7 PUAKŌ COMMUNITY PLAN

7.1 CURRENT AND FUTURE PLANS AND DEVELOPMENTS

7.1.1 POPULATION

Population figures for Puakō were not kept until the 1990 U.S. Census. In 1990, the population of Puakō was 397 people and by 2000 population had increased to 429 people. Of the resident population, 84% are 25 years or older. The residents of Puakō are mostly retirees and second home owners. Most of the residents that do work commute to their jobs in Waimea or to the resorts in South Kohala.

7.1.2 DEVELOPMENT PATTERN AND LAND USE

The community consists mainly of single-family homes that were built along both sides of Puakō Beach Drive. There is one store in the community. The Puakō Store is central to the area and serves as a meeting place and a place for information sharing. The coastline bordering Puakō is home to an extensive coral reef system while the dry lowlands to the east support a large kiawe forest.

The northern end of the community is bordered by residential homes at Waialea Bay and the Hapuna State Recreational Area. The State Recreational Area includes several beaches including Hapuna Beach and Beach 69. Local residents, residents from around the whole island, and tourists frequent these beaches, making them some of the most popular and crowded beaches on the island. The southern end of the community is called Paniau, a surf spot with a rocky beach. Further south is Holoholokai Beach Park and the Mauna Lani Resort. Puakō also contains several cultural and historical sites, including the Puakō petroglyph field and the Hokuloa Church.

Hapuna Beach State Park

In addition to its marine and coastal resources, another major natural resource unique to Puakō is an underground aquifer that supports to a dense kiawe forest. The Puakō forest is very lush and productive. The underground aquifer is regarded by some as a "natural oasis in a desert like climate." These large kiawe trees produce flowers heavy with nectar. A small bee-keeping company is producing internationally known gourmet quality honey from these trees.

7.1.3 MAJOR DEVELOPMENTS

Within the core community of Puakō along Puakō Beach Drive, there is little or no room for major development. However, there are several large developments outside of the core community that may have a significant impact on Puakō. The Villages of ʻĀina Leʻa, a development on the mauka side of Queen Kaʻahumanu Highway almost directly across from Puakō, has proposed to develop 2,406 multi- and single- units, not more than five golf courses, golf academy, commercial villages, and a 40-unit resort lodge. The development also includes 863 lots in the State agriculture land use district. In addition to these developments, 234 acres will be set aside for open space and 26 acres will be used for parks. A five acre red ilima preserve area is also planned. The total project area is approximately 3,000 acres.

Another major proposed project within the Mauna Lani Resort and mauka of the Puakō forest, is the Stanford Carr Development for which, 691 residential units, 284 hotel units, and three golf holes are

planned. On the mauka end of the Puakō forest, a private company, Colony Capital, is planning to develop a golf course.

Puakō Bay Investors LLC is planning to develop an 8-lot single family residential subdivision along Puakō Beach Drive near the Puakō small boat ramp. Also, the University of Hawai'i is considering building a marine research center on land on the northern side of the small boat ramp.

County Land Use Designations

The maps on the following page illustrate the County of Hawai'i General Plan Land Use Pattern Allocation Guide (LUPAG) and current County zoning of lands in the Puakō area.

FIGURE 7.1: GENERAL PLAN LUPAG DESIGNATION FOR PUAKŌ

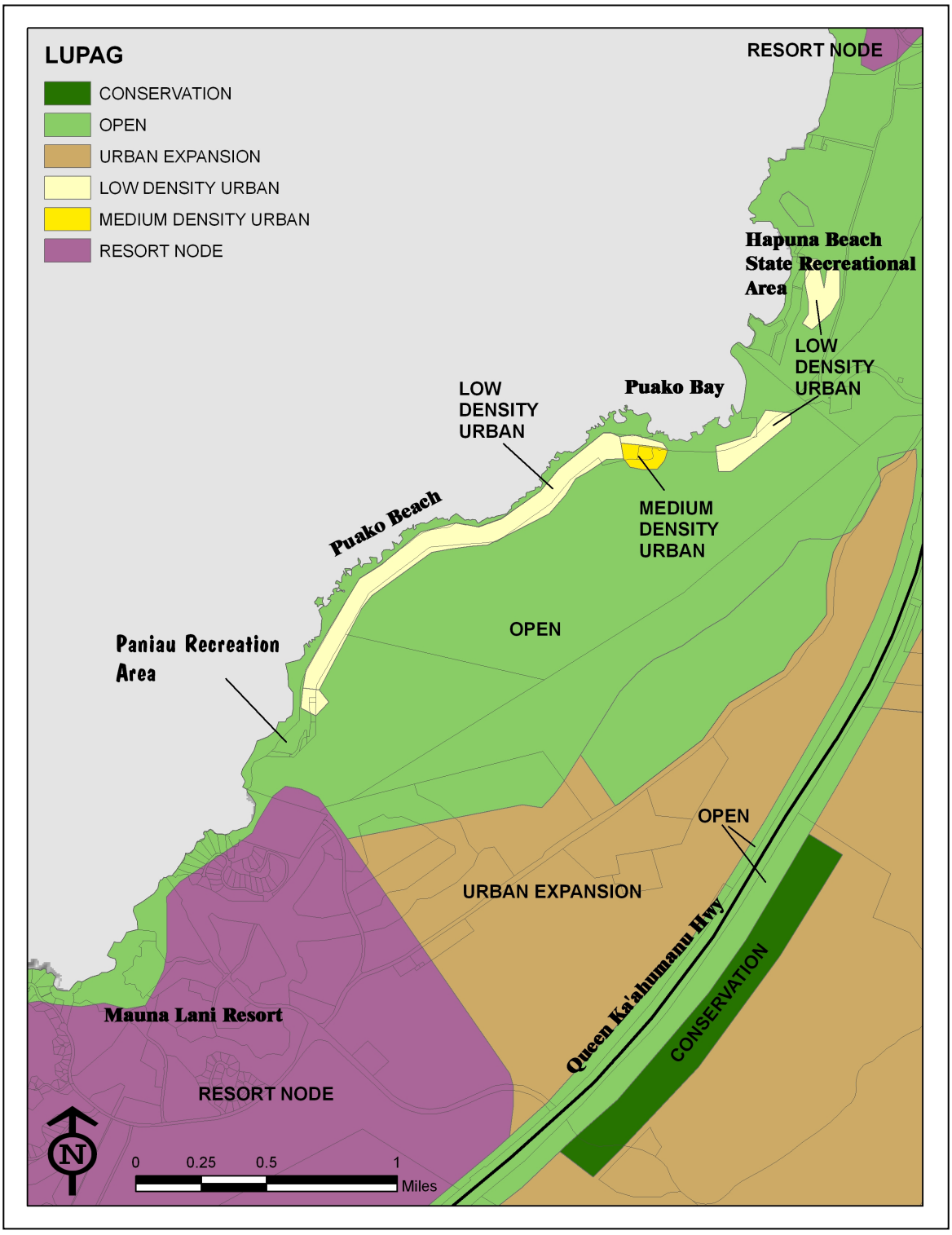
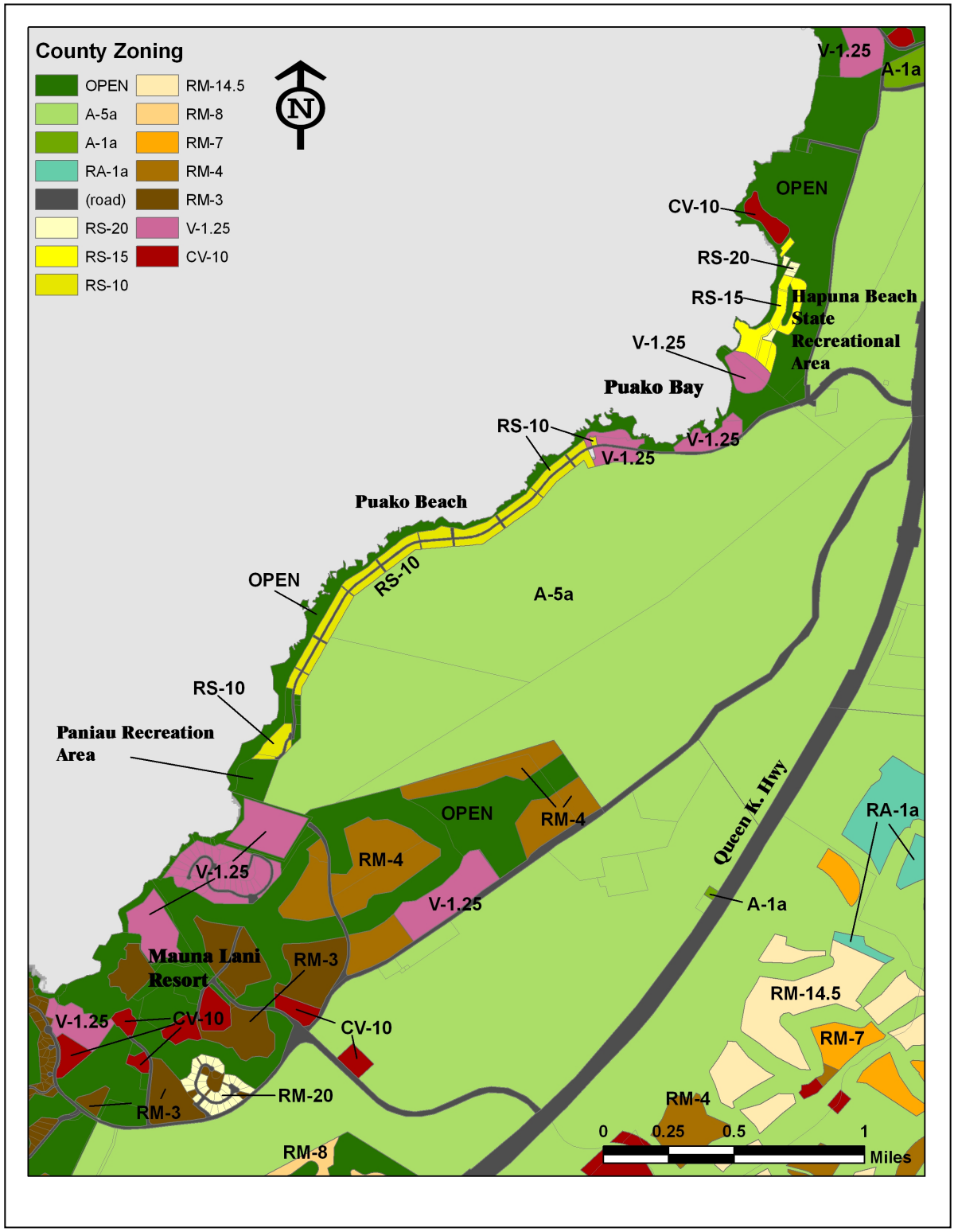


FIGURE 7.2: COUNTY ZONING FOR PUAKŌ



There are some areas in Puakō that are zoned resort (V-1.25). However, it is important to note that some of these resort zoned areas are designated as either low density or medium density by the General Plan LUPAG. Therefore, if these properties apply for SMA permits (these properties are also all in the SMA as well), the properties cannot be developed to the zoned density because it would be inconsistent with the General Plan LUPAG map.

7.2 PUAKŌ TOMORROW: PUAKŌ CONCEPTUAL PLAN & POLICIES

Suggested overall Goals for the Puakō Community are:

Puakō Policy 1. **MANAGE THE EFFECTS OF GROWTH AND DEVELOPMENT**
The County Government shall work closely with the Puakō Community to manage the effects of growth and development in a responsible manner.

Puakō Policy 2. **MITIGATE THE RISKS OF NATURAL DISASTERS**
The County Government and the Puakō Community shall work with other State and Federal agencies to reduce the risk to life and property from natural disasters.

Puakō Policy 3. **ENVIRONMENTAL STEWARDSHIP**
The County Government and the Puakō Community shall work with other State and Federal agencies to protect and manage the rich coastal and near shore marine environment.

Puakō Policy 4. **INCREASE TRAFFIC SAFETY**
The County Government shall work closely with the Puakō Community to improve traffic safety.

Important related land use strategies for the Puakō Community are summarized on the following pages:

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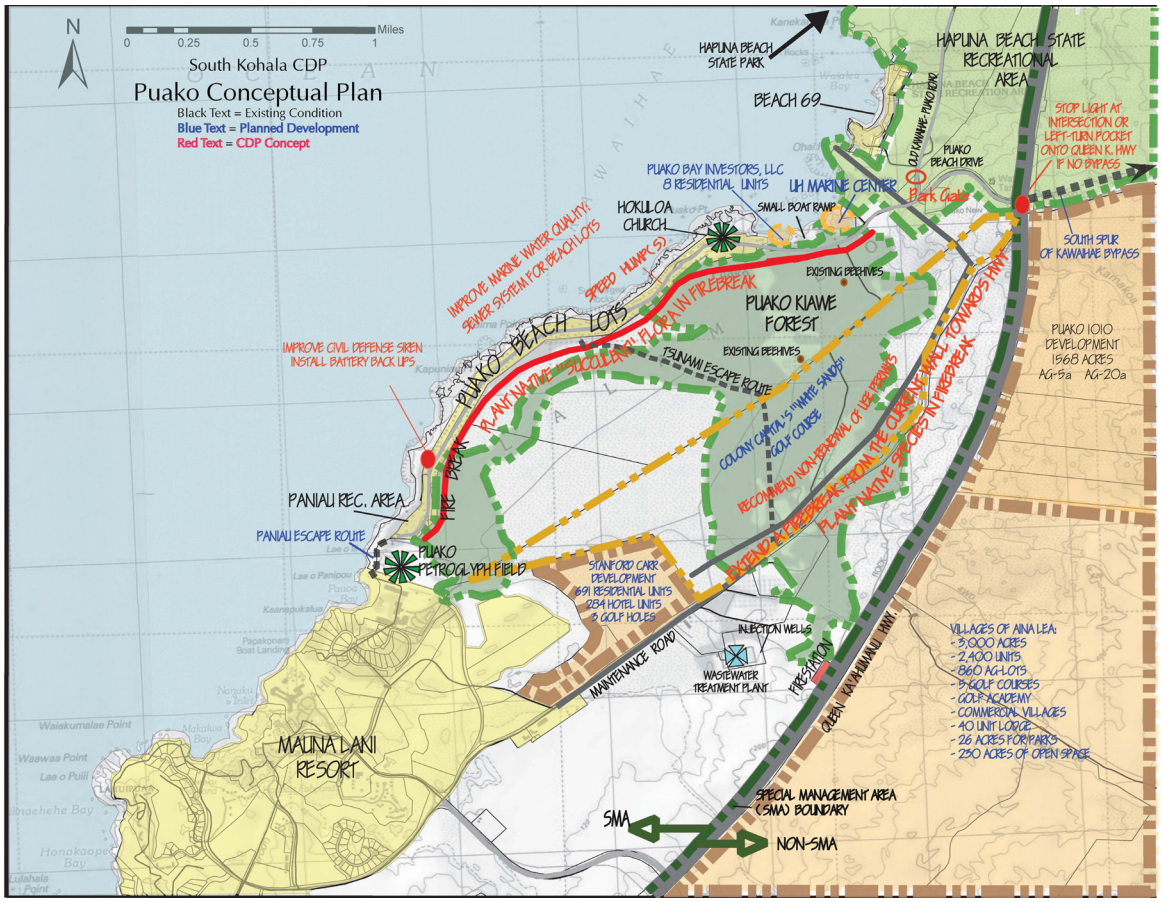
FIGURE 7.3 PUAKŌ CONCEPTUAL PLAN



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POLICY 1. . MANAGE THE EFFECTS OF GROWTH AND DEVELOPMENT

Strategy 1.1 Preserve the historical integrity of Puakō -- Historically, Puakō was a small fishing village. The petroglyph field is a unique resource of the pre-contact period. The Hokuloa Church, built in 1858, is still used today for weekly services and community meetings. The Puakō Sugar Plantation was established in 1895. The area was also used for cattle grazing and pig farming. For over 100 years the Puakō forest has been an important apiary and has supported a substantial honey business. These elements of Puakō's past should be preserved.

Strategy 1.2 Mitigate the impacts of development within the Puakō Community – The low density, single family home character of Puakō makes this area a very desirable and pleasant place to live. Some privately owned land at the north end of Puakō Beach Drive is zoned for urban development. However, the overwhelming majority of residents in Puakō oppose any development in this area that is not in keeping with the existing character of the community. Multi-family, resort related, and multi-story structures should be prohibited.

Strategy 1.3 Mitigate the impacts of development in the surrounding area -- Full build-out of permitted housing projects in the Waikoloa and Mauna Lani area adjacent to Puakō would result in over 4,000 additional single family homes and condominiums. In addition, one option under consideration for the proposed Kawaihae bypass road would result in significantly increased use of Puakō Beach Drive by non-residents. The Superferry will also impact Puakō and Waialea Bay directly because of its proximity to the Kawaihae Harbor. Taken together, anticipated growth in the area has the potential to severely impact the integrity and character of the Puakō community. To mitigate these impacts, the following actions are proposed:

- The State Division of Land Management and/or the Division of State Parks should actively manage public use of the Paniau "park" area at the south end of Puakō Beach Drive by controlling illegal activities (e.g. camping, open fires, alcohol consumption, human waste, etc.), constructing necessary infrastructure and enlisting enforcement support from the Division of Conservation and Resource Enforcement (DOCARE) and County Police.

- Similar problems exist at the Hapuna Beach Recreation area. The County should transfer control of the Old Puakō Beach Road to the Division of State Parks. State Parks will then be able to secure the perimeters of the Hapuna Beach Recreation area at night by gating the entry points at both ends.

- The State DLNR's Division of Boating and Ocean Recreation should actively manage increasing public use of the Puakō boat ramp and expand facilities as necessary.

- The County of Hawai'i should actively manage the designated pedestrian and vehicle access corridors within the community to ensure that they remain accessible, clear of vegetation, and be kept in sanitary condition.

- Regulations to control vehicle speeding on Puakō Beach Drive should be aggressively enforced. Additional action should be taken to reduce the frequency of burglaries in the Puakō community.

- The County should aggressively assert its jurisdiction over Puakō Beach Drive to prevent encroachment of vegetation, parking within the right-of-way and deterioration of the bike lane.

Strategy 1.4 Mitigate the impacts of surrounding land uses on historical and cultural resources -- There have been several instances in the community where uses next to a historical or cultural resource have impinged upon the use and enjoyment of the resource. For instance, there are parcels that are zoned 'Resort' that neighbor the Hokuloa Church. Uses of the resort zoned properties have sometimes interfered and conflicted with the use of the church. Interferences such as these have diminished the enjoyment of historical and cultural sites. Adjacent property users should be encouraged to be "good neighbors."

POLICY 2. MITIGATE THE RISK OF NATURAL DISASTERS

Strategy 2.1 Support the construction of the Paniau Evacuation Route -- Puakō has one paved access road, Puakō Beach Drive, which provides access into and out of the community from the north. Having only one access way to the north is potentially hazardous, especially since brushfires may come from the northeast and move in a southwest direction with trade winds, cutting off the northern path of escape. There are current plans to construct a southern evacuation route at Paniau. The Puakō Community Association has nearly completed studies needed to file Conservation District Use and Special Management Area permits in order to commence construction of this route. Various governmental agencies, including State and County Civil Defense, County Council members, and the State Representative, have offered help.

The community considers the construction of the Paniau Evacuation Route as a top priority. The route should be completed before other evacuation routes are considered.

Strategy 2.2 Maintain existing fuel break behind mauka houselots -- During and immediately after the October 2007 fire, the County used bulldozers to clear and expand the fuel break from Paniau, north to the road leading to the Puakō boat ramp. Rainfall in December caused buffel grass to grow on much of the exposed fuel break areas. The Puakō Community Association contracted to hydroseed additional areas with exposed soil, to minimize wind-blown dust and deter reemergence of kiawe. Over the longer term, the community association plans to experiment with more succulent and fire resistant plant species. The Puakō Community Association plans to also work with the State and County to explore strategies that will mitigate the fire hazard resulting from the piles of kiawe debris left during the bulldozing work.

Installation of a water pipeline along the full length of the fuel break would facilitate fire response and provide irrigation water for planting. The water sources for the pipeline could be (1) recycled treated water from the Mauna Lani Waste Water Treatment Plant or a future smaller scale community waste water treatment facility, and (2) the County water system.

Strategy 2.3 Establish a fuel break between Queen Ka'ahumanu Highway and the northeastern section of Puakō Beach Drive -- The current fuel break is located in close proximity to and behind the mauka beach lots. The location of the current fuel break does little to prevent wildfires from burning the kiawe forest. Should a wildfire reach the forest, the fire may increase tremendously in intensity as kiawe wood has a high fuel load or quickly race across the tops of the trees in a crown fire. The location of the current fuel break will not prevent a strong fire from engulfing homes and the uniqueness of Puakō's forest would be destroyed with significant negative impacts to the offshore reef. Most fires start along roads and highways. With the strong trade winds from the northeast, the greatest fire vector and threat to Puakō may be a fire that starts along Queen Ka'ahumanu Highway or the northeast section of Puakō Road. Establishing a fuel break between Queen Ka'ahumanu Highway and the northeastern portion of Puakō Road will better protect homes, the kiawe forest, and reef.

Strategy 2.4 - Mitigate flooding from Kamakoa Gulch -- Much of the flooding that occurs in Puakō comes from Kamakoa Gulch. Flood mitigation measures such as clearing and maintaining of the ditch around Kamakoa Gulch need to be implemented either at the mouth of the gulch or further up mauka to control the flooding in Puakō.

Detention basins downstream of Kamakoa Gulch, which can be located within the existing flood plain, should be employed to capture and retain flood waters.

An early warning system for floods needs to be employed. The system would be triggered by large rain events mauka (specifically in places such as Waikoloa Village or the new developments in the surrounding area of the Village). There are three gulches that empty into the Puakō flood plain and they all need to be monitored in mauka areas so that the Puakō community can be warned of an imminent flood. The flood warning system could be integrated with the sirens that already exist.

Strategy 2.5 Encourage more community participation in hazard mitigation activities and emergency response training -- Picking up litter that may contribute to ignition of a wildfire is a good example of an activity that communities can participate in to mitigate a hazard. Wildfires may be caused by littering and illegal dumping of rubbish in public areas, especially if the rubbish includes glass fragments. In the hot sun, glass may cause grass to catch fire. Regular monitoring and cleanup of rubbish may help to reduce the chance of wildfire, especially along Queen Ka'ahumanu Highway.

The Community Emergency Response Team (CERT) Program educates people about disaster preparedness for hazards that may impact their area and trains them in basic disaster response skills, such as fire safety, light search and rescue, team organization, and disaster medical operations. Using the training learned in the classroom and during exercises, CERT members can assist others in their neighborhood or workplace following an event when professional responders are not immediately available to help. CERT members also are encouraged to support emergency response agencies by taking a more active role in emergency preparedness projects in their community. To date, only one CERT class has been held in Puakō and only three residents took part in that training. The Puakō Community Association plans to approach the County to schedule additional training in the community.

Strategy 2.6 Upgrade existing emergency warning signals to have back up electrical power in the event that a power outage occurs -- There is a concern that these sirens will not function if power lines are downed. An early warning system for natural disasters would give residents more time to prepare for oncoming natural disasters and may save lives. However, there may also be a lack of widespread knowledge in the community of what the appropriate response is when the sirens are activated. Thus an awareness and education program needs to be implemented in conjunction with construction of more emergency warning signals.

POLICY 3. ENVIRONMENTAL STEWARDSHIP

Strategy 3.1 Work with Mauna Lani Resort, County Department of Environmental Management, and other State and Federal agencies on possible construction of a sewer system for the Puakō community -- A sewer system would reduce the amount of untreated effluent entering the ocean from Puakō. However, this idea has been proposed in the past, but has never been implemented because the project would be very costly. Coordination among various government agencies at different levels to provide funding should be possible because the coastal waters are a natural resource not just for the immediate community, but for the larger region as well.

The Mauna Lani Waste Water Treatment Plant could accommodate and treat waste water from a Puakō waste water system. However, hook-up to the Mauna Lani Treatment Plant may be quite costly as waste water would most likely have to be pumped to the Mauna Lani Plant due to the topography of the area.

Alternative waste water treatment systems that would be more appropriate for smaller communities such as Puakō should also be considered. For instance, *Effluent Sewers* (also known as Septic Tank Effluent Pump (STEP) systems) are starting to be recognized as effective and economical waste water systems for small to mid-sized communities in environmentally sensitive areas and have been used by many coastal communities on the West Coast. Effluent Sewers have been known to be cheaper than traditional gravity sewers.

The community has voiced a strong desire that treated waste water be used for irrigation of fuel breaks or the kiawe forest, regardless of the sewer technology that will be eventually chosen. Using treated waste water for irrigation should be a requirement to be included in future waste water system feasibility studies.

Strategy 3.2 Encourage the development of the University of Hawai'i Kalākaua Marine Center on the parcel of land near the Puakō Boat Ramp -- Although the specific research activities at the proposed Marine Research Center are still to be determined, the center could play an important role in helping to improve the marine water quality of the nearby area. One possible role that the marine center could fulfill is conducting regular marine water quality monitoring. Should future water quality monitoring show that the coastal waters are put at severe risk by nearby coastal developments, it would be more likely that public monies would be allocated to remedy the pollution from coastal developments. In any case, consistent monitoring and data collection should be maintained for the near shore waters.

Strategy 3.3: Consider a wide range of management options for the Puakō forest -- The kiawe forest here is a "one of a kind" natural resource unique to Puakō. Kiawe trees in this forest are 60 feet high, while average kiawe trees only reach heights of 15 feet. It has been suggested that the kiawe forest could be utilized as a multi-use park for recreation, food production, and the restoration of native plant species. Designing a system of trails and access ways into the forest would allow people to safely hike through the forest. The forest is also a source of food production, as a small local company produces organic honey. The honey is of gourmet quality and is world renowned. The dense canopy of the 60 foot kiawe trees would shade native plant species and allow them to grow.

Several management options to preserve the forest from future development include: putting the forest into the State Hapuna Beach Recreational area or some other type of conservation easement, purchase by a conservation buyer, change in management within DLNR, or the formation of a non-profit management group to manage the forest.

Proper management of the forest also includes thinning the forest to reduce the fuel load. If done in a prudent, well-planned manner, thinning the forest may not only reduce the fuel load, it can also be economically profitable. Kiawe wood can be sold as firewood or other related products such as kiawe flour, honey, and artisan wood could be provided. Money earned from the sale of kiawe wood could go back into the management of the forest.

However, before any of the above benefits can be realized, the forest must first be protected from development. A portion of the forest is under possible threat of development. Colony Capital has plans to develop a portion of the forest (TMK: 6-8-001-022) into a golf course. The parcel is approximately 500 acres. There are two County issued permits associated with this project, an SMA permit and a use permit. Currently Plans for the golf course have stalled as no action has taken place since 2001 to develop the golf course. In 2005, Colony Capital requested and received an extension of time until May of 2011 for their permits.

The Planning Department should recommend **non-renewal** of the two permits associated with this project if a time extension is applied for in 2011.

Strategy 3.4 Community and County should collaborate with various State and Federal agencies and various non-profit organizations to share information and provide community resources to manage and protect Puakō's ocean resources -- There are various areas for community and government collaboration to take place in order to manage and protect Puakō's coastal waters. Several opportunities for collaboration include helping with enforcement of current laws and regulations, consistent monitoring coastal resources, and data collection. Currently, State DLNR's Division of Conservation and Resources Enforcement (DOCARE) does not have the resources to hire more officers to regularly monitor the coastline for illegal use of marine resources. A "community watch" type program may help DOCARE officers to prevent poaching along the coast.

Another potential opportunity for community collaboration is with Mālāma Kai Foundation (MKF). MKF is a non-profit organization dedicated to ocean stewardship for current and future generations through community service and public education. The organization raises funds to sponsor projects that help conserve Hawai'i's coastal and marine resources, and educate people about these resources. Currently MKF has helped to install seven day-use mooring buoys along the coast within the vicinity of Puakō. Eventually, more than seven day-use mooring buoys will be needed to accommodate future larger populations of recreational boaters. The Nature Conservancy and Sea Grant currently have been working with the community to monitor public activities on the reef to create a marine project-related website and to conduct shallow and deep water reef transects to document the condition of many reef species. Collaborative efforts such as these should be continued and promoted.

Strategy 3.5 Future development and uses need to take into consideration water quality and promote proper watershed management -- Many of Puakō's issues are centered on water quality. The needs of both the forest and the reef indicate that all efforts in Puakō should be viewed as watershed management issues. Proposed future developments should be evaluated against the criteria of how a development affects water flow and water quality in the watershed. Developments that are more mauka in the watershed, that are outside of the immediate vicinity of Puakō should also be evaluated as well. Developments that adversely affect ground water quality or ocean water quality should not be approved.

POLICY 4. IMPROVE TRAFFIC SAFETY

Strategy 4.1 Consider and decide upon effective and appropriate strategies to improve traffic safety within the community - The Puakō Community Association agrees on the need for speed reduction strategies to increase traffic safety within the community. Possible speed reduction strategies include: speed humps, increased police speed traps, and portable radar speed indicators. However, the community has not reached a consensus on which strategies to implement. Future discussions within the community need to take place in order for the community to reach consensus on which speed reduction strategies should be implemented.

Strategy 4.2: Improve traffic safety for vehicles merging onto Queen Ka'ahumanu Highway from Puakō Beach Drive -- Installing a stoplight at the intersection of Queen Ka'ahumanu and Puakō Beach Drive would help to improve traffic safety of motorists entering and exiting Puakō as vehicles traveling along Queen Ka'ahumanu Highway often travel at 50 mph or more. A stoplight would be necessary if the Kawaihae Road Bypass is located at the Puakō junction. The Puakō community would accept the bypass intersection at the Puakō junction. Furthermore, as a design option, a grade separated (flyover) intersection should be considered if this alignment occurs.

If there is no stoplight, a refuge lane is needed. The State DOT should construct a refuge lane for left turns out of Puakō onto Queen Ka'ahumanu Highway. The refuge lane out of Puakō onto Queen Ka'ahumanu Highway would improve the safety of motorists merging onto the highway traveling north.

7.3 ACTION PROGRAMS FOR PUAKŌ

Action Program details have been developed for the following Conceptual Plan elements:

- Strategy for preserving the Puakō forest
- Strategies for mitigating impacts of natural disasters
- Strategy for improving marine water quality

7.3.1 ACTION PROGRAM – MITIGATE IMPACTS OF NATURAL DISASTERS

The Need for Action

The Puakō community is very vulnerable to natural disasters. Located along the coastline, Puakō is threatened by coastal flooding caused by storm events and by the potential of tsunami. In 1946, a tsunami struck the South Kohala coastline. Fortunately during 1946, development along the Puakō coast was minimal and few lives were threatened. However, with the current level of development in the Puakō community, a future tsunami would put many lives at risk.

Puakō's location on the dry arid leeward side of the island coupled with strong gusty winds blowing in a south westerly direction make it extremely susceptible to wildfires. The village itself is protected by a fire break but this must be maintained regularly, and over time is often neglected due to lack of resources. The brush fire of 2007 was a very close call for this quiet little community. The community's vulnerability to coastal flooding, tsunami, and wildfire coupled with limited evacuation routes put Puakō's residents at severe risk.

Strategy 1.1 Establish a fuel break between Queen Kaʻahumanu Highway and the northeastern section of Puakō Road.

Overview

Aerial view of Puakō taken a few days after the October 2007 wildfires

As mentioned previously, currently there is a fuel break located in close proximity to and behind the mauka beach lot homes along the kiawe forest. The location of the current fuel break does little to prevent wildfires from burning the forest. Strong winds blowing in a south westerly direction would spread a wildfire to the forest rapidly. Should a wildfire reach the forest, the fire may increase tremendously in intensity as kiawe wood has a high fuel load, or it may quickly race across the tops of trees in a crown fire. The location and size of the current fuel break may not prevent a strong fire from engulfing homes. Furthermore, the uniqueness of Puakō's kiawe forest would be destroyed and the reef would be severely impacted by ash deposition, increased runoff and sedimentation due to the loss of vegetative cover, and increased nutrient input since kiawe trees help to mediate nutrient inputs from groundwater. As development occurs upslope, the role of the forest in protecting water quality and the reef will become more vital. Establishing a fuel break between Queen Kaʻahumanu Highway and the northeastern portion of Puakō Road will better protect homes and also protect the kiawe forest.

The **Action Program** for establishing a fuel break is as follows:

- **Who should take the lead?** Puakō-based subcommittee of the South Kohala CDP Action Committee, and the Puakō Community Association, with assistance from the County

Planning Department, the County Civil Defense, County Department of Public Works, the State Department of Land and Natural Resources, and the Mauna Lani Resort.

- **What needs to be done?** A fuel break needs to be designed, established, and maintained. The Hawai'i Wildfire Management Organization in cooperation with the PCA and landowners is designing a fuel break. HWMO is working to secure funds from FEMA to establish the break. HWMO will ensure maintenance of the fuel break for three years while HWMO works with the community and landowners to identify the best long-term maintenance options, including conversion of fuels to vegetation that does not carry fire as easily as grasses and kiawe.

- **When should actions be initiated?** An application for funding the project has been submitted to FEMA and is being considered for funding. Inclusion of this action in the CDP will increase opportunities for funding from other sources if necessary.

- **How much will it cost?** Fuels management in this landscape is approximately $8,000 per acre based on previous experience in this area. The fuel break will be between 15 and 30 acres depending on the final width chosen and final funding allotment. Therefore, costs will be between $120,000 and $240,000.

- **Intended Outcome**: A fuel break that will mitigate fire would be located along Queen Ka'ahumanu Highway and along the northeastern portion of Puakō Road providing additional protection against wildfire for the Puakō kiawe forest, reef, and homes of Puakō residents.

Strategy 1.2 Upgrade existing emergency warning sirens to have a battery electrical power backup in case of power outages.

Overview

Presently, there are two tsunami warning sirens in Puakō. There is a concern that these sirens will not function if power lines are down. An early warning system for natural disasters would give residents more time to prepare for oncoming natural disasters and may save lives.

The County Civil Defense also needs to help design and provide informational material educating residents of what to do after the emergency signals are activated.

- **Who should take the lead?** Puakō-based subcommittee of the South Kohala CDP Action Committee, with assistance from the County Planning Department, the County Department of Public Works, County Civil Defense, and State Civil Defense.

- **What needs to be done?** The costs to upgrade tsunami warning sirens are covered by State Civil Defense, so a funding request to State Civil Defense will need to be made. Community leaders and County Civil Defense also need to design an educational and awareness program to inform Puakō residents of what to do when emergency warning signals are activated.

- **When should actions be initiated?** Actions can be initiated upon adoption of the CDP.

- **How much will it cost?** An emergency warning siren costs around $80,000 to install. Costs to upgrade existing warning sirens with a battery back up should be less than the cost of installation of a new signal. The costs of emergency warning sirens are normally covered by State Civil Defense. Designing an educational and awareness program to inform residents of what to do in case the signals are activated would entail administrative staffing

costs and also printing costs or advertising costs depending on what type of program community members and Civil Defense devise. However, overall costs should be minimal.

- **Intended Outcome:** An improved early alert system that will save lives

Strategy 1.3 Construct the Paniau Evacuation Route

The Need for Action

As stated previously, Puakō has only one *paved* evacuation route in case of emergency. Residents agree that another evacuation route is urgently needed. Construction of an escape route in the Paniau area would allow residents to evacuate in a southern direction to Mauna Lani Resort. Currently, the only paved evacuation route is at the north end of the community. If that route becomes blocked, then area residents will be left without a paved escape route. This potential situation could prove disastrous.

Proposed location for the Paniau Evacuation Route

The **Action Program** for the construction of a Paniau escape route is as follows:

- **Who should take the lead?** Puakō Community Association, with assistance from the County Planning Department.

- **What needs to be done?** A Conservation District Use Permit (CDUP) needs to be completed and approved by the State Department of Land and Natural Resources. In addition to the CDUP, a Special Management Area (SMA) permit is also required by the County Planning Department. After obtaining these approvals, further design and construction of the escape route can proceed.

- **When should actions be initiated?** The Puakō Community Association is currently in the process of obtaining the necessary permits and approvals.

- **How much will it cost?** The Puakō Community Association has estimated costs of the escape route to be $70,000.

Intended Outcome: A second escape route that will increase the safety and welfare of coastal residents in the area.

7.3.2 ACTION PROGRAM – IMPROVING MARINE WATER QUALITY

The Need for Action

The marine waters off of Puakō along with the coral reefs and white sand beaches are not just natural resources enjoyed by Puakō residents; these are natural resources that are enjoyed by the entire district of South Kohala and the County. The coral reefs off the coast by Puakō still teem with diverse marine life. The nearby white sand beaches are arguably the best white sand beaches on the entire island and are a popular recreation spot for both locals and visitors. It is crucial that these unique resources be preserved and protected for future generations.

The marine resources of the South Kohala coastline are under threat from a variety of sources. Marine vessels sometimes anchor illegally on the coral reefs. The anchors drag along the reefs, damaging the reef structure. While rules, regulations, and more environmentally friendly mooring options are in place, enforcement and monitoring are the key actions needed for reducing the damage to the reefs from illegal anchoring.

However, marine waters and reefs are also under threat from sewerage discharges from development along the coast. The Puakō Beach lots have no sewer system; each lot has an individual wastewater system or cesspool system. Wastewater seeps into the marine waters from these cesspools.

The amount of untreated wastewater entering the ocean needs to be reduced. The County General Plan specifically calls for the construction of a sewage treatment system for the Puakō Beach Lots and that the sewerage system should utilize the existing resort waste water treatment plant. Action to protect the marine resources off of Puakō's coast needs to occur sooner rather than later. Delaying action may result in severe damage to the marine environment that may not be able to be undone.

Strategy 2.1: Construct a wastewater treatment system for the Puakō Beach Lots

Overview

In Puakō, the groundwater table is near the surface. With the beach lots on individual wastewater systems and cesspools, the environmental degradation from wastewater will continue until a permanent solution to treat and dispose of the wastewater is found. However, the financing of such a large project is a major barrier to implementation. Quite simply, constructing a sewer system, even for a small community such as Puakō, will be expensive. The major question that needs to be asked is how much residents are willing to pay to protect the marine resources off of Puakō?

The **Action Program** for the financing and construction of a sewer system for the Puakō Beach lots is as follows:

- **Who should take the lead?** Puakō-based subcommittee of the CDP Action Committee, with assistance from the County Planning Department, the County Department of Environmental Management, and the County Finance Department.

- **What needs to be done?** Gauge community interest in setting up an Improvement District to finance costs of constructing a sewer system. The next step would be to do a preliminary engineering study to explore alternative sewer systems for Puakō**.** The study would cover preliminary costs and alternative financing strategies. The alternatives could include connection with the existing waste water treatment plant that services the Mauna Lani Resort or a small stand alone system for Puakō. The preliminary study should include analysis of the feasibility of treating waste water to R1 quality, i.e., nearly drinking water

quality. The study should also consider the feasibility of using treated waste water for irrigation of fuel breaks or the kiawe forest.

- **When should actions be initiated?** The Puakō subcommittee should conduct a community survey to gauge interest in installing a sewer system.

- **How much will it cost?** Unknown at this time. Depending on the specifications for Waste Water treatment and disposal and on environmental land use factors, a small waste water treatment plant and disposal system might cost $5 to $10 million. These costs do not include operation and maintenance cost.

- **Intended Outcome:** Reduction in pollution entering waters off of Puakō and subsequent improvement in marine water quality