form of open-ocean farming or ranching. (H. Springer, L. Lightner, and C. Torres, pers. comm.) Some fishermen today practice the same fishing technique, and rely on a stable source of Opaeula to catch Opelu. The importance of this fishing tradition cannot be understated. Today, Opelu are not only a highly valued source of food, but they and the fishing methods surrounding them, continue to be a direct link to Hawaiian culture, values, and traditions of the past. The anchialine pools at Kealakehe offer a unique opportunity to help continue this tradition. Further study on the cultural use of anchialine pools of Kealakehe, Honokohau, and Kaloko by early Hawaiian inhabitants should be undertaken and incorporated into the final management plan.

4.0 Findings and Recommendations

The study site was comprised of 19 anchialine pools. Of the 19, six were considered high tide pools (exposed only at medium or high tide), seven were considered pool complexes (individual pools at low tide and interconnected at high tide), and six were single isolated pools. Three of the anchialine pools identified by Ziemann in the 2006 study were considered part of an estuary complex with direct connection to the ocean. Location, physical characteristics, aquatic macrofauna, and floral communities were recorded during higher high tide.

There were several signs of direct human use and disturbance in the pools such as trash receptacles and toilet facility. However, the greatest degradation to the majority of the anchialine and estuarine resources was due to the presence of alien fish, including topminnows and tilapia, and introduced plants, predominantly pickleweed and mangrove.

Figure 1. Location of Anchialine Pools and Estuary at Kealakehe

4.1 Survey Approach and Method

The field survey approach for anchialine pools at Kealakehe was based on recommendations made by John A. Maciolek, one of the pioneers in anchialine pool research (Maciolek, 1987). The survey was conducted on May 20th and 21st, 2007, and all pools were visually inspected each day and night at or near mean higher high tide periods. Since the inventory of aquatic fauna was of primary importance, intensive surveying was necessary during nocturnal high tides, a period conducive to anchialine faunal activity. Estuarine fauna were also recorded both days and nights as part of this study.

Temperature, salinity, oxygen and pH, were measured with an YSI model 556 multi-parameter meter, and were taken in all pools during higher high tide. These four parameters were selected because they are essential limiting factors governing populations of aquatic organisms in the anchialine biotope (Maciolek pers. comm.). All pools were less than 1 meter deep so all measurements were taken at or near the bottom of pools where water quality exhibits the most stability. Specific ions are also important factors to be considered in an aquatic ecosystem but were beyond the scope of this study. A water analysis and monitoring program is addressed later in this paper. Other physical parameters were recorded at higher high tide, and included surface water dimension, average pool depth, type of pond feature (i.e. crack, low lying depression, collapsed lava tube, etc.), and sediment depth and composition. All observed aquatic fauna was recorded and a relative abundance rating attributed to their numbers. Quadrat sampling was not used since both hypogeal shrimp species often occur in groups or clusters in a specific area of the pool. Consequently, a physical quadrant count may not be representative of the entire pool or pool complex for short-term analysis. However, long-term monitoring should involve more quantitative analysis using fixed sampling points. Riparian vegetation was a dominating feature of many Kealakehe pools and was noted in this study. Anchialine pool and estuary sites were recorded on a U.S. Geological Survey topographic map.

4.2 Survey Results

A taxonomic list of aquatic fauna observed is presented in Table 1, and includes their occurrence in each of the 19 pools and a relative abundance rating. Table 2 indicates the individual pools physical, water quality, substrate, and riparian vegetation characteristics.

Table 1. A list of aquatic fauna and their relative abundance in individual pools and pool complexes. A (n) suffix indicates organisms were observed only at night.

Abundance Rating:
1 = Less than 3 individual observed.
2 = several individuals observed or uncommon occurrence relative to other pools
3 = Common occurrence with many individuals observed relative to other pools
4 = Abundant throughout the pool or pool complex and/or numerous individuals occurring in groups.

Pool	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
Group/taxon																			
Mollusca																			
Theodoxus cariosus	4		2	2	2				1		2			2	3				4
Melania sp.											2			3	2			3	
Crustacea																			
Halocaridina rubra				3	2n	3	3	3	2n	3	2n	1n	2	3n	1n	2	2n	3	2n
Metabetaeus lohena				2	2n	2	2	3	2n	4			3n	2n	3n	3n		3	2n
Macrobrachium grandimanus	3	3			1				2		1			1n					
Metapograpsus thukuhar	3	1	2	3	2				2				1				1		2
Paryhale sp.				2															
Fish																			
Gambusia affinis	3		3		2						4	3		4	3		4		4
Poecilia reticulata	2		2		2						3	3	4	3	3	2	4	2	3
Oreochromis sp.														4	2				3
Gobidae sp.	1																		
Neomyxus sp.															1				

Table 2. Physical and water quality characteristics of anchialine pools at Kealakehe.

	Area	Depth	Sediment	Temp.		Salinity	D.O.	
Pool	m2	cm	Depth cm	ºC	pH	ppt	ppm	Description
1	16	50	<1	22.3	7.25	13	6.6	Collapsed lava tube rock-rubble substrate
2	20	74	<3	21.4	7.47	13.6	7.1	Collapsed lava tube rock-rubble substrate
3	40	53	<6	21.8	7.4	13.3	7.2	95% *Batis* filled depression complex, 3 open pools. Biogenic sediments
4	16	37	<1	22.3	7.38	13	7.4	80% *Batis* filled depression complex, 5 open pools
5	20	50	<1	22.6	7.39	14.2	7.3	90% *Batis* filled crack complex, 3 open pools
6	9	28	0	22.8	7.3	13.4	4.8	High tide crack pool, rock-rubble substrate
7	2	13	0	23	7.29	13.2	5.5	High tide pool, rock-rubble substrate
8	9	13	0	23.4	7.24	13.4	4.9	High tide pool, fissure depression, rock substrate
9	10	57	<6	22.1	7.46	14	6.9	Sunken depression two pool complex.
10	8	26	<2	22.3	7.45	13.8	4.8	Shaded cave pool, riparian *Sesuvium* northern edge
11	80	58	<15	22.3	7.56	13.2	7.4	97% *Batis* filled depression complex, 2 open pools, *Sesuvium* and *Cyperus*, biogenic sediments
12	15	78	<2	21.2	7.49	12.5	6.5	Collapsed lava tube pool
13	32	72	<4	22.3	7.58	13.6	7.5	Lava overhang, rocky depression, biogenic sediments
14	80	73	<6	23	7.5	14	6.2	70% *Batis* filled complex, 10 open pools, biogenic sediments
15	24	63	<4	22.4	7.52	14.1	7.9	90% *Batis* filled complex, 9 open pools, estuarine influence, biogenic/sand sediments
16	8	25	0	22.6	7.43	13.5	7.5	Dark fissure w/ *Hildenbrandia* epilithon
17	30	62	<10	23.6	7.27	13.7	7.8	Open cave pool, 40% *Cladophora* mat, Biogenic sediments
18	8	34	0	22.2	7.49	13.4	5.8	Rock fissure w/ no vegetation
19	64	75	<24	22.4	7.50	14.1	6.4	95% *Batis* filled depression with 5 open pools, biogenic sediments

4.2.1 Estuary Complex

The estuary at Kealakehe covers an area of approximately 1,120m^2. Its extent to the north includes the open water surrounding Makaopio heiau and the *Batis*-filled complex inland of the heiau. The eastern edge of the estuary is the inland extent of the mangroves. The southern extent runs along the mangrove and is bordered by thick *Batis* overlying rock and sand substrate. The estuary is a shallow water low-lying area with a series of open water pools and is surface connected to varying degrees during the higher high tide periods. Water chemistry and quality is influenced by direct connection to the ocean during medium and high tides mixed with the surface layer of fresher groundwater. Salinity ranged from 29.2 seaward to 14.7, the furthest inland open water exposure. Temperatures ranged from 27.5 to 22.5, and pH from 7.88 to 7.32.
The estuary is in an advanced stage of senescence, filled with *B. maritima* and *R. mangle*. The high density of this riparian and emergent vegetation, provide a barrier to more complete uniform mixing and movement of water and fauna. Sediments are comprised of sand and organic matter and vary in depth from 0cm-22cm. The estuary is distinguished from the anchialine pools not only by similar water characteristics, but similar biological components.

Many of the native species found in the estuary are common to tidepool and nearshore environments such as *Abudefduf abdominalis, Abudefduf sordidus, Sargocentron sp., Acanthurus triostegus,* and *Kuhlia sandvisensis*. Two fish species found at the furthest inland section were *Gymnothorax undulatus* and *Neomyxus leuciscus,* or possibly the introduced mullet *Chelon engeli*. There was an abundance of *T. cariosus* and Grapsid crabs. Unfortunately, throughout the estuary, minnows and tilapia were the dominant species with high population levels.

4.3 Conclusion and Evaluation

A majority of the anchialine pools at Kealakehe are degraded biologically and physically, primarily due the effects of introduced fish and plant species. The 7 pools that are currently devoid of alien fish face a high level of threat due to the proximity of pools that have these fish species. In addition, the pools with intact native biology have relatively low species abundance and diversity compared with other pools in the region and relatively small surface area and volume. They comprised only 10% of the total anchialine pool resource at Kealakehe, and approximately 40% of these were pools visible only at high tide. The high tide pools 6, 7, and 8 are the three to be eliminated by the proposed harbor.

Within the 19 pools, native and non-native fauna included 14 species comprised of 5 fish, 2 mollusca, and 6 crustacea. Algae within the pools primarily consisted of a mixed assemblage of diatoms and cyanobacteria, with several pools dominated by matted filamentous *Cladophora*, sp. The darker cave/overhang pools and high tide pools had epilithic *Hildenbrandia* sp. covering the rock substrate. Riparian vegetation was dominated by introduced species consisting of Pickleweed (*Batis maritima*), Mangrove

(*Rhyzophora mangle*), and Christmasberry (*Shinus terebenthifolius*). Only two species of native plants Akulikuli (*Sesuvium portulacastrum*) and Makaloa (*Cyperus laevigatus*) existed near the pools and comprised only few small patches and a single tuft (respectively).

Fortunately, most of the hypogeal anchialine shrimp have adapted to the presence of minnows by foraging in the pools at night. During daylight hours, only the adult shrimp appear to coexist at low population levels with the smaller *P. reticulata*, but the larger *G. affinis* and *Oreochromis* prevent the daytime appearance of hypogeal shrimp due to predation. The average salinity in Kealakehe pools is relatively high at 13.5 ppt compared to most other pools along the West Hawaii coastline, having an average of approximately 7 ppt. This high salinity appears to be characteristic of this region, and is similar to the average of most pools within the adjacent ahupua'a of Honokohau and Kaloko. This relatively high salinity is the likely reason aquatic insects were not found in any pools at Kealakehe. Though the rare damselfly *Megalagrion xanthomelas* has been observed and collected from Kaloko, a statewide assessment of its range has not found it to occur in water with salinity greater than 3ppt. However, there has been an unsubstantiated occurrence of the nymph in a pool of up to 8ppt (Polhemus, 1995). Another species of concern is the hypogeal decapod shrimp *Metabetaeus lohena*. These shrimp are sometimes predatory on *H. rubra* but are more often opportunistic omnivores similar to *H. rubra*. Predusk and nocturnal sampling at high tide is clearly the optimal method to determine habitat range and population densities for this species. These shrimp were found in 13 of the 19 pools, 7 of which had *M. lohena* only at night. The occurrences of H. *rubra* were found in 16 of 19 sampled pools, 8 of which had Opaeula observed only at night. Consequently, despite having numerous degraded anchialine resources at Kealakehe, there are opportunities for many of the pools to be restored and enhanced to a level where large populations of anchialine shrimp and other native species may return to inhabit the pools as they likely have in the past.

5.0 Framework for Management Program

In order to devise an anchialine pool management program, a set of objectives must be defined. In addition, a monitoring and evaluation program should be in place to detect changes in the physical, chemical, and biological components of the environment, and if necessary, modify the management program to achieve the stated objectives. The proposed list of management objectives and strategies for Kealakehe incorporates those suggested and actively in place by scientists and managers of anchialine systems in Hawaii, some of which include: recommendations by Maciolek in 1987 in an evaluation of anchialine pools at Awake'e, Kohanaiki, and Makalawena; recommendations by Chai, 1988 and 1990 for Ahihi-Kinau, Maui, and 3 National Parks with anchialine resources on Hawaii Island ; management of pools by Chai at Hualalai and Kona Village Resort, 1993-present; management plans developed by Brock for Waikoloa and implemented in 1987, and for Kukio Resort, implemented in 2000; and finally, those proposed by Brock and Kam in their 1997 CNPRSU technical report #112 for Kaloko-Honokohau National Historical Park. Additionally, these objectives and strategies should be taken as a preliminary framework or first step, not a static plan. Numerous valid interests toward the health and benefit of the anchialine pools and broader coastal ecosystem must be taken into account as the final objectives and strategies are formulated.

5.1 Management Objectives

Objective 1 To preserve, maintain, and foster the long-term health and native ecological integrity of anchialine pools at Kealakehe.

Objective 2 To protect and promote cultural practices and traditions surrounding anchialine resources at Kealakehe.

Objective 3 To provide education, interpretation, and interactive opportunities for the community to learn about and appreciate the anchialine resources.

Objective 4 To acquire a pond manager to implement the program, conduct monitoring, research, and reporting, and provide education to the community about anchialine and estuarine resources.

5.1.1 Objective 1 **To preserve, maintain, and foster the long-term health and native ecological integrity of anchialine pools at Kealakehe.**

To achieve this and allow all the other objectives a path toward success, the central component of the management program must involve the restoration and enhancement of the existing degraded pools. The existence of anchialine pools is ephemeral, and the senescence process that leads toward their ecological degradation and in filling, is dramatically accelerated due to the presence of alien species in and around the pools. The first stage of restoration will involve the removal of alien fish and plant species, and the removal of sediments from the pools and estuary. The consequence of this will be the natural return of native aquatic fauna to the pools very quickly. They are essentially "waiting in the wings" to reemerge from the subterranean habitat. The second stage will be the reintroduction of native plant species that formerly inhabited the pools and pool complexes. Again, as with the fauna, many native species will reemerge in the absence of

invasive plants, but some natives will need to be reintroduced to more quickly dominate the riparian and emergent habitat. Concurrent with the restoration should be a defined maintenance program to protect the ecological integrity of the system.

5.1.2 Objective 2 **To protect and promote cultural practices and traditions surrounding anchialine resources at Kealakehe.**

Concurrent with the ecological restoration should be the repair or reconstruction of the cultural features that were associated with the pools and estuary. Evidence suggests that early Hawaiian inhabitants used these pools. The pool management plan should incorporate some form of traditional use and management based on the testimony of lineal descendents of the ahupua'a if possible, or at least descendents from this region. The use of anchialine resources obtained from healthy native ecosystems can be accomplished on a sustainable basis without adverse impacts to the system. Hawaiians of the past considered anchialine pools a significant asset, a gift, and they were carefully maintained. This same respect and stewardship should be encouraged for pools at Kealakehe.

5.1.3 Objective 3 **To provide education, interpretation, and interactive opportunities for the community to learn about and appreciate the anchialine resources.**

Anchialine pools as an educational resource is important for many reasons. The pools are rare, accessible, and fascinating, allowing educators a unique opportunity to solidify concepts of science, math, and culture through their study. The pools allow people to learn about, experience, and appreciate a rare and unique habitat up-close. Understanding and appreciation of anchialine ecosystems lead to respect, and help foster the ideals and actions toward preservation and stewardship of the resource for many generations to come. Interpretive signs, tours and activities should be designed with this concept in mind.

5.1.4 Objective 4 **To acquire a pond manager to implement the program, conduct monitoring, research, and reporting, and provide education to the community about anchialine and estuarine resources.**

The designated anchialine pool manager should be well qualified and responsible for implementing the anchialine resource management program. This person will plan and oversee all the activities needed to fulfill the objectives. The manager will coordinate all aspects of the monitoring program and evaluate the results. As an ambassador to the public for the natural resources of Kealakehe, the manager must embrace the concepts and values of malama and pono in their management approach.

6.0 Water Quality and Aquatic Life Monitoring Plan

Environmental monitoring is vital as an early warning system to detect potential environmental degradation. A series of quantitative baseline analysis of the physio-chemical and biological components within the project site will provide a standard by which the effects of the development, anthropogenic activities, and natural phenomena on the environment can be measured. Changes in groundwater quality may or may not impact biological communities in the anchialine and estuarine environment. In either case, it is important to understand these relationships to effectively manage the resource. If there is significant deviation from the baseline especially in regard to nutrients, pathogens, and toxins, a mitigation plan to determine the cause and take decisive appropriate action should be implemented.

Water chemistry and sediment analysis should be undertaken in accordance with recommendations for groundwater and anchialine pool monitoring by the West Hawaii Coastal Monitoring Task Force, 1992. The monitoring protocol established in this document provides a complete and valuable management tool in helping to protect groundwater, anchialine, and marine resources. In conjunction with physio-chemical monitoring would be a quantitative analysis of biological communities. Determination of abundance, distribution, diversity, and physiological health of the populations should be key elements to the biological monitoring plan.

6.1 Monitoring Frequency

Using the 1992 monitoring protocol guidelines the monitoring program should be undertaken during 3 phases of the Kona Kai Ola project; 1) pre-construction to establish a comprehensive baseline analysis, 2) during construction as a continuation of monitoring protocol established during baseline analysis, and 3) post construction, or during the operations phase of the project. All monitoring should take place at least quarterly for water chemistry/quality and for biological communities as long as construction and pool restoration efforts are taking place. Thereafter, semi-annual monitoring should be adequate up to at least 5 years following construction activities. Extreme storm or other natural or anthropogenic events should also trigger a sampling analysis. Sediment sampling should be undertaken yearly if there is no indication of contamination by toxic pollutants. If contamination is discovered, monitoring should continue on a quarterly basis until there is no indication of contamination.

7.0 Mitigation Plan Recommendations

Based on the scale and scope of the proposed project, it is inevitable that there will be impacts to the anchialine pools, estuary, and marine environment. Managers of the proposed project have an opportunity to learn from, formulate plans, and make decisions based in some part on the mistakes and successes of other developments and resource management projects along the coast of West Hawaii. Much of the success in avoiding or mitigating detrimental environmental impacts will depend on the cooperation of the developer, landowners, and experts or persons knowledgeable in the field of environmental systems related to the project site. The following mitigation recommendations are a first step and a guideline for discussion and planning. The precise details of the plan and timeline will need to be determined at a later date.

7.1 Creation of New Anchialine Pools

A problem with the plan to restore existing degraded anchialine pools at Kealakehe is the proximity and high level of connectivity of some pools to the estuary. This connectivity will not permit the use of piscicides to eliminate alien fish, due to the possibility of harming marine organisms. Therefore, they cannot be restored to their former natural state dominated by native species. Additionally, the planned harbor is expected to eliminate three high tide anchialine pools that contain *H. rubra* and *M. lohena.* As a response to this loss of habitat there is significant opportunity to create new anchialine pools and greatly expand the native habitat and resource. It has been demonstrated at several projects in West Hawaii that anchialine pools can be created and will be colonized with a full compliment of anchialine species endemic to the area (Brock and Norris, 1988, Chai pers. observation). Anchialine pools are considered focal points of higher productivity relative to the subterranean groundwater habitat around them. Their productivity promotes an increase in population levels of anchialine species within the pools themselves and throughout the subterranean habitat surrounding them. In regard to decapod crustaceans, there exists a positive linear relationship between the size of the anchialine pool and the population of shrimp that inhabit them. A reconnaissance of the area indicates numerous potential sites within the project area to create anchialine pools wherever the land surface is within a few meters from the water table. In addition to increasing habitat productivity for native fauna, anchialine pools are functionally wetlands and have the ability to sequester and convert dissolved organic nutrients and other pollutants from the groundwater before they enter the marine environment (Brock and Kam, 1997, Ogden and Campbell, 1999).

7.2 Water Resources Protection and Mitigation

7.2.1 Bioretention

There is a high probability that nutrients and other potential pollutants will runoff landscaping and impermeable surfaces such as roadways and parking lots during medium or high rainfall events. Some of these pollutants will enter the groundwater table and into anchialine pools and ultimately the ocean. As an alternative to directing runoff into the ground through drywells, storm water should be directed into bioretention areas such as constructed surface or subsurface wetlands, vegetated filter strips, grass swales, and planted buffer areas. Storm water held and moved through these living filter systems are essentially stripped of most potential pollutants, and allowed to slowly infiltrate back to the groundwater table (Innovative Technologies for Storm water and Wastewater Workshop, 2005). Bioretention is a BMP (Best Management Practice) that would be a highly appropriate application for the proposed development. Furthermore, BMPs utilized in series may incorporate several storm water treatment mechanisms in a sequence to enhance the treatment of runoff. By combining structural and/or nonstructural treatment methods in series rather than singularly, raises the level and reliability of pollutant removal. Another means to reduce the potential for groundwater contamination is to increase soil depth above the standard in landscaped areas. This will allow chemicals to be held in the soils longer for more complete plant uptake and breakdown of these chemicals by soil microbes. A specific guide for chemical application by landscape maintenance personnel will be a beneficial tool to help avoid contamination of groundwater resources.

7.2.2 Salinity Adjustment

In the 2006 assessment by Ziemann regarding the impact to the southern pools from the proposed construction of the harbor, he stated that this construction would cause the salinity in the anchialine pools to become equivalent to the ocean at 35ppt. The anchialine biology would then soon perish. There is currently a level of uncertainty by professional hydrologists as to the exact movement of surface groundwater and a final determination of anchialine salinity following the harbor construction. The dynamics of groundwater movement through a porous lava medium both seaward and laterally along the coastline is an inexact science. This is compounded by the variations in water density, including stratification of salinity within the proposed harbor and capillary movement of low-density surface water through the substrata. The assessment that all anchialine pools will be barren with the construction of the harbor may be premature. *H. rubra* are routinely drawn from high salinity wells at 30 – 32 ppt and survive in this salinity for years. As mentioned early in this document, high populations of *H. rubra* and *M. lohena* have thrived and reproduced in pool salinities of 27ppt. If the pools do become full strength seawater at 35ppt, there exists uncertainty on the long-term effects to anchialine organisms, since there are no long-term studies or examples of native anchialine ecosystems at 35ppt. Native anchialine pool vegetation also has relatively high salinity tolerance. Akulikuli will grow as a riparian plant and *R. maritime* will thrive as an aquatic plant at a salinity of 27ppt. *Bacopa monieri* and Makaloa will grow in salinities of up to

20ppt. Other than Aki aki, (*Sporobolis virginicus*), and Ohelo kai (*Lycium sandwicense)* no other native aquatic or riparian flora will likely thrive among seawater pools.

If the salinity were expected to rise to 35 ppt, a possible mitigation would be to surcharge man-made anchialine pools created adjacent to or in the vicinity of natural pools with low salinity well water. If sufficient volume is used, it is theoretically possible to lower salinity in adjacent natural anchialine pools. This surcharge method has been successfully used to raise salinity in anchialine pools and cause the salinity rise in adjacent pools of at least up to 10 meters away. Surcharging with low salinity should work as well or better since the lower density water will essentially float atop the higher salinity water at the surface layer, and move throughout the complex of natural pools. Surcharging may also be a viable mitigation to dilute and more rapidly disperse any pollutants that may be detected in the pools.

If the harbor is to be a receptacle for the discharge of seawater from a man-made lagoon, it may help to maintain lower salinity in pools if the discharge of this seawater is place at the bottom of the harbor, thereby preserving the stratified layer of lower density surface water within the harbor. If the porosity of the lava near the surface of the groundwater table is sufficient, it may allow this low salinity surface water to move laterally through the area of anchialine pools.

7.2.3 Groundwater and Anchialine Pool Contamination Response

The response plan to contamination of the groundwater should be designed to prevent the negative impact to aquatic communities and human public who use the pools. Mitigation should focus on halting and reversing the source of contamination and its effects on living communities. Environmental problems that will trigger notification of the Developer and appropriate agencies, and require immediate mitigation and corrective action to halt the source of contamination, include: 1) the finding of pesticides or other toxic pollutants within the groundwater, anchialine pools or pool sediments; 2) a significant deviation in dissolved nutrients above normal baseline parameters; 3) a significant decline in population or a serious wide-spread health problem in the biological components that comprise the anchialine or estuarine habitat.

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RECEIVED
FEB 05 2007

Nancy Redfeather
P.O.Box 906
Kealakekua, Hawai'i 96750

Subject: Comments on Kona Kai Ola

To whom it may concern,

I have been a resident of Kona for 30 years. For 8 of those years I had a slip at Honokahou Harbor, frequently used the shoreline at Alula to the South and the now National Park to the North.. I am quite familiar with the area. I have also been part of the agricultural working group of the Kona Community Development Plan and understand the intended purpose of the plan.

Adding another 800 slips to the Harbor is just way too many, for a small area such as this to handle, this entire project is too big, too many rooms and units, too many employees, too much commercial space, and a poor use of DLNR and DHHL lands. To envision all these boats using the same harbor entrance as today is a nightmare. Especially during those winter months when waves are "closing out" the harbor entrance.

The Kona Community does not want developments of this size, which will impact not only roads but also water and all services. Perhaps this was something that at one time seemed like the right thing to do. But now, the Kona Community is beginning to realize the sober realities of living on a small island with Hawai'i government leading the way.

I would suggest you go back to the drawing board, and create something way way smaller and actually something which in the long term would actually benefit the community not just the developer, and will be less costly for the state and county taxpayers.

I have read Chris Yuen's comments, and part of the EIS. I am in agreement with his views.

Thank you for the opportunity to comment.

Aloha,

Nancy Redfeather

Cc: Department of Hawaiian Homelands
Jacoby Development Inc.
Oceanit
Office of Environmental Quality Control

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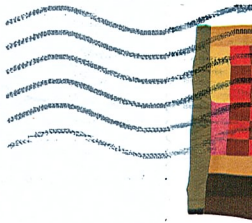

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Oceanit
Oceanit Center
828 Fort Street Mall, 6th fl
Honolulu, Hi.
96813

Attention: [illegible]

oceanit
innovation through engineering & scientific excellence

July 23, 2007

Nancy Redfeather
P.O. Box 906
Kealakekua, Hawai'i 96750

Dear Ms. Redfeather:

Subject: Kona Kai Ola Draft Environmental Impact Statement
Response to Your Comments Dated February 5, 2007

Thank you for your comments on the Kona Kai Ola Draft Environmental Impact Statement.

We acknowledge your concern regarding the addition of 800 slips to Honokōhau Harbor, the density of visitor units at Kona Kai Ola, and the overall magnitude of the project.

As explained in the DEIS, the agreement between JDI and the State of Hawai'i established a required scope and scale of the project for which the impact analysis was provided. Several comments have addressed the fact that alternatives other than the No Project Alternative were not addressed in the DEIS Section 2, Alternatives Analysis.

Kona Kai Ola is of the position that alternative actions other than a No Project alternative are not currently feasible without an amendment to the agreement with the State. Agency and public comments in response to the DEIS, as well as additional information generated as a result of inquiry into issues raised by the comments, have been helpful in identifying alternative actions that will serve the State's goal of providing additional marina slips for the Kona area. These alternative actions also serve to reduce or mitigate anticipated effects of the proposed development.

Thus, agencies such as the Land Division of the Department of Land and Natural Resources, the U.S. Department of the Interior Fish and Wildlife Service, the Planning Department of the County of Hawai'i, and the Office of Environmental Quality Control (OEQC), as well as community organizations have commented that a reduced scale marina and related facilities should be considered. The OEQC has also asked that the alternative of a reduced scale project be evaluated under the assumption that DHHL may determine that a downsized project would be preferred.

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In response to these comments on the DEIS and in consideration of measures to mitigate anticipated impacts, the EIS Section 2, Alternatives Analysis, has been revised to describe the following alternatives, which are discussed in more detail in the EIS:

- Alternative 1 is a project involving a 400-slip marina, 400 hotel units, 1,100 time-share units, and commercial and support facilities. This alternative would enhance water quality and avoid the need to widen the existing harbor entrance channel, as well as reduce traffic and socioeconomic impacts.
- Alternative 2 is an alternative that had been previously discussed, but not included in the proposed project that includes an 800-slip harbor and a golf course.
- Alternative 3 is the no-action alternative.

A comparison between impacts related to the proposed project concept and impacts related to Alternative 1 indicates that a reduction in the acreage and number of slips in the marina, as well as the reduction in hotel and time-share units, would generate less environmental, traffic, social and economic impacts. Although positive economic impacts would be reduced, Alternative 1 can be considered as a preferable alternative because of reduced environmental impacts. However, while it can be concluded that the 25-acre marina in Alternative 1 would be the preferred size, the DLNR agreement establishes the size of the marina at 45 acres and 800 slips. An amendment to the DLNR agreement is required in order to allow Alternative 1 to proceed. Hence, selection of Alternative 1 is an unresolved issue at this time.

The additional EIS text that includes the added EIS Section 2, Alternative Analysis, is contained in Attachment 1 of this letter.

Your comment letter and this response are included in the Final Environmental Impact Statement. We appreciate your participation in the environmental review process. Please submit a request to our office if you would like to receive a printed or electronic copy of the Final Environmental Impact Statement, or portions thereof.

Sincerely,

Dayan Vithanage, P.E., PhD.
Director of Engineering

cc: Office of Environmental Quality Control
State Department of Hawaiian Home Lands
Jacoby Development, Inc.

Attachment 1

2 Alternatives Analysis

~~In typical land development projects, the initial planning process includes the exploration of alternatives to development objectives. In the EIS process, these alternatives are presented with a disclosure of reasons for the dismissal of non-preferred alternatives.~~

~~Kona Kai Ola does not follow this same pattern of alternatives evaluation.~~ As discussed in Section 1.4, the proposed Kona Kai Ola project is the result of agreements between JDI and the State DLNR and DHHL. The agreements and leases between the State and JDI stipulate the parameters of development for this site in terms of uses, quantities and size of many features, resulting in a limited range of land uses. Unlike a private property project, JDI is required to meet the criteria outlined in the agreements, thereby affording less flexibility in options and uses. From the developer's perspective, the agreements must also provide sufficient flexibility to allow for a development product that responds to market needs and provides a reasonable rate of return on the private investment.

The agreements between JDI and DLNR specify that the proposed harbor basin is to be 45 acres and accommodate 800 slips. This development proposal is the subject of this EIS. In response to DEIS comments, additional water quality studies and modeling were conducted. These studies determined that the water circulation in a 45-acre 800-slip marina would be insufficient to maintain the required standard of water quality. The models of water circulation suggest that a new 25-acre harbor basin could successfully maintain required water quality in the new harbor. Comments on the DEIS from DLNR, from other government agencies, the neighbors and the general community also called for the consideration of alternatives in the EIS, including a project with a smaller harbor basin and less density of hotel and time-share units.

In response to these comments on the DEIS, three alternatives are evaluated in this Final EIS and include Alternative 1, which is a plan with a 25-acre 400-slip harbor basin including a decrease in hotel and time-share units; Alternative 2, which is an alternative that had been previously discussed but not included in the proposed project, that includes an 800-slip harbor and a golf course; and Alternative 3, the no-project alternative. Each alternative is included in the EIS with an evaluation of their potential impacts. These project alternatives are presented to compare the levels of impacts and mitigation measures of the proposed project and alternative development schemes pursuant to requirements set forth in Chapter 343, HRS.

~~JDI is required to provide a new marina basin not less than 45 acres and a minimum of 800 new boat slips. Further, the agreements provide the following options for land uses at the project site:~~

- ~~Golf Course~~
- ~~Retail Commercial Facilities~~
- ~~Hotel Development Parcels~~
- ~~Marina Development Parcels~~
- ~~Community Benefit Development Parcels~~

~~JDI is not pursuing the golf course option and is proposing instead to create various water features throughout the project site. All other optional uses have been incorporated in Kona Kai Ola.~~

2.1 Project Alternatives

2.1.1 Alternative 1: 400-Slip Marina

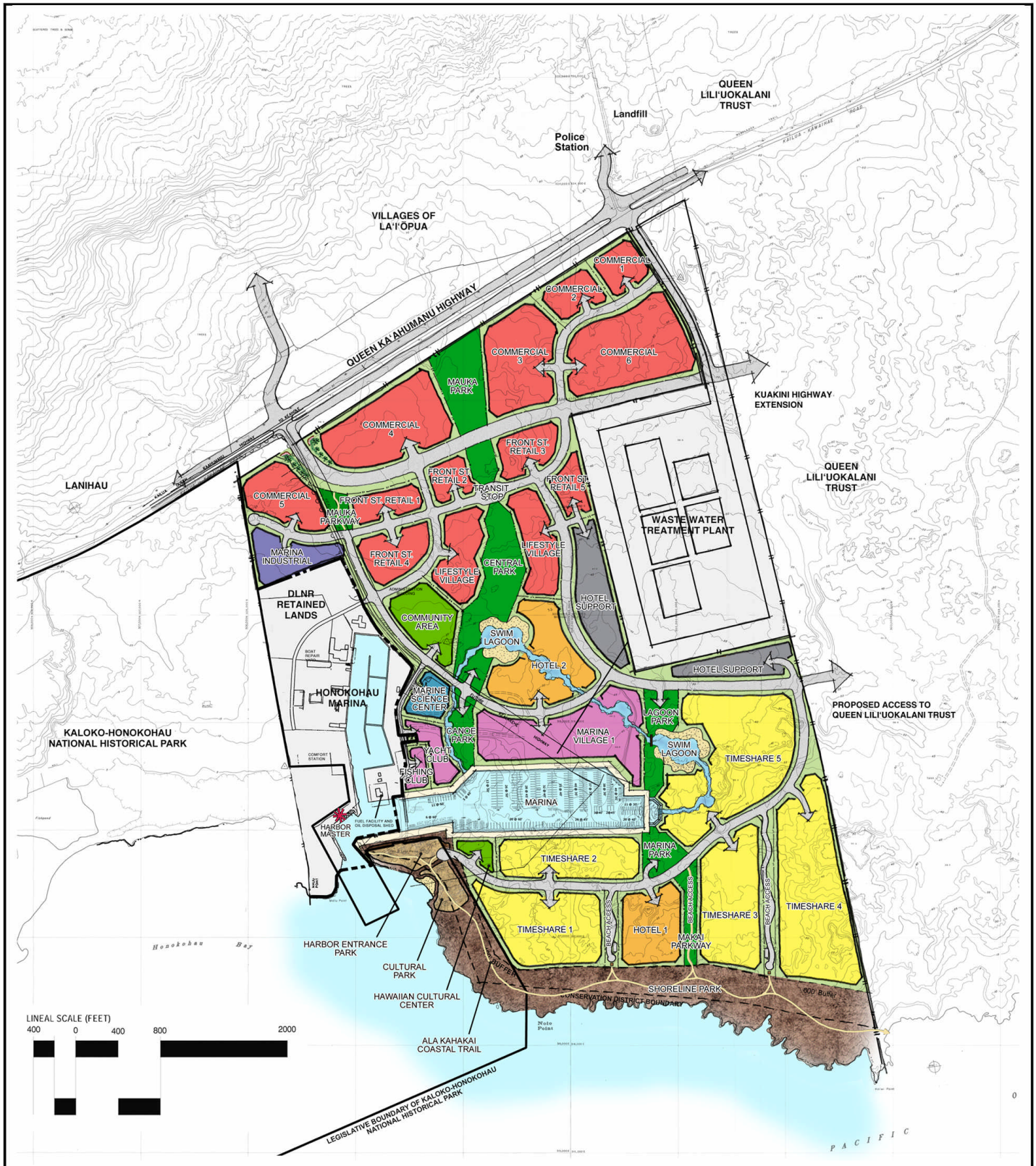
Studies conducted in response to DEIS comments found the construction and operation of an 800-slip marina may significantly impact the water quality within the marina and along the shoreline. Specifically, the Harbor Water Quality Modeling Study, as contained in Appendix U, found that the water circulation in a 45-acre 800-slip harbor was insufficient to maintain an acceptable level of water quality. Further, the existing harbor channel, which would serve both the existing and new harbors, could not adequately serve the increased boat traffic generated by an 800-slip marina during peak traffic. Mitigation measures to accommodate peak boat traffic included the widening of the existing channel, an action that would entail a complex process of Federal and State approvals and encounter significant environmental concern.

Concerns related to the proposed density of hotel and time-share units were also expressed in comments to the DEIS from members of the public, neighbors to the project site, especially the Kaniohale Community Association, and government agencies. Common themes in DEIS comments were related to impacts regarding traffic, project requirements of potable water and infrastructure systems, including sewer, drainage, utility and solid waste systems, and socioeconomic impacts.

In response to the water quality study results, and to the DEIS comments, an alternative plan was developed with a smaller marina with less boat slips, and a related decrease in hotel and time share units. Illustrated in Figure G, Alternative 1 reflects this lesser density project, and features a 400-slip marina encompassing 25 acres. For the purposes of the Alternative 1 analysis, JDI assumed 1,100 time-share units and 400 hotel rooms. Project components include:

- 400 hotel units on 34 acres
- 1,100 time-share units on 106 acres
- 143 acres of commercial uses
- 11 acres of marina support facilities
- 214 acres of parks, roads, open spaces, swim lagoons and community use areas

In addition, Alternative 1 would include the construction of a new intersection of Kealakehe Parkway with Queen Ka'ahumanu Highway, and the extension of Kealakehe Parkway to join Kuakini Highway to cross the lands of Queen Lili'uokalani Trust, and connecting with Kuakini Highway in Kailua-Kona. This is a significant off-site infrastructure improvement and is included in the agreements between the State and JDI.



Source: PBR HAWAII

Plan is conceptual only and subject to change

Figure G: Alternative 1: 400-Slip Marina

LEGEND

- TIME SHARE
- HOTEL
- RETAIL / COMMERCIAL
- MARINA RETAIL
- MARINA SUPPORT / COMMERCIAL
- MARINE SCIENCE CENTER
- COMMUNITY AREA / CULTURAL CENTER
- SWIM LAGOON
- MARINA
- UTILITIES
- PARKS & GREEN SPACE
- SHORELINE
- HARBOR ENTRANCE PARK / CULTURAL PARK

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Like the proposed project, Alternative 1 would have a strong ocean orientation, and project components that support this theme would include various water features including seawater lagoons and a marine science center. The new Alternative 1 harbor would include a yacht club, fishing club, a canoe park, and a cultural park with a focus on Hawaiian maritime cultural heritage of the voyaging canoe. The coastal area would be protected with a shoreline park with trails and public access parking for walking and shoreline fishing, and a cultural park surrounding the heiau, the cultural sites and 'Alula for community use. Additional Alternative 1 community areas would include facilities and space for community use, including programs of the Kona Kai Ola Community Foundation, which supports community programs in health care, culture, education, and employment training for the local community, especially to native Hawaiians. Like the original proposed plan, Alternative 1 includes 40 percent of the land in parks, roads, open spaces, swim lagoons and community use areas.

2.1.2 Alternative 2: Golf Course Feature

Alternative 2 was among the alternatives discussed at a community charrette in September 2003. It includes a golf course, which is a permitted use in the DLNR agreement and DHHL lease. As Figure H illustrates, an 18-hole championship golf course would occupy 222 acres on the southern portion of the project site. As with the proposed project, Alternative 2 includes an 800-slip marina on a minimum of 45 acres.

To support the economic viability of the project, other Alternative 2 uses include:

- Golf course clubhouse on three acres
- 1,570 visitor units on 88 acres fronting the marina
- 118 acres of commercial uses
- 23 acres of community uses

Community uses in Alternative 2 include an amphitheater, a canoe facilities park, a community health center, a Hawaiian cultural center and fishing village, a marine science center and employment training center. The sea water lagoon features contained in the proposed project and Alternative 1 are not included in this alternative.

2.1.3 Alternative 3: No Action

In Alternative 3, the project site would be left vacant, and the proposed marina, hotel and time-share facilities, commercial and marina industrial complexes, and community-oriented uses would not be realized.

~~The economic viability and sustainability of the project is determined by the density and uses proposed. Because JDI is obligated to develop an 800-slip marina for the State, complete road improvements, and provide various public enhancement features at its own expense, the density proposed for the income generating features of the development must be sufficient to provide an acceptable level of economic return for JDI. The market study, which is discussed in Section 4.6, reviewed various development schemes and determined that the currently proposed density and mix is the optimum to meet the anticipated financing and development cost obligations for the public features associated with the development.~~

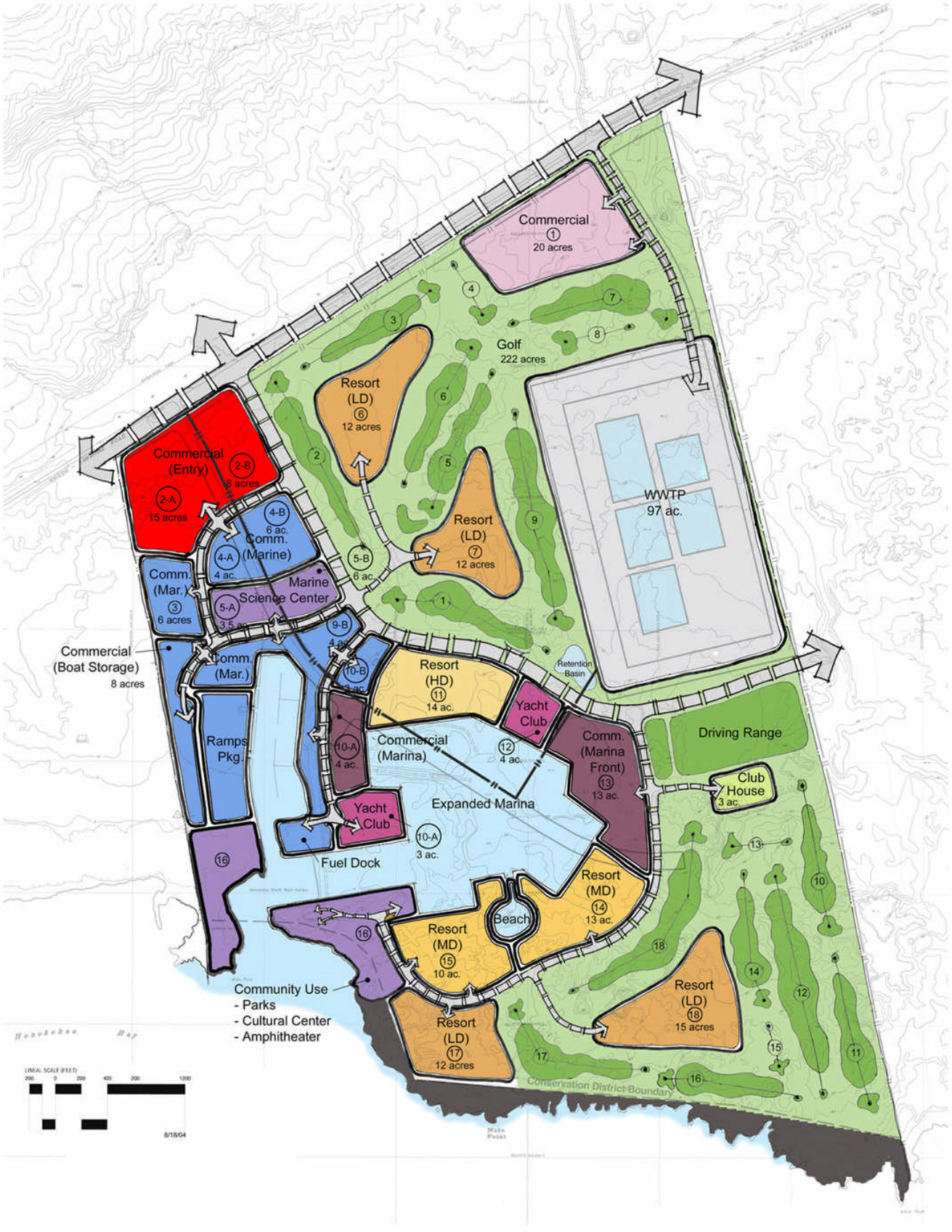

Figure H. Alternative 2: Golf Course Alternative

Legend

N E S W

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2.2 Alternatives Analysis

As discussed in Section 2.1, the proposed Kona Kai Ola project (also referred to as "proposed project") is defined by development requirements related for a marina and the related uses that would be needed to generate a reasonable rate of return that covers development costs.

Beginning with Section 2.2.1, the alternative development concepts are comparatively assessed for potential impacts that may reasonably be expected to result from each alternative. Following is an overview of the primary observations of such assessment.

Alternative 1 includes half of the State-required boat slips and 60 percent of the proposed hotel and time-share units and, due to the decreased density, this alternative would generate significantly less environmental and socio-economic impacts. A harbor water quality model found the reduction of the volume of the new marina basin by about half (approximately 25 acres) significantly improved the water circulation and quality. Further, the reduced number of boat slips would generate less boat traffic, thereby reducing congestion and the need to mitigate impacts further by the widening of the existing harbor channel.

A project with fewer hotel and time-share units and increased commercial space with a longer (14 years) absorption period would change the mix of employment offered by the project, and slightly increase the overall employment count. The public costs/benefits associated with Alternative 1 would change, compared to the proposed project, with a general increase in tax collections, and a general decrease in per capita costs. Detailed discussion of Alternative 1 potential economic impacts are provided in Section 4.6.6. Comparisons of levels of impact are presented throughout this FEIS.

While this analysis might indicate that the 25-acre marina in Alternative 1 would be the more prudent choice, the DLNR agreement establishes the minimum size and slip capacity of the marina at 45 acres and 800 slips, respectively. Amendments to the DLNR agreement would be required in order to allow Alternative 1 to proceed as the preferred alternative. Hence, selection of the preferred alternative is an unresolved issue at the writing of this FEIS.

Alternative 2, the golf course alternative, was not previously considered to be the preferred alternative primarily because market conditions at the time of project development might not likely support another golf course. Further, DHHL has a strategy goal to have more revenue-generating activities on the commercial lease lands within the project area. In addition, concerns have been expressed as to environmental impacts of coastal golf courses, including the potential adverse impact on Kona's water supply if potable water is used for golf course irrigation.

While Alternative 3, the no-project alternative, would not generate adverse impacts related to development of these lands associated with the construction and long-term operations, it would also not allow for an expanded public marina that would meet public need and generate income for the public sector. Further, the no-project alternative would foreclose the opportunity to create a master-planned State-initiated development that would result in increased tax revenue, recreation options and community facilities. Crucial privately-funded improvements, such as the marina, regional roadway and circulation improvements, and improvements to the existing wastewater treatment plant, would not be implemented. Private funds toward the development of community-oriented facilities such as parks, other recreational facilities, and public access would not be contributed.

~~Hence, the only valid alternative to the proposed project is the no-action alternative. In this alternative, the project site would be left vacant, and the proposed marina, hotel and time-share facilities, commercial and marina industrial complexes, and community-oriented uses would not be realized.~~

~~The no-project alternative would therefore not generate adverse impacts associated with the construction and long-term operations would not occur.~~

~~Likewise, the creation of a master-planned state-initiated development, resulting in increased employment, tax revenue, recreation options and community facilities, would not be created. Privately-funded improvements, such as the marina, regional roadway and circulation improvements, and improvements to the existing wastewater treatment plant, would not be implemented. Private funds toward the development of community-oriented facilities such as parks, other recreational facilities and public access would not be contributed.~~

Further, the creation of revenue-producing businesses on the DHHL property to fund homestead programs would not occur, resulting in fewer potential benefits for Hawaiians.

Hence, the agreements and leases between the State and JDI indicate that the no-action alternative is not in the public interest~~has been rejected at this time~~.

2.2.1 Impact Comparison

Grading and Excavation

The proposed project requires grading and excavation. Both actions may impact groundwater due to rainfall runoff during construction. Alternative 1 would require a significantly smaller excavation for the marina basin and would therefore carry a lesser risk of potential adverse effects on water quality. Alternative 2 would require the same basin excavation as the proposed project, and would also include extensive grading and filling to build the golf course, the latter of which would generate additional impacts. Alternative 3 would result in no change to the geography, topography and geology.

Further discussion on grading and excavation is contained in Section 3.3.

Natural Drainage

Most precipitation infiltrates into the porous ground at the site, and no significant sheet flow is likely. Alternative 1 would generate similar levels of impacts on natural drainage as those of the proposed project and thus require similar mitigation measures. The golf course in Alternative 2 would not be as porous since the site would be graded, soil would be placed, and grass and other landscaping would be grown. Sheet flow and runoff can occur on a golf course, and drainage patterns might change. Alternative 3 would result in no change to the existing natural drainage pattern. Further discussion on natural drainage is contained in Section 3.4.

Air Quality

Air quality will be affected by construction activities, as well as pollutants from vehicular, industrial, natural, and agricultural sources. Alternative 1 would generate less construction air quality impacts than the proposed project due to the reduced amount of intensive groundwork associated with the smaller marina basin and fewer long-term impacts by reducing traffic 35 and 40 percent during, respectively, AM and PM peak traffic times. Construction of Alternative 2 would result in fugitive dust and exhaust from equipment and is expected to generate the same level of air quality impact as the proposed project. Alternative 3 would result in no change to existing air quality. Further discussion on air quality is contained in Section 3.5.

Terrestrial Environment

To provide additional habitat for shorebirds and some visiting seabirds, the project proposes to construct a brackishwater pond area suitable for avian fauna, including stilts, coots and ducks. While habitat expansion is beneficial, there is also a possibility that these species may be exposed to activity that may harm them. Alternative 1 would not include a brackish water pond, but will include 5 acres of seawater features, which is 74 percent less than the 19 acres of seawater features in the proposed project. While this would reduce beneficial impacts, it would also decrease exposure to potentially harmful activity. Alternative 2 does not include the brackish water pond features, but would include drainage retention basins that would attract avian fauna and expose them to chemicals used to maintain golf course landscaping. While Alternative 3 would result in no increase in potentially harmful activity, it would also not provide additional habitat for avian fauna. Further discussion on the terrestrial environment is contained in Section 3.7.

Groundwater

Groundwater at the project site occurs as a thin basal brackish water lens. It is influenced by tides and varies in flow direction and salt content. The existing Honokōhau Harbor acts as a drainage point for local groundwater. Any impact to groundwater flow from the proposed harbor is likely to be localized. The proposed marina basin will not result in any significant increase in groundwater flow to the coastline, but rather a concentration and redirection of the existing flows to the harbor entrance.

There will be differences in the flow to the marina entrance between the proposed project and Alternative 1. Alternative 1, being smaller in size, will have less impact on groundwater flow than the proposed marina. Alternative 2 will have a similar impact to groundwater quality as the proposed project. Alternative 2 may also impact water quality by contributing nutrients and biocides to the groundwater from the golf course. Alternative 3 would result in no change in existing groundwater conditions. Further discussion on groundwater is contained in Section 3.8.1.

Surface Water

There are no significant natural freshwater streams or ponds at the site, but there are brackish anchialine pools. Surface water at the project site will be influenced by rainfall. Runoff typically percolates rapidly through the permeable ground. The proposed project will include some impermeable surfaces, which together with building roofs, will change runoff and seepage patterns.

Alternative 1 is a lower density project that is expected to have proportionally less impact on surface water and runoff patterns and less potential impact on water quality than the proposed project. Alternative 2 would have more impact on surface water quality than the proposed project due to fertilizers and biocides carried by runoff from the golf course. Alternative 3 would result in no change to surface water conditions. Further discussion on surface water is contained in Section 3.8.2.

Nearshore Environment and Coastal Waters

The potential adverse impacts to the marine environment from the proposed project are due to the construction of an 800-slip marina and the resulting inflow of higher salinity seawater and inadequate water circulation, both of which are anticipated to impair water quality to the extent of falling below applicable standards. One possible mitigation measure is to significantly reduce the size of the marina expansion.

The reduced marina size (from 45 to 25 acres) and reduced lagoon acreage in Alternative 1 are expected to result in a proportionate reduction in seawater discharging into the new harbor and increased water circulation. Alternative 2 includes the same marina basin size and is therefore subject to the same factors that are expected to adversely affect water quality.

In the existing Honokōhau Harbor, water quality issues focus on the potential for pollutants, sediments, mixing and discharge into the nearshore marine waters. Before the harbor was constructed, any pollutants entrained within the groundwater were believed to have been diffused over a broad coastline.

The water quality in the proposed harbor depends on several components. These include salinity, nutrients, and sediments that come from the ocean, rainfall runoff, water features with marine animals, and dust. The smaller project offered as Alternative 1 is expected to produce a reduced amount of pollutants and reduce the risk of adverse impact upon water quality.

It is notable that the 45-acre marina basin planned in the proposed project and Alternative 2 only becomes viable from a water quality impact standpoint if the additional brackish groundwater inflow into the new marina exceeds 60 mgd. The resulting flushing from such inflow would be expected to better maintain water quality. However, it is unclear whether 60 mgd of brackish groundwater would be available. As proposed in Alternative 1, reduction of the volume of the new marina basin by 45 percent will significantly improve the flushing and water quality because the lower volume can be flushed by the available groundwater flow.

In addition, there could be higher rainfall runoff from the Alternative 2 golf course into the harbor, because the grassed golf course will be less porous than the natural surface. The golf course will also require relatively high levels of fertilizer, biocides, and irrigation, all of which could contribute to adverse water quality impacts.

Further discussion on nearshore environment and coastal waters is contained in Section 3.9.1.

Anchialine Pools

Anchialine pools are located north of Honokōhau Harbor, and south of the harbor on the project site. The marine life in these pools is sensitive to groundwater quality, and changes due to construction and operation of the project could degrade the viability of the pool ecosystem. In the southern complex, 3 anchialine pools with a combined surface area of $20m^2$ would be eliminated due to the harbor construction in the proposed project and Alternatives 1 and 2.

Predicting the extent of change in groundwater flow is difficult if not impossible even with numerous boreholes and intense sampling. The actual flow of groundwater towards the sea is minimal today, and tidal measurements show that tide fluctuations represent more than 90 percent in actual harbor tides. The fluctuations occur simultaneous with the ocean/harbor tide, which indicate a vertical and horizontal pressure regime between bore hole 6 and the ocean and harbor. Hence, the tides alone create a mixing system that increases salinity, as the flow approaches the point of discharge which will be either the channel or the shore. Another factor that could influence groundwater quality is the increased local recharge from irrigation between the channel and shore. This will add fresh water to the lens locally but is not quantified at this time.

Quantification of these impacts, including the flow of groundwater through each pond, is therefore extremely difficult. The shallow lavas are of the pahoehoe type and have a relatively high horizontal permeability. In surface depressions or undulations, the pahoehoe lavas have a tendency to lose vertical permeability from sedimentation thus restricting water exchange within the individual pools. This is normally reflected in both the salinity and temperature and this information has been adequately studied in the pools.

Changes in groundwater quality may or may not impact biological communities in the anchialine and estuarine environment. In either case, it is important to understand these relationships to effectively manage the resource. If there is significant deviation from the baseline especially in regard to nutrients, pathogens, and toxins, a mitigation plan to determine the cause and take decisive appropriate action will be implemented.

Due to the uncertainty of changes in groundwater flow and quality due to marina construction, the variability in impacts between the proposed project and Alternatives 1 and 2 is unknown at this time. Alternative 3 would result in no change in groundwater flow. While this would eliminate the potential for adverse impacts, Alternative 3 would also continue the pattern of existing degradation related to human activity and the introduction of alien species. Further discussion on anchialine pools is contained in Section 3.9.2.

Marine Fishing Impacts

The proposed marina will increase the number of boats in the area and it is reasonable to assume that a portion of these new boats will engage in fishing activities. The increase in boats in the area would be primarily related to the marlin and tuna / pelagic fishery, coral reefs due to extractive fisheries, and SCUBA activities. The pressure on fish and invertebrate stocks is expected to increase with or without the marina. Harbor expansion provides the opportunity to address existing conditions to consolidate, focus, and fund management and enforcement activities at one location.

Compared to the proposed project, Alternative 1 would result in a 21 percent decrease in boat traffic, thereby lessening the potential for marine fishing impacts. The level of impacts in Alternative 2 would be similar to that of the proposed project. Alternative 3 would result in no change in existing marine fishing conditions, and no opportunity to address already existing pressure on fish and invertebrate stocks. Further discussion on marine fishing impacts is contained in Section 3.9.3.

Cultural and Archaeological Resources

The proposed project will integrate cultural and archaeological resources in the overall development. Archaeological sites recommended for preservation will be preserved, and cultural practices will be encouraged. Kona Kai Ola includes a canoe park, and a cultural park with a focus on Hawaiian maritime cultural heritage of the voyaging canoe. Proposed is a 400-foot shoreline setback that would serve as a buffer between the ocean and developed areas. This coastal area would be protected with a shoreline park with trails and public access parking for walking and shoreline fishing, and a cultural park surrounding the heiau, the cultural sites and ʻAlula for community use.

Alternative 1 would contain all of the cultural archaeological features and the shoreline setback area would be 400 feet in the northern portion of the site and increase to 600 feet in the southern portion. Alternative 2 would preserve cultural and archaeological resources, but does not include a 400-foot shoreline setback. Alternative 3 would result in no change to existing cultural and archaeological resources and no addition of cultural and community facilities and activities. Further discussion on cultural and archaeological resources is contained in, respectively, Sections 4.1 and 4.2.

Noise

Project-generated noise is due to construction equipment and blasting, boats, marina activities, vehicle traffic, and the Kealakehe Wastewater Treatment Plant operations. Alternative 1 would generate less noise impacts due to reduced construction activities, fewer boats, less traffic and less on-site activity. Alternative 2 would also generate less noise due to reduced traffic and less on-site activity, but noise related to the excavation of the marina basin and an increase in the number of boats would be similar to that of the proposed project. Further discussion on noise impacts is presented in Section 4.4.

Socioeconomic Impacts

The proposed project will generate an increase in de facto population of an estimated 5,321 persons due to the increase in hotel and time-share units. The estimated de facto population increase in Alternative 1 is 37 percent less, at 3,363 persons, than the proposed project. The de facto population increase in Alternative 2 is similar to Alternative 1.

Employment in the commercial components will nearly double in Alternative 1, from a stabilized level of 1,429 full-time equivalent (FTE) positions in the proposed project to 2,740 in the Alternative 1.

Under Alternative 1, the total operating economic activity at Kona Kai Ola will increase due to the added commercial space more than off-setting the fewer visitor units, moving upward from $557.6 million per year to circa $814.3 million annually. The total base economic impact resulting from development and operation of Alternative 1 will similarly be higher by between 35 and 45 percent than that of the proposed project.

Alternative 1, which has a reduced marina size of 25 acres, and fewer hotel and time-share units, would have a meaningful market standing, create significant economic opportunities, and provide a net benefit to State and County revenues. From a market perspective, a smaller Kona Kai Ola would still be the only mixed use community in the Keahole to Kailua-Kona Corridor offering competitive hotel and time-share product.

The estimated absorption periods for marketable components of Alternative 1 are generally shorter than those for the same components in the proposed project. Marina slips under Alternative 1 are estimated to be absorbed within 2 years after groundbreaking, as compared with 9 years for absorption of slips in the proposed project. Hotel rooms under Alternative 1 are estimated to be absorbed within 4 years after groundbreaking, as compared with 7 years under the proposed project. Time-share units would be absorbed within 10 years under Alternative 1, while 15 years are projected under the proposed project. Due to the planned increase in commercial facilities under Alternative 1, the absorption period of commercial space is estimated at 14 years, as compared with 8 years for absorption of such facilities under the proposed project.

The State and County will still both receive a net benefit (tax receipts relative to public expenditures) annually on a stabilized basis under the Alternative 1. The County net benefits will be some $12.2 million per year under the Alternative 1 versus $14.9 million under the proposed project. The State net benefits will increase under the Alternative 1 to about $37.5 million annually, up substantially from the $11.4 million in the proposed project.

Due to the lower de facto population at build-out, the effective stabilized public costs for both the State and County will decline meaningfully under the Alternative 1, dropping from $7.7 million annually for the County and $36.5 million for the State, to $4.9 million and $23 million per year, respectively.

Alternative 3 would result in no increase in de facto population and improvement to economic conditions. Further discussion on social and economic impacts are contained in, respectively, Sections 4.5 and 4.6.

Vehicular Traffic

The proposed project will impact the nearby road network that currently is congested during peak traffic times. The proposed project includes roadway improvements that would reduce the impact and improve roadway conditions for the regional community.

Alternative 1 includes the same roadway system improvements as the proposed project, yet would reduce vehicular traffic by 35 percent when compared to the proposed project. Alternative 2 would have similar traffic conditions and roadway improvements as Alternative 1. Alternative 3 would result in no increase in traffic and no roadway improvements.

Marina Traffic Study

The increase in boat traffic due to the proposed 800-slip marina would cause entrance channel congestion during varying combinations of existing and new marina peak traffic flow. Worst case conditions of active sport fishing weekend and summer holiday recreational traffic result in traffic volumes exceeding capacity over a short afternoon period. Mitigation to address boat traffic in the proposed project include widening the entrance channel, traffic control, implementation of a permanent traffic control tower, or limiting vessel size.

Alternative 1 would result in a 21 percent reduction in boat traffic congestion under average existing conditions and ten percent reduction during peak existing conditions. The reduction to 400 slips also reduces the impacts of congestion at the entrance channel, thereby reducing the need for any modifications to the entrance channel.

Alternative 2 would have the same level of boat traffic as the proposed project. Alternative 3 would not meet the demand for additional boat slips and would not generate additional boat traffic. Further discussion on marina traffic is contained in Section 4.8.

Police, Fire and Medical Services

The proposed project will impact police, fire and medical services due to an increase in de facto population and increased on-site activity. Alternatives 1 and 2 would have similar levels of impact as the proposed project due to increased on-site activity. Further discussion on police, fire and medical services are contained, respectively, in Sections 4.10.1, 4.10.2 and 4.10.3.

Drainage and Storm Water Facilities

The proposed project will increase drainage flows, quantities, velocities, erosion, and sediment runoff.

Alternative 1 involves a reduction of the project density that would reduce storm runoff from the various land uses due to a reduction in impervious surfaces associated with hotel and time-share development and to the creation of more open space. However, roadway areas will increase by about 30 percent in Alternative 1. Storm runoff from proposed streets would therefore increase; thus requiring additional drainage facilities and possibly resulting in no net savings. The golf course in Alternative 2 may also change drainage characteristics from those of the proposed project and may not reduce impacts. Alternative 3 would result in no change in existing conditions and no improvements to drainage infrastructure. Further discussion on drainage and storm water facilities is contained in Section 4.10.5

Wastewater Facilities

The proposed development is located within the service area of the Kealakehe WWTP and a sewer system will be installed that connects to the WWTP. The sewer system will be comprised of a network of gravity sewers, force mains, and pumping stations which collect and convey wastewater to the existing Kealakehe WWTP. Project improvements will incorporate the usage of recycled / R1 water. Improvements implemented by the proposed project will also accommodate the needs of the regional service population.

Alternative 1 would generate approximately 10 percent less wastewater flow than the proposed project. Wastewater flow in Alternative 2 is undetermined. Alternative 3 would result in no additional flow, as well as no improvements that will benefit the regional community. Further discussion on wastewater facilities is contained in Section 4.10.6.

Potable Water Facilities

The proposed project average daily water demand is estimated at 1.76 million gallons per day. Existing County sources are not adequate to meet this demand and source development is required. The developer is working with DLNR and two wells have been identified that will produce a sustainable yield that will serve the project. These wells will also serve water needs beyond the project.

Alternative 1 would result in net decrease of about five percent of potable water demand. Alternative 2 may have a lower water demand than the proposed project as long as potable water is not used for irrigation. Alternative 3 would result in no additional flow, as well as no source development that will benefit the regional community. Further discussion on potable water facilities is contained in Section 4.10.8.

Energy and Communications

Regarding Alternative 1, preliminary estimates for electrical, telecommunications, and cable resulted in a net demand load that remains similar to the proposed project. Further discussion on energy and communications is contained in Section 4.10.9.1.

The proposed project will increase the demand for electrical energy and telecommunications. The demand would be reduced in Alternative 1 because the number of boat slips and units would decrease. Similarly, Alternative 2 would have fewer units than the proposed project and therefore reduce energy demands. Further reduction in energy demand for either alternative could be achieved by using seawater air conditioning (SWAC) and other energy reduction measures, as planned by the developer. Further discussion on energy and telecommunications is contained in Section 4.10.9.2.

Water Features and Lagoons

The proposed project includes a brackishwater pond, lagoons, and marine life exhibits supplied by clean seawater. The water features in Alternative 1 would significantly decrease by 74 percent from 19 acres in the proposed project to five acres in Alternative 1. This decrease in water features would result in a corresponding decrease in water source requirements and seawater discharge. Alternative 2 does not include the seawater features. Alternative 3 would result in no additional demand for water source requirements and seawater discharge.

2.2.2 Conformance with Public Plans and Policies

State of Hawai'i

Chapter 343, Hawai'i Revised Statutes

Compliance with this chapter is effected, as described in Section 5.1.1 in regard to the proposed project and the alternatives discussed.

- State Land Use Law, Chapter 205, Hawai'i Revised Statutes

  The discussion in Section 5.1.2 is directly applicable to Alternative 1, the proposed project. Alternative 1 will involve a setback of 400 feet that increases to 600 feet along the southern portion of the project site's shoreline area. Alternative 2 does not provide for such a setback, but may still require approvals from DLNR for cultural, recreational, and community uses and structures within the Conservation district.

- Coastal Zone Management Program, Chapter 205A, Hawai'i Revised Statutes

  Recreational Resources:

  In addition to the discussion of consistency with the associated objective and policies, as described in Section 5.1.3, the reduction from the proposed project's 800-slip marina to a 400-slip marina under Alternative 1 will still expand the region's boating opportunities and support facilities. The existing harbor entrance will still be utilized under this alternative; however, potential risks relating to boat traffic and congestion in the marina entrance area will be reduced significantly. The 400-600 foot shoreline setback, public parks, trails, cultural areas, community facilities, and marine science center remain important recreational components under Alternative 1.

Alternative 2 includes a golf course component, which would add a more passive recreation to the active and social components, such as boating, fishing, swimming, trails, walkways, parks, marine life, educational and interactive areas that are also part of the project. The golf course would enhance the range of leisure and recreational opportunities offered at Kona Kai Ola.

Alternative 2, like the proposed project, will expand the region's boating opportunities and support facilities through its 800-slip marina. However, the potential adverse impacts of increased boat traffic from the size of the marina are significant enough to offset the benefits of increased boating opportunities.

Coastal Ecosystems:

The discussion in Section 5.1.3 is directly applicable to Alternative 1.

Alternative 1 not only reduces the number of slips proposed by 50 percent, but it also reduces the size of the marina from 45 acres to 25 acres. The 25-acre marina will increase the body of water within the existing harbor, but to a significantly lesser extent than the proposed project's estimated increase, which is also applicable to the 45-acre size that is proposed for the marina under Alternative 2.

The findings of the Harbor Water Quality Modeling Study conclude that a reduction in the size of the harbor expansion is an alternative that will mitigate the risk of significant impacts upon water quality within the marina and existing harbor. Accordingly, the reduction in both the number of slips and the size of the marina basin under Alternative 1, in combination with proper facilities design, public education, and enforcement of harbor rules and regulations, would result in fewer long-term impacts to water quality and coastal ecosystems. Short-term (construction-related) impacts would likely remain the same although the reduction in the total acreage of excavation is expected to result in a shorter duration of such impacts.

In addition to its 800-slip marina and potential adverse impacts upon water quality and the marine environment, Alternative 2 includes a golf course component, which has the potential to impact coastal ecosystems by increasing the nutrient loading in surface runoff and groundwater and also by introducing pesticides, herbicides, and other chemicals common in golf course use and management into the nearshore waters surrounding the project site.

Economic Uses

Although reduced in the number of slips, the smaller marina under Alternative 1 will nevertheless serve public demand for more boating facilities in West Hawai'i and is consistent with the objective and policies and discussion set forth in Section 5.1.3. The economic impacts of Alternative 2, while comparable to those of the proposed project's marina development, are notably marginal as to the golf course component, based on the marketability analysis that indicates a condition of saturation within the region.

Coastal Hazards

The discussion and considerations set forth in Section 5.1.3 are also applicable to Alternatives 1 and 2 and indicate compliance with the objective and policies addressed. Tsunami risks mainly affect the large shoreline setback area that is proposed for the project and Alternative 1. Alternative 2 projects a transient accommodation site that is partially within the tsunami hazard zone and thus carries a higher hazard risk. However, the essential requirement for these alternatives, as well as the proposed project, is a well-prepared and properly implemented evacuation plan.

Beach Protection

Discussion and considerations set forth in Section 5.1.3 are also applicable to Alternatives 1 and 2 and indicate compliance with the objective and policies addressed. Alternative 1 and, to a lesser extent, Alternative 2, will retain the shoreline area in its natural condition.

Similar to the proposed project, Alternative 1 provides for a shoreline setback of considerable width within which no structure, except for possible culturally-related structures, would be allowed. Alternatives 1 and 2 will thus be designed to avoid erosion of structures and minimize interference with natural shoreline processes.

Marine Resources

The discussion in Section 5.1.3 is also applicable to Alternative 1 which is described to be an alternative that is specifically projected to mitigate anticipated adverse impacts on water quality and the marine environment that might otherwise result from the original harbor design and scale, which is also incorporated in Alternative 2 . The reduced marina size under Alternative 1 is projected to meet water quality standards and enable greater compliance with the objective and policies addressed in this section.

Alternative 2 includes a golf course component and thus the potential to adversely impact marine resources by increasing the nutrient loading in surface runoff and groundwater and also by introducing pesticides, herbicides, and other chemicals common in golf course use and management into the nearshore waters surrounding the project site.

Hawai'i State Plans, Chapter 226, Hawai'i Revised Statutes

Section 226-4 (State goals), 5 (Objectives and policies for population, and 6 (Objective and policies for economy in general):

The discussion in Section 5.1.4 is applicable to Alternatives 1 and 2, in addition to the proposed project. These development concepts generally conform to the goals, objectives, and policies set forth in these sections because they will provide some degree of economic viability, stability, and sustainability for future generations. Kona Kai Ola will convert essentially vacant land into a mixed-use development with a distinctive marina and boating element, providing a wide range of recreational, business, and employment opportunities to the community.

Section 226-8 Objective and policies for the economy – the visitor industry:

Alternatives 1 and 2 will be consistent with the State's economic objective and policies relating to the tourism industry for the same reasons that are discussed in regard to the proposed project in Section 5.1.4. They will incorporate JDI's commitment to sustainability principles in the planning and design of the development concepts in Alternatives 1 and 2. Although the total hotel and time-share unit count is reduced to approximately 1,500 in Alternatives 1 and 2, the transient accommodations component of these alternatives will still further the State's objective and policies for increased visitor industry employment opportunities and training, foster better visitor understanding of Hawai'i's cultural values, and contribute to the synergism of this mixed-use project concept that addresses the needs of the neighboring community, as well as the visitor industry.

Section 226-11 Objectives and policies for the physical environment: land-based, shoreline and marine resources:

Alternative 1 is expected to involve less potential adverse impacts upon these environmental resources than the proposed project. Likewise, and Alternative 2 would have less adverse impact because of its reduction in the size of the marina and in the total hotel and time-share unit count. Alternative 1 carries less potential risk to water quality and related impacts upon the marine environment and anchialine pool ecosystems. Although approximately three anchialine pools are expected to be destroyed, the great majority of pools will be preserved within and outside of the proposed 400-foot shoreline setback.

The golf course component in Alternative 2 has the potential to impact marine resources by increasing the nutrient loading in surface runoff and groundwater and also by introducing pesticides, herbicides, and other chemicals common in golf course use and management into the marina basin and nearshore waters surrounding the project site. It also has the potential to adversely affect the anchialine pools by introducing the chemicals into the pond systems.

Section 226-12 Objective and policies for the physical environment: scenic, natural beauty, and historic resources:

The discussion in Section 5.1.4 is directly applicable to Alternative 1 and describes the compliance with the objective and policies addressed.

The golf course component of Alternative 2 would create a park-like view that would potentially enhance the beauty of the project site and surrounding areas when considered in combination with the existing rugged natural beauty of the area.

Just as with the proposed project, Alternatives 1 and 2 would also be designed to blend with the natural terrain and to honor and protect the cultural history, resources, and practices of these lands.

Section 226-13 Objectives and policies for the physical environment: land, air and water quality:

As stated above, because of the reduction in both the number of slips and the size of the marina basin, with proper facilities design, public education and enforcement of harbor rules and regulations, Alternative 1 is anticipated to cause fewer long-term impacts to water quality than either the proposed project or Alternative 2. Based on the findings of the Harbor Water Quality Modeling Study, water quality resulting from a reduced marina basin size as proposed under Alternative 1 is expected to be similar to existing conditions.

As previously noted, Alternative 2 has the potential to adversely impact water quality by increasing the nutrient loading in surface runoff and groundwater by introducing pesticides, herbicides and other chemicals common in golf course development and maintenance into the marina basin and nearshore waters surrounding the project site.

Section 226-14 Objectives and policies for facility systems - general:

Alternatives 1 and 2 will conform to the objective and policies of this section on the grounds that are discussed in regard to the proposed project in Section 5.1.4. The master-planning and phasing of the project concepts under these alternatives will be coordinated with associated public and private infrastructural planning and related private and public infrastructural financing. The cost of the marina construction and project-related infrastructure is to be borne by the developer, resulting in considerable savings for the public. In addition, the projected lease revenue from these public lands will provide additional public benefits by establishing a revenue stream for capital improvements and maintenance of a range of State facilities.

Section 226-15 Objectives and policies for facility systems - solid and liquid wastes:

In addition to the developer's commitment to sustainable development design, the project will involve upgrades to the County of Hawai'i's Kealakehe Wastewater Treatment Plant to meet current needs, as well as the project's future needs. This commitment is applicable to Alternatives 1 and 2, as well as the proposed project that is discussed in Section 5.1.4.

Section 226-16 Objectives and policies for facility systems – water:

The discussion of water conservation methods and the need to secure additional potable water sources in Section 5.1.4 is also applicable to Alternative 1 and demonstrates conformity to the objective and policies for water facilities. Alternative 2 involves greater irrigation demands in regard to its golf course component and greater potable water demands for human consumption than those for Alternative 1. Alternative 2 is expected to face more serious challenges in securing adequate and reliable sources of water.

Section 229-17 Objectives and policies for facility systems – transportation:

Alternatives 1 and 2 will conform to this objective and policies because they will present water transportation opportunities, including the possible use of transit water shuttles to Kailua-Kona, as described in regard to the proposed project in Section 5.1.4.

Section 226-18 Objectives and policies for facility systems – energy:

Alternatives 1 and 2 conform to these objective and policies through the use of energy efficient design and technology and commitment to the use and production of renewable energy to serve the project's needs. Solar energy production, solar hot water heating, and the use of deep cold seawater for cooling systems are currently identified as means of saving substantial electrical energy costs for the community and the developer.

Section 226-23 Objectives and policies for socio-cultural advancement – leisure:

Alternative 1 conforms to this objective and related policies for the reasons offered in Section 5.1.4 in regard to the proposed project. Alternative 1 will be of greater conformity with the policy regarding access to significant natural and cultural resources in light of the 400-600 foot shoreline setback that has been designed for this alternative.

Although it does not propose the considerable shoreline setback that is planned for Alternative 1, Alternative 2 is consistent with this objective and related policies in incorporating opportunities for shoreline-oriented activities, such as the walking trails. In addition, the golf course component adds a more passive recreation alternative to the active and social components, such as boating, fishing, swimming, trails, walkways, parks, marine life educational and interactive areas that are also part of the project. The golf course would enhance the range of leisure and recreational opportunities offered at Kona Kai Ola.

Section 226-25 Objectives and policies for socio-cultural advancement-culture:

The discussion in Section 5.1.4 is relevant to Alternatives 1 and 2 and demonstrate their conformity the objective and policies of this section.

Both alternatives involve the preservation and protection of cultural features that have been identified by the Cultural Impact Assessment and archaeological studies for the project area. Both provide for public shoreline access, and both will continue the policy of close consultation with the local Hawaiian community and cultural and lineal descendants in the planning of cultural resource preservation and protection.

Section 226-103 Economic priority guidelines:

Alternatives 1 and 2 conform to these guidelines for the same reasons that are set forth in Section 5.1.4. They involve private investment in a public project that will create economic diversification through a mix of marina, industrial, commercial, visitor, and cultural facilities. This presents a wide range of entrepreneurial opportunities, long-term employment opportunities, and job training opportunities.

Section 226-104 Population growth and land resources priority guidelines:

As described in Section 5.1.4, the policy support for the proposed project also extends to the similar development concepts considered in Alternatives 1 and 2. Those alternatives conform to the guidelines of this section because they involve an urban development under parameters and within geographical bounds that are supported by the County's General Plan, a preliminary form of the Kona Community Development Plan, the County's Keahole to Kailua Regional Development Plan, and the reality of being located along the primary commercial/industrial corridor between Keahole Airport and Kailua-Kona. As with the proposed project, the development concepts of Alternatives 1 and 2 are essentially alternatives for the implementation and "in-filling" of the urban expansion area in North Kona.

DHHL Hawai'i Island Plan

This 2002 plan projects DHHL's Honokōhau makai lands for commercial use. As compared to the proposed project and Alternative 2, Alternative 1 presents an expanded commercial component that provides greater compliance with the plan, while addressing certain beneficiaries' concerns about the scale of the marina originally required in the Project. Alternative 2 also conforms to the recommended commercial uses in the makai lands but to a lesser degree than Alternative 1 because of its more limited commercial component. Like the proposed project, its marina size and number of slips raise environmental issues, as more specifically discussed in Part 3, and community concerns.

County of Hawai'i General Plan

HCGP Section 4 – Environmental Quality Goals, Policies and Courses of Action:

Alternative 1 is consistent with this section. It presents a reduction in both the number of slips and the size of the marina basin that, in combination with proper facilities design, public education and enforcement of harbor rules and regulations, would result in very few long term impacts to water quality. Based on the findings of the Harbor Water Quality Modeling Study, water quality would remain similar to existing conditions.

Alternative 2 is the least consistent with this section. In addition to the potential significant impacts of its 800 slip marina basin, its golf course component has the potential to adversely impact marine resources by increasing the nutrient loading in surface runoff and groundwater and also by introducing pesticides, herbicides and other chemicals common in golf course use and management into the nearshore waters surrounding the project site. It also has the potential to adversely affect the anchialine pools beyond their current conditions by introducing such substances into the pool systems.

HCGP Section 7 – Natural Beauty Goals and Policies:

Alternative 2 conforms to some degree with this section. Its golf course component would create a park-like view that would potentially enhance the beauty of the project site and surrounding areas when considered in combination with the existing rugged natural beauty of the area, as demonstrated in other makai golf courses within the region.

HCGP Section 8 – Natural Resources and Shoreline:

Alternative 1 is most consistent with the goals and policies of this section. It would require considerably less marina excavation than the proposed project and Alternative 2 and would reduce the potential risk of long-term adverse impacts to water quality. Based on the findings of the Harbor Water Quality Modeling Study, water quality would remain similar to existing conditions with the degree of reduction in marina basin size that is proposed under Alternative 1. This reduction is also expected to reduce potential impacts upon anchialine pools and their ecosytems, as well as shoreline and marine resources that are affected by water quality. Alternative 1 also retains the shoreline preservation and protection concepts that are proposed in and described for the Project.

HCGP Section 10 – Public Facilities Goals and Policies:

The discussion in Section 5.2.1. in relation to the proposed project is applicable to Alternatives 1 and 2. Improvements to public facilities are are integral to the Kona Kai Ola development. The provision of additional boat slips and numerous road improvements, including a makai extension of Kuakini Highway south to Kailua-Kona are incorporated into plans for the project's development. In light of these elements, Alternatives 1 and 2 are consistent with the goals and policies of this section.

HCGP Section 11 – Public Utility Goals, Policies:

As with the proposed project, Alternatives 1 and 2 are consistent with the goals and policies of this section, based on the relevant grounds set forth in Section 5.2.1. The developer is committed to design, fund, and develop environmentally sensitive and energy efficient utility systems to the extent possible, as described previously in Part 5. Its master planning provides for the coordinated development of such systems with the objective of achieving significant savings for the public. As previously-mentioned example, the project development involves the upgrading of the Kealakehe Wastewater Treatment Plant.

HCGP Section 12 – Recreation:

Alternative 1 is consistent with the goals, policies, and courses of action for North Kona in this section.

Although the number of slips is reduced under Alternative 1, the region's boating opportunities and support facilities will still be expanded. The existing marina entrance would still be utilized under this alternative. However, concerns relating to increased activity leading to increased congestion in the marina entrance area would be mitigated to a certain extent. The 400-600 foot shoreline setback, public parks, trails, cultural areas, community facilities and marine science center remain important components of Alternative 1.

The golf course component of Alternative 2 would add a more passive recreation to the active and social components, such as boating, fishing, swimming, trails, walkways, parks, marine life, educational and interactive areas that are also part of the project. The golf course would enhance the range of leisure and recreational opportunities offered at Kona Kai Ola. Alternative 2 is also considered to be consistent with this section.

HCGP Section 13 and 13.2 – Transportation:

The reduced marina component under Alternative 1 will still provide transportation opportunities and provide for possible use of transit water shuttles to Kailua-Kona, although to a lesser degree than under the proposed project and Alternative 2 . However, in each scenario, internal people-movers are planned, and numerous roadway improvements are planned for coordination with public agencies, including but not limited to the construction of the Kuakini Highway extension between Honokōhau and Kailua-Kona. Accordingly, both Alternatives 1 and 2 are consistent with the goals, policies, and courses of action for North Kona under these sections of the General Plan.

HCGP Section 14.3 – Commercial Development:

For the reasons presented in the discussion under Section 226-104 of the State Plan, the planned commercial component under Alternatives 1 and 2 are consistent with this section.

HCGP Section 14.8 – Open Space:

Alternatives 1 and 2 are consistent with the goals and policies of this section. Alternative 1 provides a considerable (400-600 foot) shoreline setback along the entire ocean frontage of the project site as a means of protecting the area's scenic and open space resources, as well as natural and cultural resources. Although it does not incorporate the shoreline setback planned in Alternative 1, Alternative 2 provides a golf course component would contribute to the amount of open space that is currently proposed and allow additional view corridors to be created.

Community Development Plans

Community development plans are being formulated for different regions in the County in order to supplement the County's General Plan. The Kona Kai Ola project is located in the Kona Community Development Plan (CDP) area. Maps associated with the preliminary work phases

of the Kona CDP include the Kona Kai Ola project site within the "Preferred Urban Growth" boundary of the North Kona district. The Kona CDP process is guided by a Steering Committee composed of a broad cross-section of the community. The Steering Committee will eventually complete its work and recommend the CDP's adoption.

After the DEIS was published, the Kona CDP has progressed to the development of plans for the major urban growth corridor north of Kailua-Kona. The Kona CDP has produced a draft plan showing a transit oriented development that includes a midlevel public transit corridor along the mauka residential elevation, and a makai transit corridor that runs along a proposed new frontage road just makai and parallel to Queen Kaahumanu Highway. The development plan for Alternative 1 includes the Kuakini Highway as part of this proposed frontage road and transit line from Kailua Kona to the Kealakehe area, along with a transit stop at Kona Kai Ola. The Alternative 1 plan also includes a road that could be extended to be part of the proposed frontage road should it be approved and implemented. In addition, the Kona CDP has continued to emphasize the principles of smart growth planning with mixed use urban areas where people can live, work, play and learn in the same region. Kona Kai Ola has been specifically designed to be consistent with this policy in order to provide a stable employment base close to where people live in the mauka residential areas already planned for DHHL and HHFDC lands.

It should be noted that currently and over the years, the 1990 Keāhole to Kailua Development Plan (K-to-K Plan) guides land use actions by the public and private sectors. It is intended to carry out the General Plan goals and policies related to the development of the portion of North Kona area, including the Kona Kai Ola site. The "Preferred Growth Plan" of the Keāhole to Kailua Development Plan identifies the project site as a new regional urban center to include commercial, civic, and financial business related uses, an expanded "Harbor Complex," a shoreline road, and a shoreline park. The proposed project and the development concepts in Alternatives 1 and 2 are therefore consistent with the recommendations in the Keāhole to Kailua Development Plan.

Hawai'i County Zoning

As shown on Figure AA, the project site is zoned "Open". Under Section 25-5-160 of the Hawai'i County Code, "The O (Open) district applies to areas that contribute to the general welfare, the full enjoyment, or the economic well-being of open land type use which has been established, or is proposed. The object of this district is to encourage development around it such as a golf course and park, and to protect investments which have been or shall be made in reliance upon the retention of such open type use, to buffer an otherwise incompatible land use or district, to preserve a valuable scenic vista or an area of special historical significance, or to protect and preserve submerged land, fishing ponds, and lakes (natural or artificial tide lands)".

Some of the proposed uses at Kona Kai Ola are permitted uses in the Open zone such as:

- Heiau, historical areas, structures, and monuments;
- Natural features, phenomena, and vistas as tourist attractions;
- Private recreational uses involving no aboveground structure except dressing rooms and comfort stations;

- Public parks;
- Public uses and structures, as permitted under Section 25-4-11.

In addition to those uses permitted outright, the following uses are permitted after issuance of a use permit:

- Yacht harbors and boating facilities; provided that the use, in its entirety, is compatible with the stated purpose of the O district.
- Uses considered directly accessory to the uses permitted in this section shall also be permitted in the O district.

The proposed time-share and hotel units and commercial uses would not be consistent with the zoning designation of "Open". Project implementation therefore requires rezoning of portions of the project to the appropriate zoning category or use permits for certain uses.

Special Management Area

As shown in Figure AB, the entire project area up to the highway is within the coastal zone management zone known as the Special Management Area ("SMA"). At the County level, implementation of the CZM Program is through the review and administering of the SMA permit regulations. Kona Kai Ola complies with and implements the objectives and policies of the Coastal Zone Management (CZM) Program, and a full discussion is provided in Section 5.1.3. The development concepts in the proposed project and Alternatives 1 and 2 will be subject to applicable SMA rules and regulations.

Feb 5, 2007

Response to Jacoby DEIS

This project, if built in the ahupua`a of Honokohau, would be a true fiasco. As a thirty year resident of Kona, I am at my wits end dealing with the traffic situation. The development that is already planned for the area. 500 homes at Kohanaiki, and 1,000 more Hawaiian Home Lands homes, all within a few mile radius, will over burden that ahupua'a to the point of breaking. To think of adding the Kona Kai Ola project is absolutely insane. I do not believe there is one citizen, who is not financially conflicted, that wants this in their community.

The Hawaii County Administration and the majority of our county council do not approve of this development. The proposed density will cause great harm to our cultural, aesthetic and environmental resources. It does not fit with our General Plan or the Kona Community Development Plan.

This agreement with the state and Hawaiian Home Lands is a private taking of a public asset.

Please do not approve this project.

Please extend the DEIS public comment period by 60 days for these reasons:

1) The Jacoby DEIS was issued on December 19, 2006 and publicly noticed by the Office of Environmental Quality on December 23rd just before the Christmas and New Year holiday period.

2) The document was not available on-line until January 2, 2007, two weeks into the six-week public comment period.

3) Several people have reported difficulty getting the DEIS appendices to download and open.

4) Given the above, reasonable knowledge of and opinions about such a substantial document cannot be gained and presented by the general public within 45 days.

Thank You,

Pamela Greenaway
P.O. Box 999
Captain Cook, HI 96704

Pamela Greenaway
PO Box 999
Captain Cook HI 96704-0999

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February 8, 2007

Pamela Greenaway
P.O. Box 999
Captain Cook, HI 96704

Dear Ms. Greenaway:

Subject: Kona Kai Ola Draft Environmental Impact Statement (DEIS)

This letter responds to your written request to extend the comment period for the Kona Kai Ola DEIS. I received your letter on February 7, 2007.

The DEIS was published in the Office of Environmental Quality Control Bulletin on December 23, 2006. The 45-day comment period ends on February 6, 2007.

Regarding your request, we will include your comments and our response in the Final EIS if your transmittal is postmarked by February 13, 2007. Please contact me if you would like hard copies or electronic files of the DEIS.

Thank you for your interest in the Kona Kai Ola project, and we look forward to receiving your comments.

Sincerely,

Dayan Vithanage, P.E., PhD.
Director of Engineering

cc: Office of Environmental Quality Control
State Department of Hawaiian Homelands
Jacoby Development, Inc.

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July 23, 2007

Pamela Greenaway
P.O. Box 999
Captain Cook, Hawai'i 96704

Dear Ms. Greenaway:

Subject: Kona Kai Ola Draft Environmental Impact Statement
Response to Your Comments Dated February 5, 2007

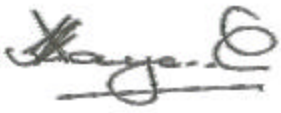
Thank you for your comments on the Kona Kai Ola Draft Environmental Impact Statement.

There has been no formal Hawai'i County Administration positions, opposition or otherwise, on Kona Kai Ola. As development approval applications have not previously been submitted to the County of Hawai'i, no formal or final decisions have yet been made by the County of Hawai'i.

Regarding the availability of the DEIS for public review, the DEIS was published in the Office of Environmental Quality Control Bulletin on December 23, 2006. The online posting of the DEIS is handled solely by the Office of Environmental Quality Control. Interested persons were invited to contact me for a hard or electronic copy of the DEIS document. The 45-day comment period ended on February 6, 2007. A response to your initial comments in relations to above was sent in a letter dated February 8, 2007.

Your comment letter and this response are included in the Final Environmental Impact Statement. We appreciate your participation in the environmental review process. Please submit a request to our office if you would like to receive a printed or electronic copy of the Final Environmental Impact Statement, or portions thereof.

Sincerely,



Dayan Vithanage, P.E., PhD.
Director of Engineering

cc: Office of Environmental Quality Control
State Department of Hawaiian Home Lands
Jacoby Development, Inc.

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Philip Fernandez
Po Box 947
Captain Cook, HI 96704

January 31, 2007

Mr. Scott Condra
Jacoby Development, Inc.
171 17th Street, NW Suite 1550
Atlanta, GA 30363

Dear Mr. Condra,

I am a concerned citizen of Kona who does not agree with the proposed development: Kona Kai Ola. This development is too large for downtown Kona, it will harm the ocean life, and it will severely tax Kona's already suffering infrastructure. We do not want to see the Kona Coast ruined by moneymaking schemes that are not sustainable.

This idea is not sustainable for several reasons. First of all, we do not need more resorts in Kona. It is wrong to try to put 2300 units on this site by the National Park. Our roads and water needs will not be able to sustain such a large development. The ocean life will suffer greatly from the blasting and constant noise and pollution generated from creating this resort complex, and from the huge increase in boats. How can the State and DHHL try to create such a complex at the expense of the environment and the city of Kona? The Planning Director has clearly stated that this idea is not right for Kona. It is the wrong place and it will never do anything good for the local Kona community. Therefore, this proposal should not happen.

Sincerely,

Philip Fernandez

CC:DLNR, Oceanit Center, OEQC

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Philip Fernandez
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July 23, 2007

Philip Fernandez
P.O. Box 947
Captain Cook, Hawai'i 96704

Dear Mr. Fernandez:

Subject: Kona Kai Ola Draft Environmental Impact Statement
Response to Your Comments Dated January 31, 2007

Thank you for your comments on the Kona Kai Ola Draft Environmental Impact Statement.

We acknowledge your concerns about the size of the project, and note that, since the DEIS was published, an alternatives analysis was conducted that explored a smaller marina and less hotel and timeshare units. As explained in the DEIS, the agreement between JDI and the State of Hawai'i established a required scope and scale of the project for which the impact analysis was provided. Several comments have addressed the fact that alternatives other than the No Project Alternative were not addressed in the DEIS Section 2, Alternatives Analysis.

We are of the position that alternative actions other than a No Project alternative are not currently feasible without an amendment to the agreement with the State. Agency and public comments in response to the DEIS, as well as additional information generated as a result of inquiry into issues raised by the comments, have been helpful in identifying alternative actions that will serve the State's goal of providing additional marina slips for the Kona area. These alternative actions also serve to reduce or mitigate anticipated effects of the proposed development.

Thus, agencies such as the Land Division of the Department of Land and Natural Resources, the U.S. Department of the Interior Fish and Wildlife Service, the Planning Department of the County of Hawai'i, and the Office of Environmental Quality Control (OEQC), as well as community organizations have commented that a reduced scale marina and related facilities should be considered. The OEQC has also asked that the alternative of a reduced scale project be evaluated under the assumption that DHHL may determine that a downsized project would be preferred.

In response to these comments on the DEIS and in consideration of measures to mitigate anticipated impacts, the EIS Section 2, Alternatives Analysis, has been revised to describe the following alternatives, which are discussed in more detail in the EIS:

- Alternative 1 is a project involving a 400-slip marina, 400 hotel units, 1,100 time-share units, and commercial and support facilities. This alternative would enhance water quality and avoid the need to widen the existing harbor entrance channel, as well as reduce traffic and socioeconomic impacts.

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- Alternative 2 is an alternative that had been previously discussed, but not included in the proposed project that includes an 800-slip harbor and a golf course.

- Alternative 3 is the no-action alternative.

A comparison between impacts related to the proposed project concept and impacts related to Alternative 1 indicates that a reduction in the acreage and number of slips in the marina, as well as the reduction in hotel and time-share units, would generate less environmental, traffic, social and economic impacts. Although positive economic impacts would be reduced, Alternative 1 can be considered as a preferable alternative because of reduced environmental impacts. However, while it can be concluded that the 25-acre marina in Alternative 1 would be the preferred size, the DLNR agreement establishes the size of the marina at 45 acres and 800 slips. An amendment to the DLNR agreement is required in order to allow Alternative 1 to proceed. Hence, selection of Alternative 1 is an unresolved issue at this time. The additional EIS text that includes the added EIS Section 2, Alternative Analysis, is contained in Attachment 1 of this letter.

We note your concern about infrastructure impacts. The project includes improvements to mitigate project-related impacts, as well as crucial privately-funded improvements, such as the marina, regional roadway and circulation improvements, and improvements to the existing wastewater treatment plant.

As development approval applications have not previously been submitted to the County of Hawai'i, no formal or final decisions have yet been made by the County of Hawai'i, including the Planning Director. We have received concerns from the Planning Director and are working to respond to these concerns.

Regarding the General Plan, Kona Kai Ola is consistent with the Urban Expansion Area designation. In December 2005, the Hawai?County Planning Director proposed that the DLNR portion of the Kona Kai Ola project that was designated "Open" in the 2005 General Plan, be amended to "Urban Expansion Area." On November 29, 2006, the Hawai'i County Council approved this amendment.

The agreement between the developer and the State identifies hotel and time-share uses as possible development at Kona Kai Ola. The project is not a resort. A resort is a concept in which visitors are attracted to spend most, if not all, of their stay within the resort area through the design of amenities that fulfill the needs of a particular visitor market segment. This self-containment is achieved to varying degrees in resort development, depending on the natural, historic/cultural, and recreational resources within a resort site and the intended scale of the resort.

State and County laws recognize this distinction between a "resort" and a "hotel" or "time share unit." Section 514E-5, Hawaii Revised Statutes, authorizes time share units to be located in a resort area or any other area in which a county may by ordinance allow a hotel unit. The Hawaii County Code correspondingly permits hotels and time share units in non-resort zoning districts. The proposed project may include up to 700 hotel units and 1,803 time-share units, and depending on the eventual location of these project components, rezoning may be required for implementation.

Kona Kai Ola is also being planned to be consistent with the Kona Community Development Plan. Since the DEIS was published, JDI has considered alternatives to the proposed project. Alternative 1, which is discussed above, is consistent with the

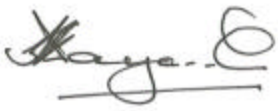
current draft of the Kona CDP and the community vision for the proposed development area.

DLNR and DHHL both independently requested a private developer to develop these public lands in order to generate revenues to support the public programs of these agencies. DLNR and DHHL will both benefit from lease payments and a percentage of revenues from the Kona Kai Ola project.

Other studies have significantly increased the EIS discussion on the affected marine environment and noise impacts that may be generated by the proposed project. Information sources are accurately represented, and modeling techniques provide a reliable indication of possible project-related impacts. We are including Section 3.9.4, Marine Mammals and Sea Turtles, as Attachment 2 in this letter.

Your comment letter and this response are included in the Final Environmental Impact Statement. We appreciate your participation in the environmental review process. Please submit a request to our office if you would like to receive a printed or electronic copy of the Final Environmental Impact Statement, or portions thereof.

Sincerely,



Dayan Vithanage, P.E., PhD.
Director of Engineering

cc: Office of Environmental Quality Control
State Department of Hawaiian Home Lands
Jacoby Development, Inc.

Attachment 1

2 Alternatives Analysis

~~In typical land development projects, the initial planning process includes the exploration of alternatives to development objectives. In the EIS process, these alternatives are presented with a disclosure of reasons for the dismissal of non-preferred alternatives.~~

~~Kona Kai Ola does not follow this same pattern of alternatives evaluation.~~ As discussed in Section 1.4, the proposed Kona Kai Ola project is the result of agreements between JDI and the State DLNR and DHHL. The agreements and leases between the State and JDI stipulate the parameters of development for this site in terms of uses, quantities and size of many features, resulting in a limited range of land uses. Unlike a private property project, JDI is required to meet the criteria outlined in the agreements, thereby affording less flexibility in options and uses. From the developer's perspective, the agreements must also provide sufficient flexibility to allow for a development product that responds to market needs and provides a reasonable rate of return on the private investment.

The agreements between JDI and DLNR specify that the proposed harbor basin is to be 45 acres and accommodate 800 slips. This development proposal is the subject of this EIS. In response to DEIS comments, additional water quality studies and modeling were conducted. These studies determined that the water circulation in a 45-acre 800-slip marina would be insufficient to maintain the required standard of water quality. The models of water circulation suggest that a new 25-acre harbor basin could successfully maintain required water quality in the new harbor. Comments on the DEIS from DLNR, from other government agencies, the neighbors and the general community also called for the consideration of alternatives in the EIS, including a project with a smaller harbor basin and less density of hotel and time-share units.

In response to these comments on the DEIS, three alternatives are evaluated in this Final EIS and include Alternative 1, which is a plan with a 25-acre 400-slip harbor basin including a decrease in hotel and time-share units; Alternative 2, which is an alternative that had been previously discussed but not included in the proposed project, that includes an 800-slip harbor and a golf course; and Alternative 3, the no-project alternative. Each alternative is included in the EIS with an evaluation of their potential impacts. These project alternatives are presented to compare the levels of impacts and mitigation measures of the proposed project and alternative development schemes pursuant to requirements set forth in Chapter 343, HRS.

~~JDI is required to provide a new marina basin not less than 45 acres and a minimum of 800 new boat slips. Further, the agreements provide the following options for land uses at the project site:~~

- ~~Golf Course~~
- ~~Retail Commercial Facilities~~
- ~~Hotel Development Parcels~~
- ~~Marina Development Parcels~~
- ~~Community Benefit Development Parcels~~

~~JDI is not pursuing the golf course option and is proposing instead to create various water features throughout the project site. All other optional uses have been incorporated in Kona Kai Ola.~~

2.1 Project Alternatives

2.1.1 Alternative 1: 400-Slip Marina

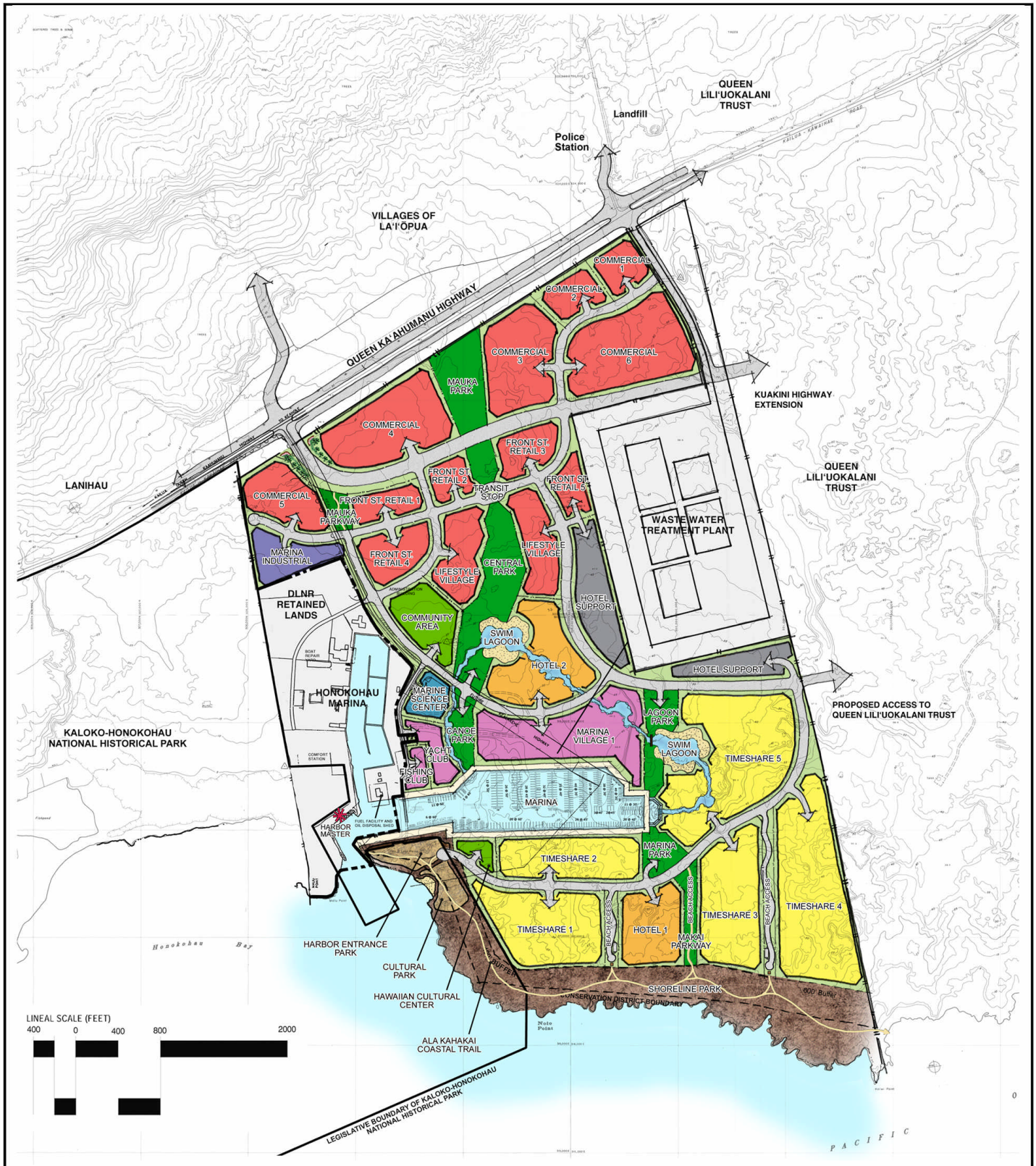
Studies conducted in response to DEIS comments found the construction and operation of an 800-slip marina may significantly impact the water quality within the marina and along the shoreline. Specifically, the Harbor Water Quality Modeling Study, as contained in Appendix U, found that the water circulation in a 45-acre 800-slip harbor was insufficient to maintain an acceptable level of water quality. Further, the existing harbor channel, which would serve both the existing and new harbors, could not adequately serve the increased boat traffic generated by an 800-slip marina during peak traffic. Mitigation measures to accommodate peak boat traffic included the widening of the existing channel, an action that would entail a complex process of Federal and State approvals and encounter significant environmental concern.

Concerns related to the proposed density of hotel and time-share units were also expressed in comments to the DEIS from members of the public, neighbors to the project site, especially the Kaniohale Community Association, and government agencies. Common themes in DEIS comments were related to impacts regarding traffic, project requirements of potable water and infrastructure systems, including sewer, drainage, utility and solid waste systems, and socioeconomic impacts.

In response to the water quality study results, and to the DEIS comments, an alternative plan was developed with a smaller marina with less boat slips, and a related decrease in hotel and time share units. Illustrated in Figure G, Alternative 1 reflects this lesser density project, and features a 400-slip marina encompassing 25 acres. For the purposes of the Alternative 1 analysis, JDI assumed 1,100 time-share units and 400 hotel rooms. Project components include:

- 400 hotel units on 34 acres
- 1,100 time-share units on 106 acres
- 143 acres of commercial uses
- 11 acres of marina support facilities
- 214 acres of parks, roads, open spaces, swim lagoons and community use areas

In addition, Alternative 1 would include the construction of a new intersection of Kealakehe Parkway with Queen Ka'ahumanu Highway, and the extension of Kealakehe Parkway to join Kuakini Highway to cross the lands of Queen Lili'uokalani Trust, and connecting with Kuakini Highway in Kailua-Kona. This is a significant off-site infrastructure improvement and is included in the agreements between the State and JDI.



Source: PBR HAWAII

Plan is conceptual only and subject to change

Figure G: Alternative 1: 400-Slip Marina

LEGEND

- TIME SHARE
- HOTEL
- RETAIL / COMMERCIAL
- MARINA RETAIL
- MARINA SUPPORT / COMMERCIAL
- MARINE SCIENCE CENTER
- COMMUNITY AREA / CULTURAL CENTER
- SWIM LAGOON
- MARINA
- UTILITIES
- PARKS & GREEN SPACE
- SHORELINE
- HARBOR ENTRANCE PARK / CULTURAL PARK

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Like the proposed project, Alternative 1 would have a strong ocean orientation, and project components that support this theme would include various water features including seawater lagoons and a marine science center. The new Alternative 1 harbor would include a yacht club, fishing club, a canoe park, and a cultural park with a focus on Hawaiian maritime cultural heritage of the voyaging canoe. The coastal area would be protected with a shoreline park with trails and public access parking for walking and shoreline fishing, and a cultural park surrounding the heiau, the cultural sites and 'Alula for community use. Additional Alternative 1 community areas would include facilities and space for community use, including programs of the Kona Kai Ola Community Foundation, which supports community programs in health care, culture, education, and employment training for the local community, especially to native Hawaiians. Like the original proposed plan, Alternative 1 includes 40 percent of the land in parks, roads, open spaces, swim lagoons and community use areas.

2.1.2 Alternative 2: Golf Course Feature

Alternative 2 was among the alternatives discussed at a community charrette in September 2003. It includes a golf course, which is a permitted use in the DLNR agreement and DHHL lease. As Figure H illustrates, an 18-hole championship golf course would occupy 222 acres on the southern portion of the project site. As with the proposed project, Alternative 2 includes an 800-slip marina on a minimum of 45 acres.

To support the economic viability of the project, other Alternative 2 uses include:

- Golf course clubhouse on three acres
- 1,570 visitor units on 88 acres fronting the marina
- 118 acres of commercial uses
- 23 acres of community uses

Community uses in Alternative 2 include an amphitheater, a canoe facilities park, a community health center, a Hawaiian cultural center and fishing village, a marine science center and employment training center. The sea water lagoon features contained in the proposed project and Alternative 1 are not included in this alternative.

2.1.3 Alternative 3: No Action

In Alternative 3, the project site would be left vacant, and the proposed marina, hotel and time-share facilities, commercial and marina industrial complexes, and community-oriented uses would not be realized.

~~The economic viability and sustainability of the project is determined by the density and uses proposed. Because JDI is obligated to develop an 800-slip marina for the State, complete road improvements, and provide various public enhancement features at its own expense, the density proposed for the income generating features of the development must be sufficient to provide an acceptable level of economic return for JDI. The market study, which is discussed in Section 4.6, reviewed various development schemes and determined that the currently proposed density and mix is the optimum to meet the anticipated financing and development cost obligations for the public features associated with the development.~~

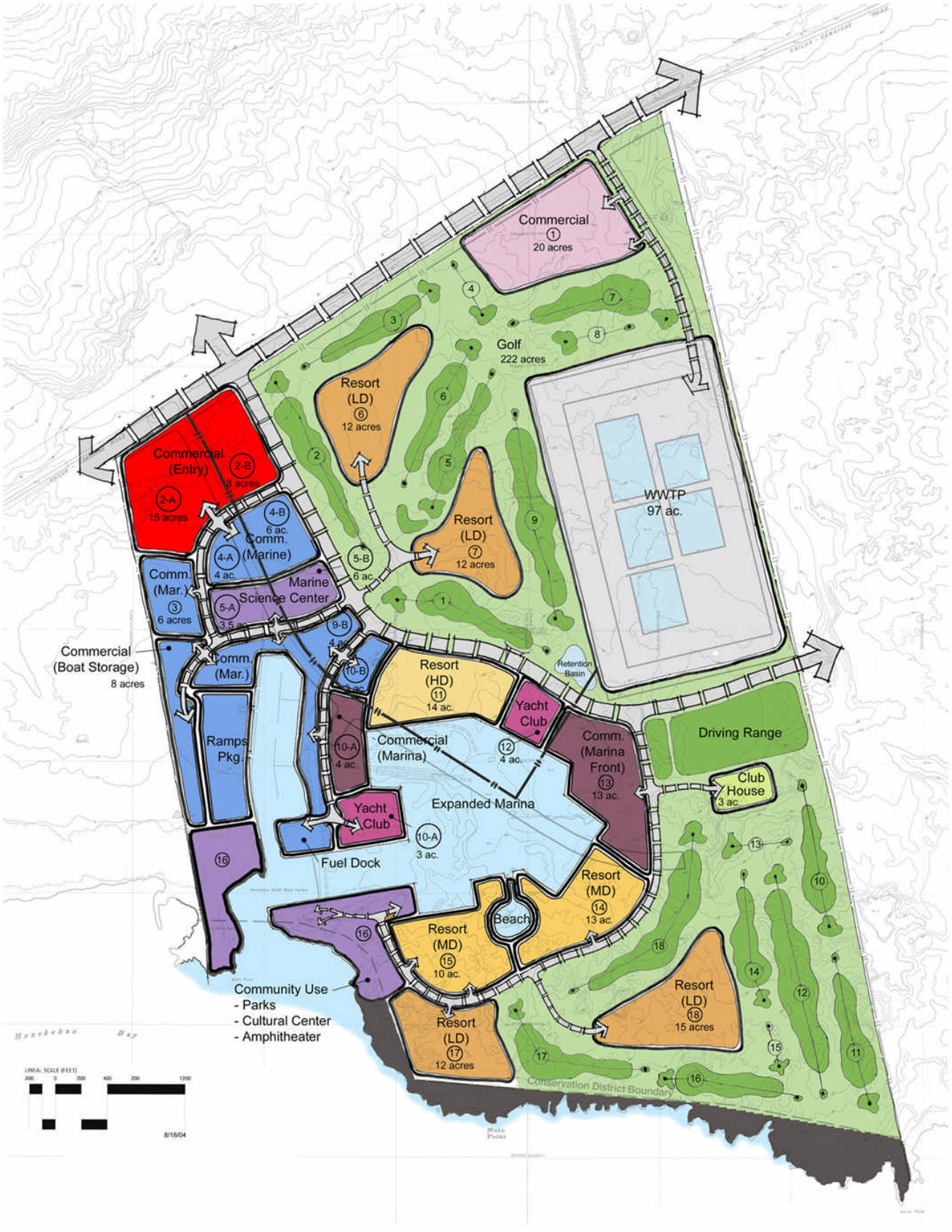

Figure H. Alternative 2: Golf Course Alternative

Legend

N E S W

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2.2 Alternatives Analysis

As discussed in Section 2.1, the proposed Kona Kai Ola project (also referred to as "proposed project") is defined by development requirements related for a marina and the related uses that would be needed to generate a reasonable rate of return that covers development costs.

Beginning with Section 2.2.1, the alternative development concepts are comparatively assessed for potential impacts that may reasonably be expected to result from each alternative. Following is an overview of the primary observations of such assessment.

Alternative 1 includes half of the State-required boat slips and 60 percent of the proposed hotel and time-share units and, due to the decreased density, this alternative would generate significantly less environmental and socio-economic impacts. A harbor water quality model found the reduction of the volume of the new marina basin by about half (approximately 25 acres) significantly improved the water circulation and quality. Further, the reduced number of boat slips would generate less boat traffic, thereby reducing congestion and the need to mitigate impacts further by the widening of the existing harbor channel.

A project with fewer hotel and time-share units and increased commercial space with a longer (14 years) absorption period would change the mix of employment offered by the project, and slightly increase the overall employment count. The public costs/benefits associated with Alternative 1 would change, compared to the proposed project, with a general increase in tax collections, and a general decrease in per capita costs. Detailed discussion of Alternative 1 potential economic impacts are provided in Section 4.6.6. Comparisons of levels of impact are presented throughout this FEIS.

While this analysis might indicate that the 25-acre marina in Alternative 1 would be the more prudent choice, the DLNR agreement establishes the minimum size and slip capacity of the marina at 45 acres and 800 slips, respectively. Amendments to the DLNR agreement would be required in order to allow Alternative 1 to proceed as the preferred alternative. Hence, selection of the preferred alternative is an unresolved issue at the writing of this FEIS.

Alternative 2, the golf course alternative, was not previously considered to be the preferred alternative primarily because market conditions at the time of project development might not likely support another golf course. Further, DHHL has a strategy goal to have more revenue-generating activities on the commercial lease lands within the project area. In addition, concerns have been expressed as to environmental impacts of coastal golf courses, including the potential adverse impact on Kona's water supply if potable water is used for golf course irrigation.

While Alternative 3, the no-project alternative, would not generate adverse impacts related to development of these lands associated with the construction and long-term operations, it would also not allow for an expanded public marina that would meet public need and generate income for the public sector. Further, the no-project alternative would foreclose the opportunity to create a master-planned State-initiated development that would result in increased tax revenue, recreation options and community facilities. Crucial privately-funded improvements, such as the marina, regional roadway and circulation improvements, and improvements to the existing wastewater treatment plant, would not be implemented. Private funds toward the development of community-oriented facilities such as parks, other recreational facilities, and public access would not be contributed.

~~Hence, the only valid alternative to the proposed project is the no-action alternative. In this alternative, the project site would be left vacant, and the proposed marina, hotel and time-share facilities, commercial and marina industrial complexes, and community-oriented uses would not be realized.~~

~~The no-project alternative would therefore not generate adverse impacts associated with the construction and long-term operations would not occur.~~

~~Likewise, the creation of a master-planned state-initiated development, resulting in increased employment, tax revenue, recreation options and community facilities, would not be created. Privately-funded improvements, such as the marina, regional roadway and circulation improvements, and improvements to the existing wastewater treatment plant, would not be implemented. Private funds toward the development of community-oriented facilities such as parks, other recreational facilities and public access would not be contributed.~~

Further, the creation of revenue-producing businesses on the DHHL property to fund homestead programs would not occur, resulting in fewer potential benefits for Hawaiians.

Hence, the agreements and leases between the State and JDI indicate that the no-action alternative is not in the public interest~~has been rejected at this time~~.

2.2.1 Impact Comparison

Grading and Excavation

The proposed project requires grading and excavation. Both actions may impact groundwater due to rainfall runoff during construction. Alternative 1 would require a significantly smaller excavation for the marina basin and would therefore carry a lesser risk of potential adverse effects on water quality. Alternative 2 would require the same basin excavation as the proposed project, and would also include extensive grading and filling to build the golf course, the latter of which would generate additional impacts. Alternative 3 would result in no change to the geography, topography and geology.

Further discussion on grading and excavation is contained in Section 3.3.

Natural Drainage

Most precipitation infiltrates into the porous ground at the site, and no significant sheet flow is likely. Alternative 1 would generate similar levels of impacts on natural drainage as those of the proposed project and thus require similar mitigation measures. The golf course in Alternative 2 would not be as porous since the site would be graded, soil would be placed, and grass and other landscaping would be grown. Sheet flow and runoff can occur on a golf course, and drainage patterns might change. Alternative 3 would result in no change to the existing natural drainage pattern. Further discussion on natural drainage is contained in Section 3.4.

Air Quality

Air quality will be affected by construction activities, as well as pollutants from vehicular, industrial, natural, and agricultural sources. Alternative 1 would generate less construction air quality impacts than the proposed project due to the reduced amount of intensive groundwork associated with the smaller marina basin and fewer long-term impacts by reducing traffic 35 and 40 percent during, respectively, AM and PM peak traffic times. Construction of Alternative 2 would result in fugitive dust and exhaust from equipment and is expected to generate the same level of air quality impact as the proposed project. Alternative 3 would result in no change to existing air quality. Further discussion on air quality is contained in Section 3.5.

Terrestrial Environment

To provide additional habitat for shorebirds and some visiting seabirds, the project proposes to construct a brackishwater pond area suitable for avian fauna, including stilts, coots and ducks. While habitat expansion is beneficial, there is also a possibility that these species may be exposed to activity that may harm them. Alternative 1 would not include a brackish water pond, but will include 5 acres of seawater features, which is 74 percent less than the 19 acres of seawater features in the proposed project. While this would reduce beneficial impacts, it would also decrease exposure to potentially harmful activity. Alternative 2 does not include the brackish water pond features, but would include drainage retention basins that would attract avian fauna and expose them to chemicals used to maintain golf course landscaping. While Alternative 3 would result in no increase in potentially harmful activity, it would also not provide additional habitat for avian fauna. Further discussion on the terrestrial environment is contained in Section 3.7.

Groundwater

Groundwater at the project site occurs as a thin basal brackish water lens. It is influenced by tides and varies in flow direction and salt content. The existing Honokōhau Harbor acts as a drainage point for local groundwater. Any impact to groundwater flow from the proposed harbor is likely to be localized. The proposed marina basin will not result in any significant increase in groundwater flow to the coastline, but rather a concentration and redirection of the existing flows to the harbor entrance.

There will be differences in the flow to the marina entrance between the proposed project and Alternative 1. Alternative 1, being smaller in size, will have less impact on groundwater flow than the proposed marina. Alternative 2 will have a similar impact to groundwater quality as the proposed project. Alternative 2 may also impact water quality by contributing nutrients and biocides to the groundwater from the golf course. Alternative 3 would result in no change in existing groundwater conditions. Further discussion on groundwater is contained in Section 3.8.1.

Surface Water

There are no significant natural freshwater streams or ponds at the site, but there are brackish anchialine pools. Surface water at the project site will be influenced by rainfall. Runoff typically percolates rapidly through the permeable ground. The proposed project will include some impermeable surfaces, which together with building roofs, will change runoff and seepage patterns.

Alternative 1 is a lower density project that is expected to have proportionally less impact on surface water and runoff patterns and less potential impact on water quality than the proposed project. Alternative 2 would have more impact on surface water quality than the proposed project due to fertilizers and biocides carried by runoff from the golf course. Alternative 3 would result in no change to surface water conditions. Further discussion on surface water is contained in Section 3.8.2.

Nearshore Environment and Coastal Waters

The potential adverse impacts to the marine environment from the proposed project are due to the construction of an 800-slip marina and the resulting inflow of higher salinity seawater and inadequate water circulation, both of which are anticipated to impair water quality to the extent of falling below applicable standards. One possible mitigation measure is to significantly reduce the size of the marina expansion.

The reduced marina size (from 45 to 25 acres) and reduced lagoon acreage in Alternative 1 are expected to result in a proportionate reduction in seawater discharging into the new harbor and increased water circulation. Alternative 2 includes the same marina basin size and is therefore subject to the same factors that are expected to adversely affect water quality.

In the existing Honokōhau Harbor, water quality issues focus on the potential for pollutants, sediments, mixing and discharge into the nearshore marine waters. Before the harbor was constructed, any pollutants entrained within the groundwater were believed to have been diffused over a broad coastline.

The water quality in the proposed harbor depends on several components. These include salinity, nutrients, and sediments that come from the ocean, rainfall runoff, water features with marine animals, and dust. The smaller project offered as Alternative 1 is expected to produce a reduced amount of pollutants and reduce the risk of adverse impact upon water quality.

It is notable that the 45-acre marina basin planned in the proposed project and Alternative 2 only becomes viable from a water quality impact standpoint if the additional brackish groundwater inflow into the new marina exceeds 60 mgd. The resulting flushing from such inflow would be expected to better maintain water quality. However, it is unclear whether 60 mgd of brackish groundwater would be available. As proposed in Alternative 1, reduction of the volume of the new marina basin by 45 percent will significantly improve the flushing and water quality because the lower volume can be flushed by the available groundwater flow.

In addition, there could be higher rainfall runoff from the Alternative 2 golf course into the harbor, because the grassed golf course will be less porous than the natural surface. The golf course will also require relatively high levels of fertilizer, biocides, and irrigation, all of which could contribute to adverse water quality impacts.

Further discussion on nearshore environment and coastal waters is contained in Section 3.9.1.

Anchialine Pools

Anchialine pools are located north of Honokōhau Harbor, and south of the harbor on the project site. The marine life in these pools is sensitive to groundwater quality, and changes due to construction and operation of the project could degrade the viability of the pool ecosystem. In the southern complex, 3 anchialine pools with a combined surface area of $20m^2$ would be eliminated due to the harbor construction in the proposed project and Alternatives 1 and 2.

Predicting the extent of change in groundwater flow is difficult if not impossible even with numerous boreholes and intense sampling. The actual flow of groundwater towards the sea is minimal today, and tidal measurements show that tide fluctuations represent more than 90 percent in actual harbor tides. The fluctuations occur simultaneous with the ocean/harbor tide, which indicate a vertical and horizontal pressure regime between bore hole 6 and the ocean and harbor. Hence, the tides alone create a mixing system that increases salinity, as the flow approaches the point of discharge which will be either the channel or the shore. Another factor that could influence groundwater quality is the increased local recharge from irrigation between the channel and shore. This will add fresh water to the lens locally but is not quantified at this time.

Quantification of these impacts, including the flow of groundwater through each pond, is therefore extremely difficult. The shallow lavas are of the pahoehoe type and have a relatively high horizontal permeability. In surface depressions or undulations, the pahoehoe lavas have a tendency to lose vertical permeability from sedimentation thus restricting water exchange within the individual pools. This is normally reflected in both the salinity and temperature and this information has been adequately studied in the pools.

Changes in groundwater quality may or may not impact biological communities in the anchialine and estuarine environment. In either case, it is important to understand these relationships to effectively manage the resource. If there is significant deviation from the baseline especially in regard to nutrients, pathogens, and toxins, a mitigation plan to determine the cause and take decisive appropriate action will be implemented.

Due to the uncertainty of changes in groundwater flow and quality due to marina construction, the variability in impacts between the proposed project and Alternatives 1 and 2 is unknown at this time. Alternative 3 would result in no change in groundwater flow. While this would eliminate the potential for adverse impacts, Alternative 3 would also continue the pattern of existing degradation related to human activity and the introduction of alien species. Further discussion on anchialine pools is contained in Section 3.9.2.

Marine Fishing Impacts

The proposed marina will increase the number of boats in the area and it is reasonable to assume that a portion of these new boats will engage in fishing activities. The increase in boats in the area would be primarily related to the marlin and tuna / pelagic fishery, coral reefs due to extractive fisheries, and SCUBA activities. The pressure on fish and invertebrate stocks is expected to increase with or without the marina. Harbor expansion provides the opportunity to address existing conditions to consolidate, focus, and fund management and enforcement activities at one location.

Compared to the proposed project, Alternative 1 would result in a 21 percent decrease in boat traffic, thereby lessening the potential for marine fishing impacts. The level of impacts in Alternative 2 would be similar to that of the proposed project. Alternative 3 would result in no change in existing marine fishing conditions, and no opportunity to address already existing pressure on fish and invertebrate stocks. Further discussion on marine fishing impacts is contained in Section 3.9.3.

Cultural and Archaeological Resources

The proposed project will integrate cultural and archaeological resources in the overall development. Archaeological sites recommended for preservation will be preserved, and cultural practices will be encouraged. Kona Kai Ola includes a canoe park, and a cultural park with a focus on Hawaiian maritime cultural heritage of the voyaging canoe. Proposed is a 400-foot shoreline setback that would serve as a buffer between the ocean and developed areas. This coastal area would be protected with a shoreline park with trails and public access parking for walking and shoreline fishing, and a cultural park surrounding the heiau, the cultural sites and ʻAlula for community use.

Alternative 1 would contain all of the cultural archaeological features and the shoreline setback area would be 400 feet in the northern portion of the site and increase to 600 feet in the southern portion. Alternative 2 would preserve cultural and archaeological resources, but does not include a 400-foot shoreline setback. Alternative 3 would result in no change to existing cultural and archaeological resources and no addition of cultural and community facilities and activities. Further discussion on cultural and archaeological resources is contained in, respectively, Sections 4.1 and 4.2.

Noise

Project-generated noise is due to construction equipment and blasting, boats, marina activities, vehicle traffic, and the Kealakehe Wastewater Treatment Plant operations. Alternative 1 would generate less noise impacts due to reduced construction activities, fewer boats, less traffic and less on-site activity. Alternative 2 would also generate less noise due to reduced traffic and less on-site activity, but noise related to the excavation of the marina basin and an increase in the number of boats would be similar to that of the proposed project. Further discussion on noise impacts is presented in Section 4.4.

Socioeconomic Impacts

The proposed project will generate an increase in de facto population of an estimated 5,321 persons due to the increase in hotel and time-share units. The estimated de facto population increase in Alternative 1 is 37 percent less, at 3,363 persons, than the proposed project. The de facto population increase in Alternative 2 is similar to Alternative 1.

Employment in the commercial components will nearly double in Alternative 1, from a stabilized level of 1,429 full-time equivalent (FTE) positions in the proposed project to 2,740 in the Alternative 1.

Under Alternative 1, the total operating economic activity at Kona Kai Ola will increase due to the added commercial space more than off-setting the fewer visitor units, moving upward from $557.6 million per year to circa $814.3 million annually. The total base economic impact resulting from development and operation of Alternative 1 will similarly be higher by between 35 and 45 percent than that of the proposed project.

Alternative 1, which has a reduced marina size of 25 acres, and fewer hotel and time-share units, would have a meaningful market standing, create significant economic opportunities, and provide a net benefit to State and County revenues. From a market perspective, a smaller Kona Kai Ola would still be the only mixed use community in the Keahole to Kailua-Kona Corridor offering competitive hotel and time-share product.

The estimated absorption periods for marketable components of Alternative 1 are generally shorter than those for the same components in the proposed project. Marina slips under Alternative 1 are estimated to be absorbed within 2 years after groundbreaking, as compared with 9 years for absorption of slips in the proposed project. Hotel rooms under Alternative 1 are estimated to be absorbed within 4 years after groundbreaking, as compared with 7 years under the proposed project. Time-share units would be absorbed within 10 years under Alternative 1, while 15 years are projected under the proposed project. Due to the planned increase in commercial facilities under Alternative 1, the absorption period of commercial space is estimated at 14 years, as compared with 8 years for absorption of such facilities under the proposed project.

The State and County will still both receive a net benefit (tax receipts relative to public expenditures) annually on a stabilized basis under the Alternative 1. The County net benefits will be some $12.2 million per year under the Alternative 1 versus $14.9 million under the proposed project. The State net benefits will increase under the Alternative 1 to about $37.5 million annually, up substantially from the $11.4 million in the proposed project.

Due to the lower de facto population at build-out, the effective stabilized public costs for both the State and County will decline meaningfully under the Alternative 1, dropping from $7.7 million annually for the County and $36.5 million for the State, to $4.9 million and $23 million per year, respectively.

Alternative 3 would result in no increase in de facto population and improvement to economic conditions. Further discussion on social and economic impacts are contained in, respectively, Sections 4.5 and 4.6.

Vehicular Traffic

The proposed project will impact the nearby road network that currently is congested during peak traffic times. The proposed project includes roadway improvements that would reduce the impact and improve roadway conditions for the regional community.

Alternative 1 includes the same roadway system improvements as the proposed project, yet would reduce vehicular traffic by 35 percent when compared to the proposed project. Alternative 2 would have similar traffic conditions and roadway improvements as Alternative 1. Alternative 3 would result in no increase in traffic and no roadway improvements.

Marina Traffic Study

The increase in boat traffic due to the proposed 800-slip marina would cause entrance channel congestion during varying combinations of existing and new marina peak traffic flow. Worst case conditions of active sport fishing weekend and summer holiday recreational traffic result in traffic volumes exceeding capacity over a short afternoon period. Mitigation to address boat traffic in the proposed project include widening the entrance channel, traffic control, implementation of a permanent traffic control tower, or limiting vessel size.

Alternative 1 would result in a 21 percent reduction in boat traffic congestion under average existing conditions and ten percent reduction during peak existing conditions. The reduction to 400 slips also reduces the impacts of congestion at the entrance channel, thereby reducing the need for any modifications to the entrance channel.

Alternative 2 would have the same level of boat traffic as the proposed project. Alternative 3 would not meet the demand for additional boat slips and would not generate additional boat traffic. Further discussion on marina traffic is contained in Section 4.8.

Police, Fire and Medical Services

The proposed project will impact police, fire and medical services due to an increase in de facto population and increased on-site activity. Alternatives 1 and 2 would have similar levels of impact as the proposed project due to increased on-site activity. Further discussion on police, fire and medical services are contained, respectively, in Sections 4.10.1, 4.10.2 and 4.10.3.

Drainage and Storm Water Facilities

The proposed project will increase drainage flows, quantities, velocities, erosion, and sediment runoff.

Alternative 1 involves a reduction of the project density that would reduce storm runoff from the various land uses due to a reduction in impervious surfaces associated with hotel and time-share development and to the creation of more open space. However, roadway areas will increase by about 30 percent in Alternative 1. Storm runoff from proposed streets would therefore increase; thus requiring additional drainage facilities and possibly resulting in no net savings. The golf course in Alternative 2 may also change drainage characteristics from those of the proposed project and may not reduce impacts. Alternative 3 would result in no change in existing conditions and no improvements to drainage infrastructure. Further discussion on drainage and storm water facilities is contained in Section 4.10.5

Wastewater Facilities

The proposed development is located within the service area of the Kealakehe WWTP and a sewer system will be installed that connects to the WWTP. The sewer system will be comprised of a network of gravity sewers, force mains, and pumping stations which collect and convey wastewater to the existing Kealakehe WWTP. Project improvements will incorporate the usage of recycled / R1 water. Improvements implemented by the proposed project will also accommodate the needs of the regional service population.

Alternative 1 would generate approximately 10 percent less wastewater flow than the proposed project. Wastewater flow in Alternative 2 is undetermined. Alternative 3 would result in no additional flow, as well as no improvements that will benefit the regional community. Further discussion on wastewater facilities is contained in Section 4.10.6.

Potable Water Facilities

The proposed project average daily water demand is estimated at 1.76 million gallons per day. Existing County sources are not adequate to meet this demand and source development is required. The developer is working with DLNR and two wells have been identified that will produce a sustainable yield that will serve the project. These wells will also serve water needs beyond the project.

Alternative 1 would result in net decrease of about five percent of potable water demand. Alternative 2 may have a lower water demand than the proposed project as long as potable water is not used for irrigation. Alternative 3 would result in no additional flow, as well as no source development that will benefit the regional community. Further discussion on potable water facilities is contained in Section 4.10.8.

Energy and Communications

Regarding Alternative 1, preliminary estimates for electrical, telecommunications, and cable resulted in a net demand load that remains similar to the proposed project. Further discussion on energy and communications is contained in Section 4.10.9.1.

The proposed project will increase the demand for electrical energy and telecommunications. The demand would be reduced in Alternative 1 because the number of boat slips and units would decrease. Similarly, Alternative 2 would have fewer units than the proposed project and therefore reduce energy demands. Further reduction in energy demand for either alternative could be achieved by using seawater air conditioning (SWAC) and other energy reduction measures, as planned by the developer. Further discussion on energy and telecommunications is contained in Section 4.10.9.2.

Water Features and Lagoons

The proposed project includes a brackishwater pond, lagoons, and marine life exhibits supplied by clean seawater. The water features in Alternative 1 would significantly decrease by 74 percent from 19 acres in the proposed project to five acres in Alternative 1. This decrease in water features would result in a corresponding decrease in water source requirements and seawater discharge. Alternative 2 does not include the seawater features. Alternative 3 would result in no additional demand for water source requirements and seawater discharge.

2.2.2 Conformance with Public Plans and Policies

State of Hawai'i

Chapter 343, Hawai'i Revised Statutes

Compliance with this chapter is effected, as described in Section 5.1.1 in regard to the proposed project and the alternatives discussed.

- State Land Use Law, Chapter 205, Hawai'i Revised Statutes

  The discussion in Section 5.1.2 is directly applicable to Alternative 1, the proposed project. Alternative 1 will involve a setback of 400 feet that increases to 600 feet along the southern portion of the project site's shoreline area. Alternative 2 does not provide for such a setback, but may still require approvals from DLNR for cultural, recreational, and community uses and structures within the Conservation district.

- Coastal Zone Management Program, Chapter 205A, Hawai'i Revised Statutes

  Recreational Resources:

  In addition to the discussion of consistency with the associated objective and policies, as described in Section 5.1.3, the reduction from the proposed project's 800-slip marina to a 400-slip marina under Alternative 1 will still expand the region's boating opportunities and support facilities. The existing harbor entrance will still be utilized under this alternative; however, potential risks relating to boat traffic and congestion in the marina entrance area will be reduced significantly. The 400-600 foot shoreline setback, public parks, trails, cultural areas, community facilities, and marine science center remain important recreational components under Alternative 1.

Alternative 2 includes a golf course component, which would add a more passive recreation to the active and social components, such as boating, fishing, swimming, trails, walkways, parks, marine life, educational and interactive areas that are also part of the project. The golf course would enhance the range of leisure and recreational opportunities offered at Kona Kai Ola.

Alternative 2, like the proposed project, will expand the region's boating opportunities and support facilities through its 800-slip marina. However, the potential adverse impacts of increased boat traffic from the size of the marina are significant enough to offset the benefits of increased boating opportunities.

Coastal Ecosystems:

The discussion in Section 5.1.3 is directly applicable to Alternative 1.

Alternative 1 not only reduces the number of slips proposed by 50 percent, but it also reduces the size of the marina from 45 acres to 25 acres. The 25-acre marina will increase the body of water within the existing harbor, but to a significantly lesser extent than the proposed project's estimated increase, which is also applicable to the 45-acre size that is proposed for the marina under Alternative 2.

The findings of the Harbor Water Quality Modeling Study conclude that a reduction in the size of the harbor expansion is an alternative that will mitigate the risk of significant impacts upon water quality within the marina and existing harbor. Accordingly, the reduction in both the number of slips and the size of the marina basin under Alternative 1, in combination with proper facilities design, public education, and enforcement of harbor rules and regulations, would result in fewer long-term impacts to water quality and coastal ecosystems. Short-term (construction-related) impacts would likely remain the same although the reduction in the total acreage of excavation is expected to result in a shorter duration of such impacts.

In addition to its 800-slip marina and potential adverse impacts upon water quality and the marine environment, Alternative 2 includes a golf course component, which has the potential to impact coastal ecosystems by increasing the nutrient loading in surface runoff and groundwater and also by introducing pesticides, herbicides, and other chemicals common in golf course use and management into the nearshore waters surrounding the project site.

Economic Uses

Although reduced in the number of slips, the smaller marina under Alternative 1 will nevertheless serve public demand for more boating facilities in West Hawai'i and is consistent with the objective and policies and discussion set forth in Section 5.1.3. The economic impacts of Alternative 2, while comparable to those of the proposed project's marina development, are notably marginal as to the golf course component, based on the marketability analysis that indicates a condition of saturation within the region.

Coastal Hazards

The discussion and considerations set forth in Section 5.1.3 are also applicable to Alternatives 1 and 2 and indicate compliance with the objective and policies addressed. Tsunami risks mainly affect the large shoreline setback area that is proposed for the project and Alternative 1. Alternative 2 projects a transient accommodation site that is partially within the tsunami hazard zone and thus carries a higher hazard risk. However, the essential requirement for these alternatives, as well as the proposed project, is a well-prepared and properly implemented evacuation plan.

Beach Protection

Discussion and considerations set forth in Section 5.1.3 are also applicable to Alternatives 1 and 2 and indicate compliance with the objective and policies addressed. Alternative 1 and, to a lesser extent, Alternative 2, will retain the shoreline area in its natural condition.

Similar to the proposed project, Alternative 1 provides for a shoreline setback of considerable width within which no structure, except for possible culturally-related structures, would be allowed. Alternatives 1 and 2 will thus be designed to avoid erosion of structures and minimize interference with natural shoreline processes.

Marine Resources

The discussion in Section 5.1.3 is also applicable to Alternative 1 which is described to be an alternative that is specifically projected to mitigate anticipated adverse impacts on water quality and the marine environment that might otherwise result from the original harbor design and scale, which is also incorporated in Alternative 2 . The reduced marina size under Alternative 1 is projected to meet water quality standards and enable greater compliance with the objective and policies addressed in this section.

Alternative 2 includes a golf course component and thus the potential to adversely impact marine resources by increasing the nutrient loading in surface runoff and groundwater and also by introducing pesticides, herbicides, and other chemicals common in golf course use and management into the nearshore waters surrounding the project site.

Hawai'i State Plans, Chapter 226, Hawai'i Revised Statutes

Section 226-4 (State goals), 5 (Objectives and policies for population, and 6 (Objective and policies for economy in general):

The discussion in Section 5.1.4 is applicable to Alternatives 1 and 2, in addition to the proposed project. These development concepts generally conform to the goals, objectives, and policies set forth in these sections because they will provide some degree of economic viability, stability, and sustainability for future generations. Kona Kai Ola will convert essentially vacant land into a mixed-use development with a distinctive marina and boating element, providing a wide range of recreational, business, and employment opportunities to the community.

Section 226-8 Objective and policies for the economy – the visitor industry:

Alternatives 1 and 2 will be consistent with the State's economic objective and policies relating to the tourism industry for the same reasons that are discussed in regard to the proposed project in Section 5.1.4. They will incorporate JDI's commitment to sustainability principles in the planning and design of the development concepts in Alternatives 1 and 2. Although the total hotel and time-share unit count is reduced to approximately 1,500 in Alternatives 1 and 2, the transient accommodations component of these alternatives will still further the State's objective and policies for increased visitor industry employment opportunities and training, foster better visitor understanding of Hawai'i's cultural values, and contribute to the synergism of this mixed-use project concept that addresses the needs of the neighboring community, as well as the visitor industry.

Section 226-11 Objectives and policies for the physical environment: land-based, shoreline and marine resources:

Alternative 1 is expected to involve less potential adverse impacts upon these environmental resources than the proposed project. Likewise, and Alternative 2 would have less adverse impact because of its reduction in the size of the marina and in the total hotel and time-share unit count. Alternative 1 carries less potential risk to water quality and related impacts upon the marine environment and anchialine pool ecosystems. Although approximately three anchialine pools are expected to be destroyed, the great majority of pools will be preserved within and outside of the proposed 400-foot shoreline setback.

The golf course component in Alternative 2 has the potential to impact marine resources by increasing the nutrient loading in surface runoff and groundwater and also by introducing pesticides, herbicides, and other chemicals common in golf course use and management into the marina basin and nearshore waters surrounding the project site. It also has the potential to adversely affect the anchialine pools by introducing the chemicals into the pond systems.

Section 226-12 Objective and policies for the physical environment: scenic, natural beauty, and historic resources:

The discussion in Section 5.1.4 is directly applicable to Alternative 1 and describes the compliance with the objective and policies addressed.

The golf course component of Alternative 2 would create a park-like view that would potentially enhance the beauty of the project site and surrounding areas when considered in combination with the existing rugged natural beauty of the area.

Just as with the proposed project, Alternatives 1 and 2 would also be designed to blend with the natural terrain and to honor and protect the cultural history, resources, and practices of these lands.

Section 226-13 Objectives and policies for the physical environment: land, air and water quality:

As stated above, because of the reduction in both the number of slips and the size of the marina basin, with proper facilities design, public education and enforcement of harbor rules and regulations, Alternative 1 is anticipated to cause fewer long-term impacts to water quality than either the proposed project or Alternative 2. Based on the findings of the Harbor Water Quality Modeling Study, water quality resulting from a reduced marina basin size as proposed under Alternative 1 is expected to be similar to existing conditions.

As previously noted, Alternative 2 has the potential to adversely impact water quality by increasing the nutrient loading in surface runoff and groundwater by introducing pesticides, herbicides and other chemicals common in golf course development and maintenance into the marina basin and nearshore waters surrounding the project site.

Section 226-14 Objectives and policies for facility systems - general:

Alternatives 1 and 2 will conform to the objective and policies of this section on the grounds that are discussed in regard to the proposed project in Section 5.1.4. The master-planning and phasing of the project concepts under these alternatives will be coordinated with associated public and private infrastructural planning and related private and public infrastructural financing. The cost of the marina construction and project-related infrastructure is to be borne by the developer, resulting in considerable savings for the public. In addition, the projected lease revenue from these public lands will provide additional public benefits by establishing a revenue stream for capital improvements and maintenance of a range of State facilities.

Section 226-15 Objectives and policies for facility systems - solid and liquid wastes:

In addition to the developer's commitment to sustainable development design, the project will involve upgrades to the County of Hawai'i's Kealakehe Wastewater Treatment Plant to meet current needs, as well as the project's future needs. This commitment is applicable to Alternatives 1 and 2, as well as the proposed project that is discussed in Section 5.1.4.

Section 226-16 Objectives and policies for facility systems – water:

The discussion of water conservation methods and the need to secure additional potable water sources in Section 5.1.4 is also applicable to Alternative 1 and demonstrates conformity to the objective and policies for water facilities. Alternative 2 involves greater irrigation demands in regard to its golf course component and greater potable water demands for human consumption than those for Alternative 1. Alternative 2 is expected to face more serious challenges in securing adequate and reliable sources of water.

Section 229-17 Objectives and policies for facility systems – transportation:

Alternatives 1 and 2 will conform to this objective and policies because they will present water transportation opportunities, including the possible use of transit water shuttles to Kailua-Kona, as described in regard to the proposed project in Section 5.1.4.

Section 226-18 Objectives and policies for facility systems – energy:

Alternatives 1 and 2 conform to these objective and policies through the use of energy efficient design and technology and commitment to the use and production of renewable energy to serve the project's needs. Solar energy production, solar hot water heating, and the use of deep cold seawater for cooling systems are currently identified as means of saving substantial electrical energy costs for the community and the developer.

Section 226-23 Objectives and policies for socio-cultural advancement – leisure:

Alternative 1 conforms to this objective and related policies for the reasons offered in Section 5.1.4 in regard to the proposed project. Alternative 1 will be of greater conformity with the policy regarding access to significant natural and cultural resources in light of the 400-600 foot shoreline setback that has been designed for this alternative.

Although it does not propose the considerable shoreline setback that is planned for Alternative 1, Alternative 2 is consistent with this objective and related policies in incorporating opportunities for shoreline-oriented activities, such as the walking trails. In addition, the golf course component adds a more passive recreation alternative to the active and social components, such as boating, fishing, swimming, trails, walkways, parks, marine life educational and interactive areas that are also part of the project. The golf course would enhance the range of leisure and recreational opportunities offered at Kona Kai Ola.

Section 226-25 Objectives and policies for socio-cultural advancement-culture:

The discussion in Section 5.1.4 is relevant to Alternatives 1 and 2 and demonstrate their conformity the objective and policies of this section.

Both alternatives involve the preservation and protection of cultural features that have been identified by the Cultural Impact Assessment and archaeological studies for the project area. Both provide for public shoreline access, and both will continue the policy of close consultation with the local Hawaiian community and cultural and lineal descendants in the planning of cultural resource preservation and protection.

Section 226-103 Economic priority guidelines:

Alternatives 1 and 2 conform to these guidelines for the same reasons that are set forth in Section 5.1.4. They involve private investment in a public project that will create economic diversification through a mix of marina, industrial, commercial, visitor, and cultural facilities. This presents a wide range of entrepreneurial opportunities, long-term employment opportunities, and job training opportunities.

Section 226-104 Population growth and land resources priority guidelines:

As described in Section 5.1.4, the policy support for the proposed project also extends to the similar development concepts considered in Alternatives 1 and 2. Those alternatives conform to the guidelines of this section because they involve an urban development under parameters and within geographical bounds that are supported by the County's General Plan, a preliminary form of the Kona Community Development Plan, the County's Keahole to Kailua Regional Development Plan, and the reality of being located along the primary commercial/industrial corridor between Keahole Airport and Kailua-Kona. As with the proposed project, the development concepts of Alternatives 1 and 2 are essentially alternatives for the implementation and "in-filling" of the urban expansion area in North Kona.

DHHL Hawai'i Island Plan

This 2002 plan projects DHHL's Honokōhau makai lands for commercial use. As compared to the proposed project and Alternative 2, Alternative 1 presents an expanded commercial component that provides greater compliance with the plan, while addressing certain beneficiaries' concerns about the scale of the marina originally required in the Project. Alternative 2 also conforms to the recommended commercial uses in the makai lands but to a lesser degree than Alternative 1 because of its more limited commercial component. Like the proposed project, its marina size and number of slips raise environmental issues, as more specifically discussed in Part 3, and community concerns.

County of Hawai'i General Plan

HCGP Section 4 – Environmental Quality Goals, Policies and Courses of Action:

Alternative 1 is consistent with this section. It presents a reduction in both the number of slips and the size of the marina basin that, in combination with proper facilities design, public education and enforcement of harbor rules and regulations, would result in very few long term impacts to water quality. Based on the findings of the Harbor Water Quality Modeling Study, water quality would remain similar to existing conditions.

Alternative 2 is the least consistent with this section. In addition to the potential significant impacts of its 800 slip marina basin, its golf course component has the potential to adversely impact marine resources by increasing the nutrient loading in surface runoff and groundwater and also by introducing pesticides, herbicides and other chemicals common in golf course use and management into the nearshore waters surrounding the project site. It also has the potential to adversely affect the anchialine pools beyond their current conditions by introducing such substances into the pool systems.

HCGP Section 7 – Natural Beauty Goals and Policies:

Alternative 2 conforms to some degree with this section. Its golf course component would create a park-like view that would potentially enhance the beauty of the project site and surrounding areas when considered in combination with the existing rugged natural beauty of the area, as demonstrated in other makai golf courses within the region.

HCGP Section 8 – Natural Resources and Shoreline:

Alternative 1 is most consistent with the goals and policies of this section. It would require considerably less marina excavation than the proposed project and Alternative 2 and would reduce the potential risk of long-term adverse impacts to water quality. Based on the findings of the Harbor Water Quality Modeling Study, water quality would remain similar to existing conditions with the degree of reduction in marina basin size that is proposed under Alternative 1. This reduction is also expected to reduce potential impacts upon anchialine pools and their ecosytems, as well as shoreline and marine resources that are affected by water quality. Alternative 1 also retains the shoreline preservation and protection concepts that are proposed in and described for the Project.

HCGP Section 10 – Public Facilities Goals and Policies:

The discussion in Section 5.2.1. in relation to the proposed project is applicable to Alternatives 1 and 2. Improvements to public facilities are are integral to the Kona Kai Ola development. The provision of additional boat slips and numerous road improvements, including a makai extension of Kuakini Highway south to Kailua-Kona are incorporated into plans for the project's development. In light of these elements, Alternatives 1 and 2 are consistent with the goals and policies of this section.

HCGP Section 11 – Public Utility Goals, Policies:

As with the proposed project, Alternatives 1 and 2 are consistent with the goals and policies of this section, based on the relevant grounds set forth in Section 5.2.1. The developer is committed to design, fund, and develop environmentally sensitive and energy efficient utility systems to the extent possible, as described previously in Part 5. Its master planning provides for the coordinated development of such systems with the objective of achieving significant savings for the public. As previously-mentioned example, the project development involves the upgrading of the Kealakehe Wastewater Treatment Plant.

HCGP Section 12 – Recreation:

Alternative 1 is consistent with the goals, policies, and courses of action for North Kona in this section.

Although the number of slips is reduced under Alternative 1, the region's boating opportunities and support facilities will still be expanded. The existing marina entrance would still be utilized under this alternative. However, concerns relating to increased activity leading to increased congestion in the marina entrance area would be mitigated to a certain extent. The 400-600 foot shoreline setback, public parks, trails, cultural areas, community facilities and marine science center remain important components of Alternative 1.

The golf course component of Alternative 2 would add a more passive recreation to the active and social components, such as boating, fishing, swimming, trails, walkways, parks, marine life, educational and interactive areas that are also part of the project. The golf course would enhance the range of leisure and recreational opportunities offered at Kona Kai Ola. Alternative 2 is also considered to be consistent with this section.

HCGP Section 13 and 13.2 – Transportation:

The reduced marina component under Alternative 1 will still provide transportation opportunities and provide for possible use of transit water shuttles to Kailua-Kona, although to a lesser degree than under the proposed project and Alternative 2 . However, in each scenario, internal people-movers are planned, and numerous roadway improvements are planned for coordination with public agencies, including but not limited to the construction of the Kuakini Highway extension between Honokōhau and Kailua-Kona. Accordingly, both Alternatives 1 and 2 are consistent with the goals, policies, and courses of action for North Kona under these sections of the General Plan.

HCGP Section 14.3 – Commercial Development:

For the reasons presented in the discussion under Section 226-104 of the State Plan, the planned commercial component under Alternatives 1 and 2 are consistent with this section.

HCGP Section 14.8 – Open Space:

Alternatives 1 and 2 are consistent with the goals and policies of this section. Alternative 1 provides a considerable (400-600 foot) shoreline setback along the entire ocean frontage of the project site as a means of protecting the area's scenic and open space resources, as well as natural and cultural resources. Although it does not incorporate the shoreline setback planned in Alternative 1, Alternative 2 provides a golf course component would contribute to the amount of open space that is currently proposed and allow additional view corridors to be created.

Community Development Plans

Community development plans are being formulated for different regions in the County in order to supplement the County's General Plan. The Kona Kai Ola project is located in the Kona Community Development Plan (CDP) area. Maps associated with the preliminary work phases

of the Kona CDP include the Kona Kai Ola project site within the "Preferred Urban Growth" boundary of the North Kona district. The Kona CDP process is guided by a Steering Committee composed of a broad cross-section of the community. The Steering Committee will eventually complete its work and recommend the CDP's adoption.

After the DEIS was published, the Kona CDP has progressed to the development of plans for the major urban growth corridor north of Kailua-Kona. The Kona CDP has produced a draft plan showing a transit oriented development that includes a midlevel public transit corridor along the mauka residential elevation, and a makai transit corridor that runs along a proposed new frontage road just makai and parallel to Queen Kaahumanu Highway. The development plan for Alternative 1 includes the Kuakini Highway as part of this proposed frontage road and transit line from Kailua Kona to the Kealakehe area, along with a transit stop at Kona Kai Ola. The Alternative 1 plan also includes a road that could be extended to be part of the proposed frontage road should it be approved and implemented. In addition, the Kona CDP has continued to emphasize the principles of smart growth planning with mixed use urban areas where people can live, work, play and learn in the same region. Kona Kai Ola has been specifically designed to be consistent with this policy in order to provide a stable employment base close to where people live in the mauka residential areas already planned for DHHL and HHFDC lands.

It should be noted that currently and over the years, the 1990 Keāhole to Kailua Development Plan (K-to-K Plan) guides land use actions by the public and private sectors. It is intended to carry out the General Plan goals and policies related to the development of the portion of North Kona area, including the Kona Kai Ola site. The "Preferred Growth Plan" of the Keāhole to Kailua Development Plan identifies the project site as a new regional urban center to include commercial, civic, and financial business related uses, an expanded "Harbor Complex," a shoreline road, and a shoreline park. The proposed project and the development concepts in Alternatives 1 and 2 are therefore consistent with the recommendations in the Keāhole to Kailua Development Plan.

Hawai'i County Zoning

As shown on Figure AA, the project site is zoned "Open". Under Section 25-5-160 of the Hawai'i County Code, "The O (Open) district applies to areas that contribute to the general welfare, the full enjoyment, or the economic well-being of open land type use which has been established, or is proposed. The object of this district is to encourage development around it such as a golf course and park, and to protect investments which have been or shall be made in reliance upon the retention of such open type use, to buffer an otherwise incompatible land use or district, to preserve a valuable scenic vista or an area of special historical significance, or to protect and preserve submerged land, fishing ponds, and lakes (natural or artificial tide lands)".

Some of the proposed uses at Kona Kai Ola are permitted uses in the Open zone such as:

- Heiau, historical areas, structures, and monuments;
- Natural features, phenomena, and vistas as tourist attractions;
- Private recreational uses involving no aboveground structure except dressing rooms and comfort stations;

- Public parks;
- Public uses and structures, as permitted under Section 25-4-11.

In addition to those uses permitted outright, the following uses are permitted after issuance of a use permit:

- Yacht harbors and boating facilities; provided that the use, in its entirety, is compatible with the stated purpose of the O district.
- Uses considered directly accessory to the uses permitted in this section shall also be permitted in the O district.

The proposed time-share and hotel units and commercial uses would not be consistent with the zoning designation of "Open". Project implementation therefore requires rezoning of portions of the project to the appropriate zoning category or use permits for certain uses.

Special Management Area

As shown in Figure AB, the entire project area up to the highway is within the coastal zone management zone known as the Special Management Area ("SMA"). At the County level, implementation of the CZM Program is through the review and administering of the SMA permit regulations. Kona Kai Ola complies with and implements the objectives and policies of the Coastal Zone Management (CZM) Program, and a full discussion is provided in Section 5.1.3. The development concepts in the proposed project and Alternatives 1 and 2 will be subject to applicable SMA rules and regulations.

Attachment 2

The increased level of fisheries knowledge has spawned an atmosphere of stewardship in the general charter-boat fishing community. With catch and release programs returning upwards of 40 percent of the Kona catch back to the ocean there is an obvious awareness that the value of catching the fish is often far greater than the value of selling it. It is ~~recommended~~ proposed that facilities and programs to foster continued stewardship, fisheries science, tracking of all fish catch, and educational programs be implemented in the design of the new marina facilities.

The proposed marina, marina support facilities, public marina promenade, fishing club, and marine science center will provide a venue for implementing the following efforts:

- Efforts to promote tag and release will be fostered through public education and the implementation of more "Catch and Release – Only" tournaments.
- Promote management through catch limits to possibly include slot weight catch limits, ~~ie.~~i.e. must tag & release animals between 250–950 pounds
- Promote various other stewardship measures relating to fisheries conservation.

~~3.9.5~~3.9.4 Marine Mammals and Sea Turtles

In addition to water quality, which is discussed in Section 3.9.1.3, other environmental impacts that may affect marine mammals and sea turtles include noise and vessel collisions. The following sections describe existing conditions, potential impacts and suggested mitigations to prevent negative impacts to marine mammals and sea turtles from noise and vessel collisions.

~~3.9.5.1~~3.9.4.1 ~~Existing Conditions~~Affected Environment

A number of marine mammal and turtle species are found in Hawaiian waters near the Kona Kai Ola project site. Detailed information on the abundance, behavior, threats to the species, hearing ability and vocalization data is provided for all species in Appendix S. Data on the most prevalent endangered species and species of particular interest are summarized here.

Humpback Whales: The population of h~~H~~umpback whales (*Megaptera novaeangliae*) around Hawai'i was estimated to be between ~~are mammals and belong to the baleen whale suborder, *mysticeti*. An estimated~~ 4,500-6,500 in 2000 ~~whales migrate between subpolar Alaska and Hawai'i each year~~ (Mobley et al 2001). The population growth rate between 1993 and 2000 is estimated to be seven percent indicating that the population is recovering from its dramatic reduction due to commercial whaling. It is worth noting that this is considered a high rate of increase for a mammalian species.

The highest densities of animals are found within the 100 fathom isobath. ~~and seek refuge in shallow waters close to shore.~~ Most humpbacks off Hawai'i are found north of Honokōhau in the waters of the Hawaiian Islands Humpback Whale National Marine Sanctuary. Nevertheless, they are commonly seen off Honokōhau in winter months. Humpbacks are not deep diving animals. Whales in Hawai'i typically dive to less than 100 feet, although occasional deeper dives are possible (Hamilton et al. 1997)The whales breed and give birth while in Hawai'i during the winter months, and migrate north to feed each spring.

~~Humpback whales found in Hawai'i's waters are part of a global population of Humpback whales that was reduced by over 250,000 individuals, or 90 percent, due to hunting (Johnson et al 1984). In 1966, the International Whaling Commission instituted a moratorium on all hunting of whales globally, and populations have begun to rebound. The North Pacific population of humpback whales, with a population of approximately 15,000 prior to hunting, is recovering from an estimated low of 1,000 individuals (Rice 1978, Johnson et al 1984). Humpback whales are also protected under the Federal Endangered Species Act. It is estimated that Hawai'i's population of Humpback whales is growing by 7% annually (Mobley et al 2001).~~

Congress designated the Hawaiian Islands Humpback Whale National Marine Sanctuary (HINMS) on November 4, 1992, and was followed by the Governor of Hawai'i's formal approval in 1997. The Sanctuary's purpose includes protecting humpback whales and their habitat within the Sanctuary, educating the public about the relationship of humpback whales to the Hawaiian Islands marine environment, managing the human uses of the Sanctuary, and providing for the identification of marine resources and ecosystems of national significance for possible inclusion in the Sanctuary. The sanctuary is approximately four nautical miles north of Honokōhau Harbor.

~~While waters surrounding the main Hawaiian islands constitute one of the world's most important North Pacific humpback whale habitats (Calambokidis et al. 1997), the Sanctuary actually encompasses five noncontiguous marine protected areas across the Main Hawaiian Islands, totaling 1370 square miles. Almost half of this area surrounds the islands of Maui, Lāna'i and Moloka'i. Smaller areas are designated on the North shore of Kaua'i, North and Southeast shores of O'ahu, and Hawai'i's Kona Coast. On Hawai'i's Kona Coast, the Sanctuary encompasses the entire northwest-facing coast, consisting of submerged lands and waters seaward of the shoreline to the 100-fathom (183 meter) isobath from 'Upolu Point southward to Keāhole Point, which is approximately four nautical miles north of Honokōhau Harbor.~~

Whales have very sensitive hearing, so any loud underwater sound has ~~may have~~ the potential to disturb these animals. ~~Vessel collisions are also a concern with whales.~~ Playback experiments have estimated that humpback whales will respond to biologically meaningful sound at levels as low as 102 dB re 1 µPa, a level that is similar to background ambient noise (Frankel et al. 1995). Increases in vessel numbers will lead to an increase in noise from operating boats. However, even at its greatest predicted increase, the median sound level from active boats is not expected to raise sound levels to an intensity that would be considered an impact (Level B take) to marine mammal population (See Appendices T-2 and T-3). Humpback whale song ranges from 20 Hz to over 10,000 Hz, with most acoustic energy typically concentrated in the 100-1000 Hz range. This vocal production and the anatomy of their inner ear indicate that these animals are most sensitive to low-frequency sound (Ketten 1992).

Numerous studies have shown that human activity can affect humpback whale behavior, including vessel activity (Bauer 1986; Norris 1994; Corkeron 1995; McCauley et al. 1996; Scheidat et al. 2004), oceanographic research (Frankel and Clark 2000; Frankel and Clark 2002), and sonar (Miller et al. 2000; Fristrup et al. 2003). If the humpback whale population continues to expand at its present rate (8%/year) it can be expected that greater numbers of whales will extend into waters off the Kona Coast. This is likely to increase the demand for whale watching vessels from the new harbor and this increase will have a negative impact on the whale population expansion. The increase in both the number of vessels and number of whales increases the chance for collisions.

Vessel collisions are also a major concern. The majority of whale strikes occur~~red~~ where whales and boats are most common, such as in ~~and boats watching are common as in~~ shallow waters between Lāna‘i and Maui. In a recent study, three of ~~conducted by NMFS on~~ 22 ~~27~~ recorded whale-vessel collisions ~~strikes~~ in the main Hawaiian Islands ~~, only two were recorded~~ occurred off the Kona coast. (Lammers et al. 2003). That study also found that 14 of the 22 collisions were reported between 1995 and 2003. This observed increase may result from more awareness of the issue, or from the greater number of both whales and vessels in Hawaiian waters. In Hawai‘i, data from 1972 to 1996 reveal at least six entanglements of humpback whales in commercial fishing equipment (Mazzuca et al. 1998). These data also indicate an increasing trend of entanglement since 1992 and a three-fold increase in death and entanglement occurrences related to human activity in 1996.

It is highly unlikely that humpback whales will approach to within the Level A or Level B impact “take” zones created by the explosive blasts of harbor construction. However, the sounds generated by these explosions will be within the frequency hearing range of humpback whales and could potentially be heard by whales between Kona and Maui. Modeling predicts that the maximum sound level two miles offshore the site is less than 150 dB re1 µPa, which is less than the threshold for Level B impacts. As the explosions are planned to occur daily for up to 9 months, the cumulative impact of this noise must be considered if construction is anticipated when whales are expected in the area (December 15 – March 30).~~In one instance, a fishing boat was pulling in a catch and was lifted by a whale. In the other instance, a whale was struck by a dive boat heading towards its diving spot.~~

Dolphins: A number of dolphin species are found in the waters near Honokōhau Harbor. Detailed information on all of these can be found in Appendix S. Spinner dolphins (*Stenella longirostris*) are regularly seen in shallow water and in close proximity to the project site. ~~Spinner dolphins (*Stenella longirostris*), often inhabit waters within Honokōhau Bay and at times intentionally congregate near the harbor channel to take advantage by bow-riding outgoing vessels. "Spinners" common name stems from their habit of leaping clear of the water and twirling in the air.~~ They are the smallest dolphins typically seen in Hawai‘i, with a mature size of 6 feet in length and 160 pounds.

Spinners school in pods of a few animals to ~~100~~ 180 or more, with pod sizes of 1-20 being most common (Östman-Lind et al. 2004). They ~~and show community behavior when~~ feed~~ing in~~ on mesopelagic fish, squid and shrimp in deep water at night, and rest in nearshore shallow waters during the day (Norris and Dohl 1980; Benoit-Bird et al. 2001). ~~when they come near shore to play and rest. On the Island of Hawai'i, Kealakekua Bay is one location of almost daily spinner visits, but they frequent many other bays along the coast and regularly rest in Honokōhau Bay.~~ There are seven primary resting areas along the Kona coast of Hawai'i, including Honokōhau Bay, where spinners are regularly seen near the harbor entrance (Östman-Lind et al. 2004). There is some evidence that the spinner dolphins may be resident to the area (Östman-Lind et al. 2004), making them more susceptible to repeated disturbance.

The hearing ability of spinner dolphins has not been measured. However, hearing of the related striped dolphin (*Stenella coeruleoalba*) was measured between 500 Hz and 160 kHz, with maximum sensitivity at 64 kHz (Kastelein et al. 2003). The hearing response of this single dolphin was less sensitive below 32 kHz than other dolphins. ~~As all marine mammals have very sensitive hearing, any loud underwater sounds have the potential to disturb dolphins as well. Given the sporting habit of spinners and other dolphins of bow-riding ships and small boat wakes, they are apparently not overtly impacted by vessel traffic noises.~~

Despite their limited sensitivity to low frequency sound, spinner dolphins have been shown to be impacted by human activity. Examples include interruption of resting activity and increases in the number of higher energy behaviors (Luna-Valiente and Bazúa-Durán 2006). Numerous studies describe changes in distribution (Haviland-Howell et al. in press) and short-term behavioral changes of dolphins in response to vessel traffic (Bejder et al. 1999; Scarpaci et al. 2000; Gregory and Rowden 2001; Nowacek et al. 2001; Van Parijs and Corkeron 2001; Ritter 2002; Lusseau 2003; Ng and Leung 2003). However, it has been established that for at least one population of bottlenose dolphins, these repeated short-term effects translate into long-term detrimental effects on the affected population (Bejder et al. 2006a; Bejder et al. 2006b).

In Hawai'i, some entanglements of spinner dolphins have been observed (Nitta and Henderson 1993; Rickards et al. 2001) but no estimate of annual human-caused mortality and serious injury is available. A habitat issue of increasing concern is the potential effect of swim-with-dolphin programs and other tourism activities focused on spinner dolphins around the main Hawaiian Islands (Östman-Lind et al. 2004).

Hawaiian Monk Seals: Endangered Hawaiian Monk Seals (*Monachus schauinslandi*, Hawaiian Name: 'Ilio holo I ka uaua) ~~are on the endangered species list . They~~ are rare, but not unknown along the Kona Coast. ~~Fortunately, monk seals are air breathing and spend the majority of their time above water where they are easily observed. If a monk seal is reported observed in the area, Kona Kai Ola would work with relevant agencies to protect the seal.~~ Most monk seals are found in the Northwest Hawaiian Islands, but recent aerial surveys estimated that there are 52 seals in the main Hawaiian Islands (Baker and Johanos 2004). There have been 13 sightings between 2003 and 2006 in the vicinity of Kaloko-Honokōhau National Historical Park (NOAA protected species division data) indicating regular, albeit low-level use of these areas by monk seals. ~~One~~Two birth on the Island of Hawai'i have~~s~~ been reported (Baker and Johanos 2004).

The best population estimates for Hawaiian monk seals (as of 2003) was 1,244 (Carretta et al. 2004). However the population is currently showing a decline that has been continuing since the 1950s (Antonelis et al. 2006).

Underwater hearing in the Hawaiian monk seal has been measured between 300 Hz to 40 kHz. Their most sensitive hearing is at 12 to 28 kHz, which is a narrower range compared to other phocids. Above 30 kHz, their hearing sensitivity drops markedly (Thomas et al. 1990).

Monk seals are very intolerant of human activity and are easily disturbed. When the U.S. military inhabited Sand Island and the Midway Islands and Kure Atoll, the monk seals disappeared until after the military left. Monk seals prefer to be solitary animals (Reeves et al., 2002).

Sea Turtles: Five species of sea turtles are known to frequent Hawaiian waters, with Hawaiian green sea turtles (*Chelonia mydas*) by far the most abundant at 97% of the total numbers, hawksbill turtles (*Eretmochelys imbricata*, 1.7% of total), olive ridley turtles (*Lepidochelys olivacea*, 0.8%), and occasional sightings of leatherback (*Dermochelys coriacea*) and loggerhead sea turtles (*Caretta caretta*, Chaloupka, et al, 2006, from stranding reports). Green sea turtles are the most plentiful large marine herbivore in the world and have experienced a very successful population recovery in Hawaiian waters since 1974 when harvest was outlawed in Hawai'~~i~~i, and 1978 when they became protected under the Endangered Species Act (Balazs, et al. 2004). Both green sea turtles and hawksbills are known to breed and nest on beaches within the main Hawaiian Islands, and have a 25-30 year generation time with a life span of 60-70 years (Balazs et al 2004). Total population numbers of green sea turtles in the Hawaiian archipelago have not been estimated, but the population has at least tripled since the 1970s and may now be approaching the carrying capacity of the islands (Chaloupka, et al. 2006).

Bartol et al. (1999) measured the hearing of juvenile loggerhead sea turtles using auditory evoked potentials to low-frequency tone bursts found the range of hearing to be from at least 250 to 750 Hz. The frequency range that was presented to the turtles was from 250 Hz to 1000 Hz (Bartol et al. 1999).

Most recently, Bartol and Ketten (2006) used auditory evoked potentials to determine the hearing capabilities of subadult green sea turtles and juvenile Kemp's ridleys. Subadult Hawaiian green sea turtles detected frequencies between 100 and 500 Hz, with their most sensitive hearing between 200 and 400 Hz. However, two juvenile green turtles tested in Maryland had a slightly expanded range of hearing when compared to the subadult greens tested in Hawai'i. These juveniles responded to sounds ranging from 100 to 800 Hz, with their most sensitive hearing range from 600 to 700 Hz. The two juvenile Kemp's ridleys had a more restricted range (100 to 500 Hz) with their most sensitive hearing falling between 100 and 200 Hz (Bartol and Ketten 2006).

Adult ~~G~~green turtles are primarily herbivorous often seen on reefs as deep as 100+ feet but much more common in shallower waters. Foraging behavior of green turtles is well documented and in Hawai‘i is typically characterized by numerous short dives (4 to 8 min) in shallow water (typically less than 3 m) with short surface intervals (less than 5 sec) (Rice et al. 1999).Resting periods are characterized by longer dives (over 20 min) in deeper water (4 to 40 m) with surface intervals averaging 2.8 min (Rice et al. 1999). The amount of time that turtles spend foraging versus resting is still largely unknown. Green turtles in Hawai‘i frequently use small caves and crevices in the sides of reefs as resting areas, and spend significant amounts of time on the tops of reefs (Balazs et al. 1987). Green turtles are known to be resident in Kiholo Bay, Hawai‘i (Balazs et al. 2000), and presumably other areas as well, potentially increasing their susceptibility to vessel collision and/or repeated disturbance. Two turtle “cleaning stations” have been reported near the mouth of Honokōhau Harbor. ~~During periods of calm water green sea turtles are often seen over very shallow reef flats where the choicest of algae are to be found. While some turtles may "rest" upon the surface, it is much more common to find them in small caves or wedged between coral heads where they are less subject to shark attacks. Green sea turtles may occasionally be seen far at sea (they nest in French Frigate Shoals in the NW Hawaiian Islands), but they are much more prevalent over the shallow shoreline areas where they forage for food.~~

Vessel collisions and potential noise impacts are a concern with regard to turtles. In a study of 3,861 turtle strandings in the main Hawaiian Islands from 1982 – 2003 (Chaloupka, et al. 2006), boat strikes accounted for only about 2.7 percent of the cases and were almost always fatal (95 percent). Entanglement in gill nets accounted for about six percent of strandings and also had a high rate of mortality (75 perce~~d~~nt). Hook and line entanglement (seven percent of strandings) was much less likely to result in the death of the turtle (52 percent mortality). At least 20 green sea turtles have stranded in Honokōhau Harbor or along the boundaries of Kaloko- Honokōhau National Historical Park. ~~Of all 3,861 strandings recorded in the Main Hawaiian Islands since 1982 only three occurred within 10 miles north or south of Honokōhau Harbor (Balazs, personal communication from NMFS database).~~

Recent increases in longline fisheries may be a serious source of mortality. Greens comprised 14% of the annual observed take of all species of turtles by the Hawai‘i-based longline fishery between 1990 to 1994 (NMFS 1998a). Over the period of 1994 to 1999, it was estimated that an annual average of 40 green sea turtles were caught by the Hawai‘i-based longline fishery (McCracken 2000).

Recent proliferation of a tumorous disease known as fibropapillomatosis (Herbst 1994) may reverse improvements in the status of the Hawaiian stock (NMFS 1998a), although recent modeling suggests that population levels continue to increase despite the disease (Chaloupka and Balazs 2005). The disease is characterized by grayish tumors of various sizes, particularly in the axial regions of the flippers and around the eyes. This debilitating condition can be fatal and neither a cause nor a cure has been identified.

Hawksbill turtles (Eretmochelys imbricate) are observed less often than green sea turtles near Honokōhau. About 20-30 female hawksbills nest annually in the Main Hawaiian Islands (NMFS 1998b). In 20 years of netting and hand-capturing turtles at numerous nearshore sites in Hawai‘i, only eight hawksbills (all immatures) have been encountered at capture sites including Kiholo Bay and Ka‘u (Hawai‘i), Palo‘ou (Moloka‘i) and Makaha (O‘ahu) (NMFS 1998b). It was only recently discovered that hawksbills appear to be specialist sponge carnivores (Meylan 1988). Previously they had been classified as opportunistic feeders on a wide variety of marine invertebrates and algae.

Increasing human populations and the concurrent destruction of habitat are also a major concern for the Pacific hawksbill populations (NMFS 1998b). Hawksbill turtles appear to be rarely caught in pelagic fisheries (McCracken, 2000). However, incidental catches of hawksbill turtles in Hawai‘i do occur, primarily in nearshore gillnets (NMFS 1998b). The primary threats to hawksbills in Hawai‘i are increased human presence, beach erosion and nest predation (*e.g.,* by mongooses) (NMFS 1998b).

~~3.9.5.2~~3.9.4.2 Anticipated Impacts and ~~Recommended~~ Proposed Mitigation

A complete analysis of the in-air and in-water potential acoustic impacts from the construction of the Kona Kai Ola small boat harbor was completed by Marine Acoustics, Inc.(MAI) and is included in this document as Appendix T-3. In conducting this analysis, the best available scientific, environmental, geologic, and meteorological data were obtained and used to calculate the acoustic transmission loss (TL) and subsequently to predict the received levels (RLs) at the five receiver sites. State of the art acoustic propagation models were employed in this analysis to determine in-air and in-water TL. MAI used the Acoustic Integration Model© (AIM©) to assess the impact of the predicted acoustic sound field on the species of marine mammals that could conceivably occur near the Kona Kai Ola project site.

The conclusion of that report determined that the criteria for Level A impacts to marine mammals for either in-air or in-water conditions at the receiver sites were never exceeded for the model source and receiver locations for non-blasting activities. However, these thresholds could be exceeded by the explosive blasting used to create the new harbor. For both in-air or in-water acoustic propagation, this only occurred when an animal was within about 200 meters (656 ft) of the explosion, This condition could only occur when the explosive source was at locations farthest north in the new harbor and closest to the existing harbor. This condition mandates that a safety range out to at least 200 meters (656 ft) of the source be shown to be clear of all marine mammals and sea turtle prior to each blast to preclude potential Level A takes.

The MAI report indicated that the in-air RLs for the explosive sources would exceed the assumed 100 dBA threshold for Level B harassment of pinnipeds (seals) for ranges out to about 0.4 nm (i.e., 800 yds [731 m]). This threshold is nominally for pinnipeds, but it should be extended to surface resting marine mammals and basking or beached sea turtles. Therefore, an in-air safety buffer of at least 731m from any explosive source is proposed, that should be maintained and found clear of marine mammals and basking or beached sea turtles prior to any blasts. It should be noted that although a receiver site was not modeled specifically in the existing harbor, that area is often within the range of this safety buffer and that extra care should be taken to ensure that no marine mammals or sea turtle are in the existing harbor prior to any blast. Analysis of the most restrictive Level B in-water explosive threshold shows that it is only exceeded when an animal is closer than 300 m (984 ft) from the explosive source.

Although the possibility exists for Level B impacts to marine mammals, based purely on the sound fields produced by the explosive blasts, analysis is the marine mammal distribution and movement as predicted by the AIM model, indicates that this is very unlikely situation. Therefore, it is expected that there will be much less than 0.5 Level B takes, with or without mitigation. But the mitigation safety buffer must still be enforced to preclude the unlikely possibility of marine mammals or sea turtle being near the explosive sources when they are used.

It should be recognized that several mitigation measures are already built into the proposed project. For example, the proposed practice to maintain a rock "dam" separating the construction site from the existing harbor reduces acoustic energy propagating to area potentially containing marine mammals or sea turtles. Also, this dam precludes animals from entering the construction area. This dam or land-bridge will be in place for all drilling and dredging activities, except for the removal of the land bridge itself.

Several other possible methods of mitigation are available to the Kona Kai Ola project, and feasibility, practicality, and benefit will be discussed with the National Marine Fisheries Service (NMFS) during consultation, and may be implemented subsequent to that consultation. The first possible mitigation technique is to acoustically monitor the potentially impacted areas during construction to: a) assess the accuracy of the modeling and b) to interact proactively with construction personnel to ensure that the identified threshold levels are not exceeded. Although the best available science and data was used to model the acoustics of the area, numerous conservative assumptions needed to be built into the modeling. By monitoring the actual levels received, in-situ corrections/updates to modeled parameters could potentially reduce the built--in conservativeness and reduce the potentially impacted areas. For example, the modeling assumes that all of the small voids in the bedrock are water-filled and therefore impart minimum attenuation on the acoustic signal as it propagates through. If even a small percentage of the voids are gas-filled, this attenuation would increase greatly and the impacted area would be reduced.

Another possible mitigation technique would be to augment the land-based visual observer, who it is assumed would verify that the area was clear the animals, with boat-based observers. This would increase the effectiveness of recognizing the presence of marine mammals and sea turtles in the potentially affected areas.

Additionally, interactions with the construction teams to alter the blasting methods modeled could potentially mitigate and reduce acoustic impacts to marine animals. A blasting expert will be consulted to develop a discontinuous non-linear blasting plan that will optimize cancellation of the explosion pressure wave into the marine environment. Examples of possible changes include: reducing charge size, reducing the depth drilled and blasted during any blast, reducing the number of blast holes or the volume of each blast, etc. The combination of these techniques with acoustic monitoring could potentially allow a large portion of the northern third of the harbor to be excavated with little or no potential impact to marine animals.

Interactions with NMFS during the consultation period will be used to examine these or any other techniques which may be identified. Also, the project is requesting help in identifying any possible method known to NMFS to establish and maintain turtle exclusion areas, especially in the existing harbor, without harassing the turtles. It may become apparent during those consultations that even with the identified buffer zones and mitigation techniques that an Incidental Harassment Authorization (IHA) is required, especially for the northern third of the proposed harbor.

Marine Acoustics, Inc. also completed a study of the expected ambient noise levels in Honokōhau Bay as a result of the increased vessel traffic from the expanded harbor. This report is included in this document as Appendix T-2. That report concluded that the average maximum daytime ambient noise levels would be expected to increase about 9.7 dB across the frequency spectrum from 100 Hz – 2 kHz, with the quadrupling of the vessels using the expanded harbor (i.e., the proposed action). Although significant, this increase would occur primarily during daylight hours, and the predicted median ambient noise would still be below 100 dB for all frequencies. The other significant factor is that there will be a quadrupling of the number of localized (i.e., small) individual sound fields in the area. These sound fields surround the individual boat that are contributing to the overall ambient noise. Noise levels in excess of 120 dB extend out to about 550 m (1804 ft) from these boats, with even high levels at closer ranges. Short of actual collisions with animals, Level A impacts are unlikely for noise levels typically generated by small boats. The Level B threshold nominally extends to approximately ten meters around each boat (depending on equipment such as size of motor, conditions of propeller and other equipment). Therefore potential Level B impacts to marine mammals and sea turtles would only occur within this range. Therefore, the chance for potential Level B impacts is small.

Completion of the harbor expansion project will increase the vessel traffic crossing the Hawaiian Islands Humpback Whale National Marine Sanctuary, the southern boundary of which is approximately four nautical miles north of Honokōhau Harbor. At a time when the whale population is growing, an increase of vessel traffic may increase the likelihood of vessel-whale collisions. Related to vessel traffic, an increase in whale watching activities is also likely. Vessels participating in these activities directly seek out higher whale population densities, increasing the likelihood of collisions, but also having the potential for disrupting whale behaviors such as resting, courting, mating or birthing.

As noted earlier, however, of the ~~27~~ 22 recorded whale strikes in the main Hawaiian Islands, only ~~two~~ three were recorded off the Kona coast. Sanctuary managers may need to implement additional regulations for private and/or commercial activities directly involving whale encounters. Mariner education programs, already in place as part of Sanctuary operations, will help to mitigate possible impacts due to increased boaters, and the proposed marine science center will complement Sanctuary educational programs.

~~Impacts to turtles may occur during construction of the marina. Since most of the marina will be excavated in a land-locked condition, turtles will not be subject to any potential harm from excavation. Experience during construction of the Ko Olina lagoons, and the expansion of the Barber's Point Harbor on O'ahu indicate that turtles abandoned their offshore (30-100 ft depth) resting habitats and concentrated in very near shore waters adjacent to the harbor and, at times, even within the active construction areas as soon as blasting and excavation began. Although no turtle injuries or mortalities were reported during either of those harbor construction activities, this should serve as a cautionary example for future coastal construction activities.~~

An increased level of impacts to turtles from increased boating and fishing activities may occur. ~~The level of impact documented by National Marine Fisheries Service is limited to only three turtle mortalities confirmed, since 1982, from a total of 3,861 strandings throughout the Main Hawaiian Islands~~. Of the 3,861 turtle strandings recorded from the Main Hawaiian Islands since 1982, 75% were mortalities, and of these about 4% (~est. 116, from Figure 3 of Chaloupka, et.al.) were from boat strikes and 3 of these occurred within 10 miles of Honokōhau Harbor. Data from NPS staff at the adjacent Kaloko-Honokōhau National Historical Park show a total of 20 strandings within the parking (19) and harbor (1) between 2000 and 2006 with one attributed to boat strike and 6 to fishing gear entanglement. Eleven additional gear entanglements and one additional boat strike were also recorded but not listed as strandings. Human caused impacts from fishing and boat strikes are anticipated to increase as turtle populations continue to increase and boating /fishing activities increase with the expanding harbor.

~~It would appear that anthropomorphic impact to turtles from boat strikes and fishing activities is very low along the Kona Coast adjacent to the existing harbor. It is likely that this is due in part to the relatively steep ocean bottom that limits the habitat of the turtles to the very nearshore areas away from the areas of heavy boat traffic~~. Recognition by the general public that sea turtles are protected ~~also~~ puts a heavy social pressure on fishermen who may inadvertently catch a sea turtle, and is likely a factor in the recovery of this species. Although no adverse impacts to turtles have been documented within the existing harbor, the close proximity of boats and turtles in this environment is cause for concern.

~~During land-based construction of the marina, no mitigation is necessary as previous experience has shown that turtles are not adversely impacted by these activities.~~ Once the land bridge is open, ~~however,~~ it is highly likely that turtles will be attracted into the new harbor and be subject to potential harm from in-water construction of piers or other facilities. During this period of time and until the harbor is operational, ~~it is recommended that a~~ mesh barrier will be ~~is~~ erected across the new harbor channel to exclude turtles from the inner basin. The mesh size needs to be selected in consultation with ~~regulatory~~ NMFS ~~agencies~~ to make sure it does not entangle turtles.

As the new harbor area will ~~likely~~possibly attract turtles to the basin (similar to the existing harbor) and an increase in boat traffic is expected in the harbor channel there will be an increased possibility of turtle strikes within the channel and new harbor area. To minimize this possibility it is ~~recommended~~ proposed that educational signs be erected around the harbor describing the turtles and warning boaters to be cautious while traversing harbor channels. The slow no-wake lane in the entrance channel should also be strictly enforced and the State should consider extending the slow no-wake zone further out to the first green buoy.

~~As all marine mammals have very sensitive hearing, any loud underwater sounds have the potential to disturb these creatures. Potential underwater acoustics may impact marine mammals and sea turtles during construction activities, such as blasting and pile driving. Appendix Q contains a study of underwater noise impacts during the construction and operation of the proposed project.~~

~~To mitigate impacts related to noise generated by construction activities, such as blasting and pile driving, a program to monitor sound levels and the presence of marine mammals and sea turtles will be implemented. Construction activities will be adjusted if whales, monk seals, dolphins or sea turtles are in the vicinity. Further, keeping the land bridge closed to the ocean until all major pile driving and blasting are completed will further avoid adverse impacts.~~

~~Increased boat traffic will result in increased low intensity sounds in the harbor area and along transit routes. The ecological role played by anthropomorphic sound in the marine environment has recently received heightened awareness. Evidence from declassified Department of Defense ocean recordings off of San Diego show that background sound levels off-shore of the harbor have increased approximately ten-fold in 30 years. Much of this increase in sound level has been ascribed to large ship traffic. While intense sound levels can adversely impact marine mammals and potentially other species, this level of sound pressure has not been shown to be produced by the small boats envisioned to occupy the new marina.~~

~~Adverse impacts of lower intensity noise, such as from small boat engines, have been very difficult to quantify. No definitive information is available to determine the level of impact produced by increase in small boat generated noise on fish, marine mammals and sea turtles. Given the sporting habit of spinners and other dolphins of bow-riding ships and small boat wakes, they are apparently not overtly impacted by vessel traffic noises.~~

~~However, boat-generated noises can be reduced by slowing boats to "slow-no-wake" in the main traffic lane of the entrance channel. The State could also consider extending the "slow-no-wake" lane out to the first green buoy. Appropriate signage to enforce these requirements is recommended.~~

~~3.9.6~~3.9.5 Ciguatera

Rick Gaffney

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February 13, 2007

Dayan Vithanage
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Fax 531-3177

Subject: Comments on Kona Kai Ola DEIS

I was born and raised in Hawaii and literally grew up in island waters. I have actively participated in and contributed to the planning process for ocean recreation development across the State for over 30 years.

I have had the opportunity to review both the project plan and the DEIS for Kona Kai Ola and think the latter represents a very thorough analysis of all of the issues and impacts of the proposed development, and that it provides for more than adequate mitigations to those impacts.

The DEIS and the plan suggest that Jacoby Development has the commitment, desire, skills and experience to deliver a quality development that minimizes its impact on the West Hawaii and the rest of our Big Island communities, and at the same time contributes several unique solutions to the growth-related problems we are experiencing here in West Hawaii.

I strongly support the private-public partnership established between Jacoby Development and the State of Hawaii DLNR and DHHL, and hope that they will proceed with an expanded marina facility, and the development of necessary support facilities, commercial and retail activities, because of our community's current pressing need for harbor expansion and our long term future as a major ocean recreation destination.

Jacoby Development's plans to build the much needed extension of Kuakini Highway through Queen Liliuokalani Trust Lands to Kealakehe Parkway will help to alleviate traffic, and their plans to create a shuttle transportation system throughout the area will further

alleviate traffic. Other positive plans include a number of environmentally sensitive and creative contributions to the completion of our new urban center in the Kealakehe/Honokohau area.

The focus of the project plan and the DEIS on sustainable design and smart growth are most attractive, as is the idea of all the major public infrastructure being paid for by the private development.

I am particularly impressed by the ocean focus of the project (expanded harbor, the marine science center, seawater lagoons, and shoreline park) and the connection between the project's design and focus, with the ahupua`a and region. I'm also impressed with the many community benefits, including jobs close to planned residential growth areas.

I find the DEIS to be a thorough and valuable document that should support the progress of this worthy project.

Mahalo,

Rick Gaffney
Kona, Hawaii
325-5000

oceanit
innovation through engineering & scientific excellence

July 23, 2007

Rick Gaffney
73-1062 Ahikawa Street
Kailua-Kona, Hawai'i 96740

Dear Mr. Gaffney:

Subject: Kona Kai Ola Draft Environmental Impact Statement
Response to Your Comments Dated February 13, 2007

Thank you for your comments on the Kona Kai Ola Draft Environmental Impact Statement.

We appreciate your statements that the DEIS represents a thorough analysis of issues and impacts, and provides mitigation to those impacts. The developer is committed to development that sustains and enhances the physical, cultural, social and economic environment.

The public-private partnership between the State and JDI will allow the realization of crucial privately-funded improvements, such as the marina, regional roadway and circulation improvements, and improvements to the existing wastewater treatment plant. Private funds will also be used in the development of community-oriented facilities such as parks, other recreational facilities and public access. Public interest will be served through the development of the Kona Kai Ola project.

We also concur with your acknowledgement of the incorporation of sustainable design and smart growth principles in Kona Kai Ola, and EIS Section 1.5.2, Project Sustainable Design, provides sustainability goals in the areas of design, energy, water, waste and transportation. These goals are consistent with many of your comments.

Your appreciation of the project's ocean orientation and ahupua'a relationship is noted. It is the developer's intent to incorporate these aspects throughout Kona Kai Ola.

Your comment letter and this response are included in the Final Environmental Impact Statement. We appreciate your participation in the environmental review process. Please submit a request to our office if you would like to receive a printed or electronic copy of the Final Environmental Impact Statement, or portions thereof.

Sincerely,

Dayan Vithanage, P.E., PhD.
Director of Engineering

cc: Office of Environmental Quality Control
State Department of Hawaiian Home Lands
Jacoby Development, Inc.

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Dayan Vithanage

Oceanit

828 Fort Street Mall, 6th Floor

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Feb. 4, 2007

Dear Mr. Vithanage,

I have reviewed the Draft Environmental Impact Statement (DEIS) for Kona Kai Ola, Hawaii Island.

Your document is well written and thorough. Given that the project has strict conditions devised by the state DLNR, it is understandable that there is not a selection of project approach options. Every environmental and natural resource concern expressed by community members and adjacent land owner/managers (NPS, for example) appears to have been addressed, with one exception.

The wastewater treatment 4.10.6, paragraph two suggests adding an additional lagoon to the treatment process. This may be inadequate unless a filtration system is added. Paragraph 6 notes that project will need to work with the county to upgrade the Kealakehe Waste Water Treatment Plant. It appears at this time the options are vague, possibly due to the undeveloped plans with Hawaii County. The text your DEIS provides indicates a willingness and commitment to work with the county to achieve R-1 water.

4.10.9.3 Telecommunications needs a sentence reconstruct, second sentence. A new …maintained facilities.

Your discussion on deep seawater cooling sounds well thought out with one exception. As a biologist, I am concerned about the fact that the intake expects to be pumped at 52,000 gallons per minute. This is twice as much volume as the Natural Energy Laboratory (NELHA) of Hawaii's 55 inch pipe with 27,000 gallons per minute capacity. In both cases I am concerned about the effect on marine biota with continual pumping from depths at these volumes. The NELHA papers did not address the effect and your DEIS does not either. Consideration of the overall environmental effect should be discussed.

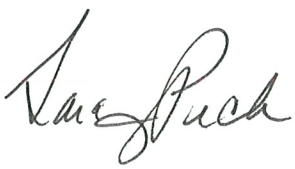
In every other sense the DEIS is describing a development that could be a model for future endeavors. The energy and resource use reductions, architecture to use prevailing winds for cooling, and provision for nearby working class homes are all welcome ideas. I look forward to seeing this development grow and work with the community to achieve an outstanding attraction for residents and visitors to convene to learn, recreate and for Hawaiian practitioners to continue their activities. Your sensitivity to community input and tendency to foster 'smart growth' principles is refreshing.

I thank you for allowing me to review the DEIS.

If you should have questions, please contact me.

Sincerely,

Sara Peck



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968134321

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July 23, 2007

Sara J. Peck
P.O. Box 56
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Dear Ms. Peck:

Subject: Kona Kai Ola Draft Environmental Impact Statement
Response to Your Comments Dated February 4, 2007

Thank you for your comments on the Kona Kai Ola Draft Environmental Impact Statement. Our responses to your comments are based on a paragraph designation

Paragraph 1

We acknowledge your comments regarding the quality and thoroughness of the DEIS. Every effort has been made to incorporate community concerns expressed through various meetings and contact in the community outreach program.

Paragraph 2

We note your comment that the additional sixth lagoon may be inadequate unless a filtration system is added. As discussed in the EIS Section 4.10.6, the project sewer system will collect and convey wastewater to the existing Kealakehe WWTP. The gravity sewer lines will be oversized to provide 15 percent excess capacity at the given slope, and the pumps at the major pump stations will be designed to meet peak flow requirements of the proposed projects. All pump stations will be equipped with a standby pump that will be equal to the largest pumping unit. Further detailed system design will occur as the project progresses, and as Hawai'i County finalizes plans for the Kealakehe WWTP. As you have pointed out, the developer will work with Hawai'i County to incorporate the use of recycled R-1 water into the sewerage plan.

Paragraph 3

That sentence has been edited as follows: "To provide telephone circuits for the development, new HTCo-owned and maintained facilities will be situated in an easement placed within the development prior to removal of the existing unit."

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Paragraph 4

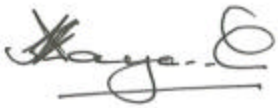
As discussed in DEIS Section 3.9.7, the average cold water pumping rate will be 7,500 gallons per minute (gpm), not 52,000 gpm as stated in your letter. This amount is less than 30 percent of NELHA pumpage. The water would be pumped from a depth of approximately 3,000 feet. At this depth, only deep dwelling marine fauna could possibly be impacted by pipe suction. To mitigate possible impacts, the ocean end of the intake pipe will be fitted with a diffuser to dissipate the suction force of water into the pipe to prevent any fouling by rays or other fauna.

Paragraph 5

We also appreciate your acknowledgement of the incorporation of environmentally sound practices at Kona Kai Ola. EIS Section 1.5.2, Project Sustainable Design, provides sustainability goals in the areas of design, energy, water, waste and transportation. These goals are consistent with the principles you outline in your comments.

Your comment letter and this response are included in the Final Environmental Impact Statement. We appreciate your participation in the environmental review process. Please submit a request to our office if you would like to receive a printed or electronic copy of the Final Environmental Impact Statement, or portions thereof.

Sincerely,



Dayan Vithanage, P.E., PhD.
Director of Engineering

cc: Office of Environmental Quality Control
State Department of Hawaiian Home Lands
Jacoby Development, Inc.

Re: PROPOSED...Kona Kai Ola/ Jacoby/ harbor expansion

Aloha,

First of all. please extend the comment period for at least sixty days. In my case, I didn't learn the DEIS was online until the end of January. I have been very ill and unable to leave my house. The only way I could comment on this issue, is online. When I went to the site to download, It said, "file has been damaged and can not be repaired". Well that doesn't do me a lot of good, so i'll just have to comment in a general way. Please extend the deadline. Saying the DEIS is available online when it is not, is cheating and not fair to the community.

This project will be devastating to our area! Our roads are totally inadequate for a project of this magnitude.Our main highway can not handle even one more car at present. If there is a wreck, traffic is STOPPED for hours. Even without a wreck, the traffic is gridlocked twice a day. A proposed Jacoby road into town will only make it worse. The proposed road will only bottleneck right in the middle of Kailua-Kona town. Great, another road to nowhere. Now we'll have two traffic jams, instead of one.

We have no workers to spare, here. Local companies are flying in labor, with nowhere to house them! Working people are living on the beaches. Three families are living in one and two bedroom apartments. Rents and mortgages are very high and most proposed wages for service jobs in this project will be low, thus, you will be adding more working homeless to our area. When a rental does come up, over a hundred people show up to apply! The very few rentals that are available, are two hours away, again, adding to our horrible traffic jams.

The social impacts are unacceptable from this proposed project. Parents are unavailable to their children as they are working two to three low paying jobs, to pay these high rents and mortgages and sitting on the highway up to four or more hours a day... while most of their kids are left unsupervised. More unsupervised children can't possibly be a good idea.

This proposed project will trash our land and our ocean. Our own county government is not in favor of this project! This proposed project does not conform to our general plan. This project is far too big, and too close to our national park. The profits from this proposed project will leave our island as quickly as they are made.

Public facilities should not be turned over to private companies.

Again,this proposed project would be absolutely devastating to our area at this time! This project pretends to be a "sustainable" and "green" project, but you can't possibly get any further from the truth! Please don't allow this proposed project!!! We absolutely must have housing and roads before any more huge projects such as this are approved, to do otherwise is sheer stupidity! The majority of this community DOES NOT WANT THIS PROJECT! Please, don't shove it down our throats!

Thank you,

Shannon Rudolph
P.O. 243 Holualoa, Hi. 96725

Shannon Rudolph

S. RUDOLPH
P.O. 243
HOLUALOA, HI. 96725

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oceanit
innovation through engineering & scientific excellence

February 8, 2007

Shannon Rudolph
P.O. Box 243
Holualoa, HI 96725

Dear Ms. Rudolph:

Subject: Kona Kai Ola Draft Environmental Impact Statement (DEIS)

This letter responds to your written request to extend the comment period for the Kona Kai Ola DEIS. I received your letter on February 7, 2007.

The DEIS was published in the Office of Environmental Quality Control Bulletin on December 23, 2006. The 45-day comment period ends on February 6, 2007.

Regarding your request, we will include your comments and our response in the Final EIS if your transmittal is postmarked by February 13, 2007. Please contact me if you would like hard copies or electronic files of the DEIS.

Thank you for your interest in the Kona Kai Ola project, and we look forward to receiving your comments.

Sincerely,

Dayan Vithanage, P.E., PhD.
Director of Engineering

cc: Office of Environmental Quality Control
State Department of Hawaiian Homelands
Jacoby Development, Inc.

Oceanit Center 828 Fort Street Mall, Suite 600 Honolulu, Hawaii 96813 Phone: 808.531.3017 Fax: 808.531.3177
www.oceanit.com

oceanit
innovation through engineering & scientific excellence

July 23, 2007

Shannon Rudolph
P.O. Box 243
Holualoa, Hawai'i 96725

Dear Shannon Rudolph:

Subject: Kona Kai Ola Draft Environmental Impact Statement
Response to Your Comments Dated February 6, 2007

Thank you for your comments on the Kona Kai Ola Draft Environmental Impact Statement. We hereby respond to your comments based on the sequence of paragraphs.

Paragraph 1

We responded to your request for a comment period extension in a letter dated February 8, 2007. We offered to include your comments and our response in the Final EIS if your transmittal is postmarked by February 13, 2007. We also invited you to contact me if you would like hard copies or electronic files of the DEIS.

Paragraph 2

We note your concerns about traffic impacts related to Kona Kai Ola. To mitigate traffic impacts, Kona Kai Ola will include various signalization improvements and roadway improvements. To connect Kona Kai Ola with the neighboring communities, Kona International Airport, and Kailua-Kona Village, the project proposes to sponsor a regularly scheduled shuttle service, so that people could utilize Kona Kai Ola without having to use a car for access. Further, the project includes the construction and realignment of Kealakehe Parkway which would run makai of Queen Ka'ahumanu Highway and through the lands of Queen Lili'uokalani Trust, and connect with Kuakini Highway in Kailua-Kona. Another measure to enhance road connectivity in the ahupua'a is the improvement of the intersection of Kealakehe Parkway and Queen Ka'ahumanu Highway. These improvements will serve the project as well as the regional community.

Such improvements will be privately-funded and ensure that the project minimizes its own impacts while improving existing conditions. Further, with development of Kona Kai Ola, the Kuakini Highway extension road is anticipated

to be built on a more accelerated schedule than would occur without the Kona Kai Ola project.

Paragraph 3

We understand your concern regarding the employment needs generated by Kona Kai Ola and the existing regional labor supply. A study of workforce housing requirements was prepared to evaluate secondary impacts. Findings are summarized in EIS Section 4.6.5, Workforce Housing Impacts, and Appendix C-1 contains the new study. It is estimated that Kona Kai Ola will generate a workforce housing need of 625 units, based on the ratio set forth in Hawai'i County Ordinance Chapter 11, Section 4, Affordable Housing Requirements. Attachment 1 contains EIS text of Section 4.6.5 Workforce Housing Impacts.

As agreements between the State and JDI prohibit residential development at Kona Kai Ola, workforce housing would need to be located off-site. The most suitable location for workforce housing units is the Villages at La'i'Opua community, a DHHL project, or within the Hawai'i Housing Finance and Development Corporation affordable housing development planned for Keahuolu. These are two State-owned undertakings directly across the highway in the same or adjacent ahupua'a. Locating workforce affordable housing units in these communities would substantially lessen the traffic impacts associated with a community subject workforce. Alternatively, the State lands adjacent to Waikoloa Village would be appropriate for workforce housing.

JDI will comply with all affordable housing requirements of applicable Hawai'i County ordinances.

Paragraph 4

We note your concern about possible social impacts related to existing economic conditions related to parents holding multiple jobs. Kona Kai Ola will provide residents with opportunities to improve their quality of life through economic development that enhances the County's natural and social environments. The proposed uses at Kona Kai Ola will broaden the spectrum of business opportunities in the area, and provide a wider range of employment options.

In addition to employment and entrepreneurial opportunities related to the commercial areas and the hotel and timeshare complexes, Kona Kai Ola will offer diverse opportunities related skilled marina support jobs, SWAC facility mechanical jobs, and the water features and marine science center will involve employment of marine biology and environmental education jobs. These employment opportunities at Kona Kai Ola are located close to where there is current and future planned residential areas, including over 4,000 affordable homes on DHHL and HHFDC state parcels. This will substantially reduce the commute time for these employees. And, with the project-supported public transit system, it could also reduce the need for each worker to depend on their own personal care to get to work.

Paragraph 5

We disagree with your statement that the "project will trash our land and ocean" The EIS contains a detailed and thorough discussion of project impacts and actions that will be taken to mitigate impacts. In many cases, the mitigation of impacts will benefit the wider community.

We disagree with your statement that the project "does not conform to our general plan." Kona Kai Ola is consistent with the Urban Expansion Area designation on the Hawai'i County General Plan. The agreement between JDI and the State identifies hotel and time-share uses as possible development at Kona Kai Ola. The project is not a resort. A resort is a concept in which visitors are attracted to spend most, if not all, of their stay within the resort area through the design of amenities that fulfill the needs of a particular visitor market segment. This self-containment is achieved to varying degrees in resort development, depending on the natural, historic/cultural, and recreational resources within a resort site and the intended scale of the resort.

State and County laws recognize this distinction between a "resort" and a "hotel" or "time-share unit." Section 514E-5, Hawai'i Revised Statutes, authorizes time-share units to be located in a resort area or any other area in which a county may by ordinance allow a hotel unit. The Hawai'i County Code correspondingly permits hotels and time-share units in non-resort zoning districts. The proposed project may include up to 700 hotel units and 1,803 time-share units, and depending on the eventual location of these project components, rezoning may be required for implementation. Project implementation requires rezoning to allow proposed uses.

We do not concur with your statement that "profits from this proposed project will leave our islands as quickly as they are made. Public facilities should not be turned over to private companies."

Kona Kai Ola includes crucial privately-funded infrastructure improvements, such as the marina, regional roadway and circulation improvements, and improvements to the existing wastewater treatment plant. Further, with the use of private funds, JDI will protect natural resources through the various measures that preserve and enhance the environment. Private funds will also be used in the development of community-oriented facilities such as parks, other recreational facilities and public access. Hence, Kona Kai Ola will bring in private investment for infrastructure improvements that would mitigate project impacts while serving the wider community. Land ownership will remain with the State. DLNR and DHHL will both benefit from lease payments and a percentage of revenues from the Kona Kai Ola project.

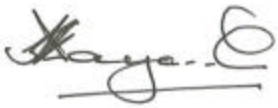
Finally, your statement that the "project pretends to be a 'sustainable' and 'green' project" is inaccurate. JDI has made a corporate commitment to environmental sustainability in all its work. In Kona Kai Ola, JDI intends to incorporate the latest environmental design and technology to create an energy efficient, low

environmental impact, sustainable development at Kona Kai Ola. The vision for the project is to develop a project that has minimal impact on the environment by striving to significantly reduce water consumption, waste disposal, energy use and carbon dioxide emissions.

One key to measuring the sustainability of the project's design and operation is to develop based on the Leadership in Energy and Environmental Design (LEED) Green Building Rating System. The LEED Green Building Rating System is the nationally accepted benchmark for the design, construction, and operation of high performance green buildings. LEED gives building developers and operators the tools they need to have an immediate and measurable impact on their buildings' performance (LEED 2006). JDI has experience with the LEED certification process from its other projects both for individual buildings, and for large campus infrastructure as well. JDI intends to pursue, at a minimum, Silver LEED certification for its development of the Kona Kai Ola project.

Your comment letter and this response are included in the Final Environmental Impact Statement. We appreciate your participation in the environmental review process. Please submit a request to our office if you would like to receive a printed or electronic copy of the Final Environmental Impact Statement, or portions thereof.

Sincerely,



Dayan Vithanage, P.E., PhD.
Director of Engineering

cc: Office of Environmental Quality Control
State Department of Hawaiian Home Lands
Jacoby Development, Inc.

Attachment 1

4.6.5 Workforce Housing Impacts

In response to DEIS comments, a study of possible workforce requirements and related secondary impacts was conducted by The Hallstrom Group; this study is presented in Appendix C-2. This study was based on a four-step study process that included 1) quantification of population and employment projections, 2) .analysis of West Hawai'i employment demand and supply, 3) characterization of the subject workforce, and 4) quantification of subject workforce housing impacts.

The population and job count on the Hawai'i Island are forecast to increase by approximately 70 percent during the 24 year projection period that ends in 2030. On average, at least 60 percent of the population growth will be a result of net in-migration to the County.

Although trends will be slowing relative to recent decades, a significant portion of the population and business expansion will be directed towards West Hawai'i. In the next two decades, the population and job count in West Hawai'i will increase by about 80 percent, reaching 128,200 residents and 87,400 employment positions by 2030. The available approved or entitled, proposed and announced new projects and their associated forecast job creation supply will not be sufficient to meet estimated employment demand over time. Further, with the approaching build-out of the major West Hawai'i resorts and residential-orientation of the newer resort communities, few opportunities will exist for expansion in the historically-vital tourism economic sector.

As discussed in Section 4.6.3.2, implementation of the Kona Kai Ola master plan will create a total of 3,842 on-site full time equivalent employment positions in the operating businesses of the development. The project is estimated to be operational around 2012, following completion of infrastructure and Phase I construction, and will continue until the community reaches build-out and stabilization in 2026.

Approximately 45 percent of the jobs will be entry level positions with an average annual wage of $20,000 in current dollars. Another 40 percent will be mid-level jobs with average yearly pay of $32,000, and, 15 percent will be management/high-skill positions with wages averaging $50,000.

Approximately 2,147 of the jobs in the subject project will be filled by persons who have in-migrated to the Big Island. However, only a nominal portion would be specifically relocated to West Hawai'i as a result of the development.

The total net housing load created by Kona Kai Ola in-migrant workers will be 1,074 units. This in-migration will generate a need for a range of 625 to 859 affordable housing units, as follows:

- As discussed in Section 4.5.2.2, under Hawai'i County Ordinance Chapter 11, Section 4 Affordable Housing Requirements, hotel uses generating more than 100 employees on a full-time equivalent basis must earn one affordable housing credit for every four full-time equivalent jobs created. Application of the "1 to 4" ratio to all of the transient units proposed for Kona Kai Ola (hotel and time-share) results in a workforce housing requirement of 625 units.

- Another method of calculating the need for affordable worker housing units is to estimate that approximately 80 percent of the total in-migrant worker need housing that meet affordable housing pricing guidelines. This results in a high end range of 859 units.

Based on affordable housing pricing guidelines, affordable housing units will have an estimated sales price of $216,000 to $292,000.

As agreements between the State and JDI prohibit residential development at Kona Kai Ola, workforce housing would need to be located off-site. Probable and desirable locations for workforce housings were based on availability, efficiencies and surveys conducted of area workers. Possible locations in support of Kona Kai Ola included the mid-elevation lands of the Keahole to Kailua-Kona Corridor, between the Queen Kaʻahumanu fronting commercial/industrial developments and Mamalahoa Highway; and in the Waikoloa Village expansion areas.

The most suitable location for workforce housing units is the Villages at La'i'Ōpua community, a DHHL project, or within the Hawaiʻi Housing Finance and Development Corporation affordable housing development planned for Keahuolū. These are two State-owned undertakings directly across the highway in the same ahupuaʻa . Locating workforce affordable housing units in these communities would substantially lessen the traffic impacts associated with a community subject workforce. Alternatively, the State lands adjacent to Waikoloa Village would be appropriate.

JDI will comply with all affordable housing requirements of applicable Hawai'i County ordinances.

4.6.6 Market and Economic Impacts Associated with Alternative 1

Alternative 1, which has a reduced marina size of 25 acres, and fewer hotel and time-share units, would have a meaningful market standing, create significant economic opportunities, and provide a net benefit to State and County coffers. From a market perspective, a smaller Kona Kai Ola would still be the only mixed use community in the Keahole to Kailua-Kona Corridor offering competitive hotel and time-share product.

The additional commercial sites in the near-highway lands will also be in demand as the area continues its evolution into the northerly gateway of the Kona urban center. The increased retail acreage will further capitalize on the available frontage-related opportunities by generating greater cumulative attraction for the development and enabling increased product diversity supporting a wider spectrum of businesses.

Absorption of the visitor-oriented inventory would be proportionately shorter with fewer hotel and time-share sites and units to be marketed, and fewer marina slips to be filled. The absorption time-frame for the larger commercial component will be longer, while the amount of marina-support and other leasable acreage is the same as in the proposed project and will require a similar absorption period.

Table 3 compares the primary marketable components of the proposed project and Alternative 1 and their estimated absorptions:

Envelope PostMarked 14 Feb 2007
Also received fax copy same date

G350 PRODUCTIONS, LLC

Event & Video Productions

February 13, 2007

Dayan Vithanage
Oceanit
828 Fort Street Mall, 6th Floor
Honolulu, HI 96813

Fax: 808-531-3177 RE: Expansion of Honokohau Marina – Jacoby Development

Aloha,

I am in support of the mixed use development that is planned by Kona Kai Ola, and the Jacoby Development team,

The Kona Kai Ola development should include all of the mixed-use harbor front commercial village components that include a marina, commercial support businesses, retail, hotels and public Areas.

The current development plan outlines Timeshare development. I would be more supportive of Condo development, as the increased traffic and parking of timeshare accommodations would be a much bigger impact on the use of the area. A Condo development would include more absentee owners with less car and traffic pressure on the already congested area.

Accommodations made available to visitors who will be utilizing the marina's many new services, which include sport fishing events which is a billion dollar industry world-wide, is mandatory for the development of the lands at Honokohau harbor. With a resort hotel and condo development, the expanded harbor would be able to sustain itself as well as provide the community a location to house visiting anglers, boat owners and their families to participate in world recognized events. The commercial use and business development would provide the Kona community a location for much needed jobs for the area.

I agree that the infrastructure of the development should begin immediately on the project and that this development should be encouraged to proceed in a timely fashion. Kona Kai Ola and Jacoby Development are the best developers for this project.

Aloha,

Sue Vermillion

G350 Productions, LLC
Sue Vermillion
P.O. Box 4129
Kailua-Kona, HI 96745

G350 Productions LLC
P.O. Box 4129
Kailua Kona, HI 96745

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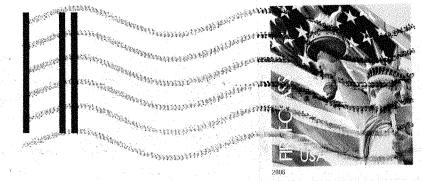

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Dayan Vithanage
Oceanit
828 Fort Street Mall, 6th Floor
Honolulu, HI 96813

oceanit
innovation through engineering & scientific excellence

July 23, 2007

Sue Vermillion
G350 Productions, LLC
P.O. Box 4129
Kailua-Kona, Hawai'i 96745

Dear Ms. Vermillion:

Subject: Kona Kai Ola Draft Environmental Impact Statement
Response to Your Comments Dated February 13, 2007

Thank you for your comments on the Kona Kai Ola Draft Environmental Impact Statement.

We concur with your description of the Kona Kai Ola development as a mixed use community.

Regarding your preferences for condo development, please note that residential uses in Kona Kai Ola are prohibited in agreements between JDI and the State. We understand your concerns regarding traffic impacts related to time-share units, and have included several measures in the project to mitigate traffic impacts. Various signalization improvements and roadway improvements will be implemented. To connect Kona Kai Ola with the neighboring communities, Kona International Airport, and Kailua-Kona Village, the project proposes to sponsor a regularly scheduled shuttle service, so that people could utilize Kona Kai Ola without having to use a car for access. Further, the project includes the construction and realignment of Kealakehe Parkway makai of Queen Ka'ahumanu Highway and through the lands of Queen Lili'uokalani Trust connecting with Kuakini Highway in Kailua-Kona. Another measure to enhance road connectivity in the ahupua'a is the improvement of the intersection of Kealakehe Parkway and Queen Ka'ahumanu Highway. These improvements will serve the project as well as the regional community. More discussion on traffic impacts is contained in EIS Section 4.7, Vehicular Traffic.

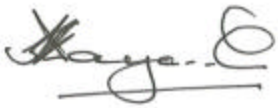
Your statement that visitor accommodations are "mandatory for the development of lands at Honokohau Harbor" is accurate. The proposed hotel and time-share units are an integral part of the Kona Kai Ola project, and will provide employment opportunities.

Oceanit Center 828 Fort Street Mall, Suite 600 Honolulu, Hawaii 96813 Phone: 808.531.3017 Fax: 808.531.3177
www.oceanit.com

Regarding the timing of infrastructure, we agree that such development should begin “immediately.” In Phase 1 of the project, JDI will not only provide access to the commercial parcel, but also address regional traffic issues through the improvements of the roadway system. JDI plans to improve the intersection of the Queen Ka‘ahumanu Highway and the Kealakehe WWTP Access Road. The Kealakehe WWTP Access Road is planned to be realigned and widened to an 80-foot road right-of-way (ROW) that will serve the Commercial Parcel No. 1 and eventually intersect with the proposed Kuakini Highway Extension to the west. Such improvements will ensure that the project minimizes its own impacts while improving existing conditions.

Your comment letter and this response are included in the Final Environmental Impact Statement. We appreciate your participation in the environmental review process. Please submit a request to our office if you would like to receive a printed or electronic copy of the Final Environmental Impact Statement, or portions thereof.

Sincerely,



Dayan Vithanage, P.E., PhD.
Director of Engineering

cc: Office of Environmental Quality Control
State Department of Hawaiian Home Lands
Jacoby Development, Inc.